Design of One Kind of Transactional Platform System for Electronic Banking

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ABSTRACT

This paper analyzed the characteristics of electronic banking in financial industry, and addressed the thoughts and architect for designing one kind of electronic banking service platform in financial industry. It also focused on the split of the transaction and the measures to guarantee the integrity, consistency and safety in the electronic banking transactional platform.

Key Words: Service Channel, Electronic Banking, Transactional Platform.

I. INTRODUCTION

As the wide utilization of information technique in the financial industry in china, more and more domestic banks pay much attention to the development of customer-oriented business productions and service channels. One important remark is to provide wide ranges of self-service-system based on customer-oriented principle, for example, telephone banking, internet banking, self-service banking and so on. The service system with great efficiency and convenience is becoming more and more essential to finance industry. One of the outstanding contradictions is between rapid generation of service channels (such as ITV, PDA, mobile phone, wearable computer, WAP, internet, etc.) and repeat development of separated processing system, which always produced repeat investment. Our specific requirement cannot be satisfied completely by using many commercial software products available in market, such as BroadVision, E-teller, etc., therefore we developed a 3-tiers platform to meet the requirement. This paper discusses the thought of design, technical scheme, architect of system and characteristics for one kind of electronic banking platform. The main benefit of platform is to avoid repeat investment on development of similar system and increase the integration of electronic data processing system.

II. DESIGN THOUGHTS

The principle of system design is to be flexibility-oriented towards diverse channels; to be robust and reliability-oriented towards back-end account processing systems; to consolidate the development, management, processing flow, and customer information of each channel for electronic banking; to be 7X24 available, to have great expansibility for future utilization, to avoid extra investment for repeat development of interface between front-end processor and back-end hosts.

First, we analyzed the business flow and data flow of new electronic banking channels such as internet banking, telephone banking, call center, self-service banking, mobile banking, firm banking, and e-commerce (including B2B and B2C model), then collected and synthesized the similar characteristics of these channels. We found that all these channels need verification of both users and font-end equipment, collection of customer information, process of transaction, authorization of business, and communication with back-end hosts, clearing of funds. By using requirement-driven methodology, we also determined what services the platform should offer (for example, login on, account inquiry, fund transfer, payment for wages and taxes, securities agent service, finance service, information service).

The platform also concentrated on the security guarantee, integrity and consistency of transaction, and designed perfect mechanism for transaction reversal. What is more important is its mechanism for splitting and reversing cross variant back-end hosts with different communication protocols and different operating system.

As an independent application system, platform provides electronic journal, system operation and transaction configuration, decomposition of transaction, customer information management, system log, system monitoring and auditing, fund clearing, statistics, etc. It is also responsible for the control of communication with front-end and back-end systems, invoking of host applications, and initialization of platform services. The demonstrative architect of platform is given by diagram 2.
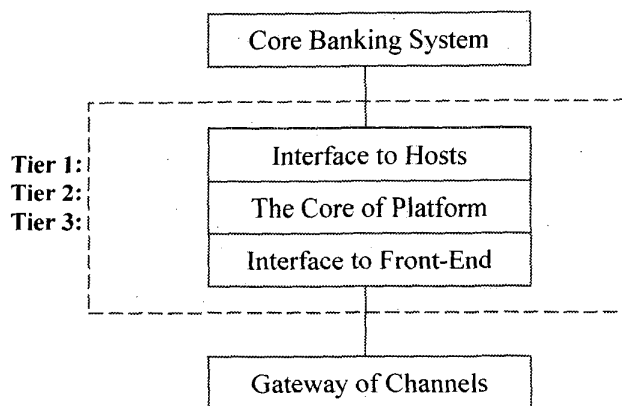
Diagram 1: Illustration of Platform

III.   THE MAIN ARCHITECT OF PLATFORM

The specified tasks of this platform include the input of request, return of business response, preparation of data and preprocessing for back-end hosts, etc. Its architect is showed by below diagram. We can see from diagram that platform has 3-tiers architect. The description of each tier is as follows:

1) **Tier 1**: the interface module to back-end host application system

This layer completes the communication, transaction commitment and file transfer between platform and back-end hosts. It also offers the interface connecting to Customer Relationship Management system.

2) **Tier 2**: the core of the platform, its purpose is to process transaction

This layer receives the request of transaction submitted by sub-layer 3 and prepares environmental parameters before loading responding services. By using sub-services and basic sub-services these services carry out the writing of electronic journal, preparation for judgment and calculation of accounting information, etc. Different channels share most of services. As the kinds of service channel grow rapidly, if the function of current services can't meet the requirement, additional services can be developed easily by using sub-services or basic sub-services. Therefore, the kernel of platform remains unchanged.

This tier contains a set of services, which takes responsibility for synthesis of transaction request by using standard transactional services of platform. The completeness of transactions and consistency of data are also guaranteed by this layer.

There are three kinds of services for platform, which can be described as follows:

(1)Basic sub-service:

It affords basic function service as follows:

➤ Database access service: the enquiry, modification, insertion and deletion of the database in the platform.

➤ Operating system service: clock, file access and management of logs.

➤ Host interface service: it provides basic interface transaction service of different host, such as balance enquiry, specification enquiry, deposit, withdrawal, the reversal of deposit and withdrawal.

➤ Communication service: it offers the interface service communicating with securities dealer, tax bureau etc.

(2)Sub-service

➤ Common sub-service built by basic sub-services.

Sub services are used to generate pipe number of transaction, auditing number, unified inquiry, transfer and payment of accounts, etc.

➤ The sub-service application such as the control of transaction and examination of validity. +-

(3)Transactional service

➤ It affords unified electronic banking and intermediate transaction services built by basic sub-service, such as balance enquiry, transfer, payment, security transaction, foreign exchange.

➤ The transaction service is carved up by the all-in-one transaction function.

The core of platform provides a set of services, which are categorized, abstracted and summarized from business requirement. Service is a module or component to execute basic function such as account inquiry, fund transfer, and can be scheduled by intelligent transaction agent of Tuxedo. A group of different services can satisfy business requirement. At the same time, if some business requirement cannot be explained by current services, we can add some new services to process them. The whole platform is a service set with three layers. So we can say these services, sub-services and basic sub-services are "toy bricks". The platform provides the method of "building up toy bricks". Services can be constructed by sub-services or basic sub-services; applications can be easily built up by services. Developing new application is as easy as "building up toy bricks".

3) **Tier 3**: the interface module for front-end processor

It completes the communication, transactional authorization, message transformation and file transfer between gateway of service channel and Tier 2.

The gateway of service channel consists of diverse front-end processors. Those processors implement the interface to service channel. When new service channel needs to be added, for example mobile banking, the only thing to do is to prepare a processor and write some new processing routines and link them to tier 3. This tier also takes responsibility of corresponding security guarantee, such as certification authorization, data encryption and decryption, etc.
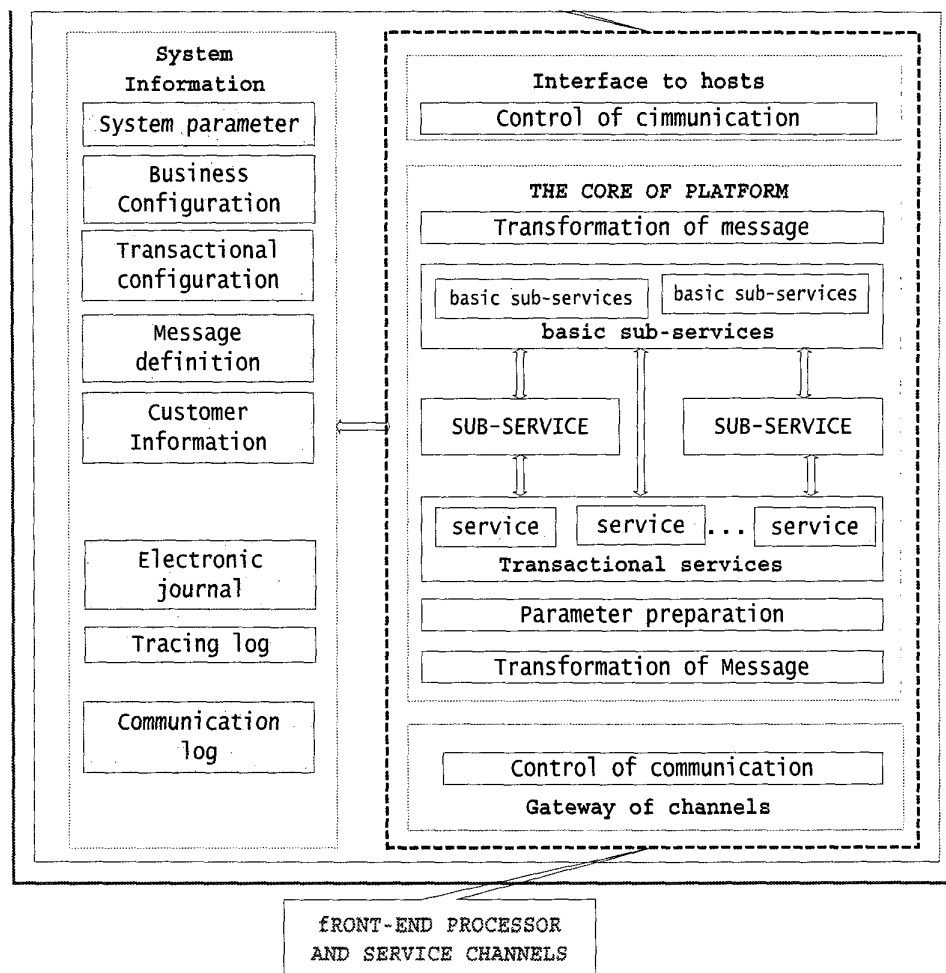
System Information

System parameter

Business Configuration

Transactional configuration

Message definition

Customer Information

Electronic journal

Tracing log

Communication log

Interface to hosts
Control of cimmunication

THE CORE OF PLATFORM
Transformation of message

basic sub-services | basic sub-services
basic sub-services

SUB-SERVICE | SUB-SERVICE

service | service |...| service
Transactional services

Parameter preparation

Transformation of Message

Control of communication
Gateway of channels

fRONT-END PROCESSOR AND SERVICE CHANNELS

Diagram 2: the Illustrative architect of platform

IV THE INTEGRITY, CONSISTENCY AND SECURITY OF PLATFORM

1. The method to split transaction

The system adopts the method of splitting for transfer transaction to achieve the transaction across different back-end hosts. That is to say, one transfer transaction is split into two simple transactions: withdrawal transaction and deposit transaction. We have also designed reversal transactions to deal with different possible failures including overtime failure and communication failure. The platform will automatically launch reversal transaction for overtime transaction as showed in diagram 3.

2. The measures to guarantee the integrity of transaction

➢ The guarantee of the integrity and consistency of transaction is very crucial to the banking transactional system. Because the electronic banking systems are usually distributed in large scale, the precondition of designing the integrity of transaction is assumed to be the unreliable communication links and failure of host processing. To prove the integrity, platform achieved many traditional methods such as automatic reversal, overtime reversal, timed retransmission, manual reversal and coupling of transaction auditing number, etc.

3. The measure to guarantee the security of transaction

The security control of system included three aspects: intrusion security defense, interior system security defense and system operation security measure.

V. THE IMPLEMENTATION OF PLATFORM

The development tools for platform are the language C, Informix database system and the Tuxedo middleware system. We also utilize modularized, structured and packaged methodology to decrease the workload, assure the quality of software and increase efficiency of development. The whole platform had been built up rapidly. For the programmers who don't get used to the Tuxedo, the platform encapsulates and binds the application functions of Tuxedo, the SQL statement of Informix, read and write instructions of files and tables, the utilization and manipulation of Unix resources into some new uniform functions. These functions are easy to use and learn, and completely independent in original instructions. So it is easy to write and debug the application program. Even the programmers who are not familiar with Tuxedo can use the Tuxedo quickly. Tuxedo

has excellent capability of communication management, transaction concurrence control, and service scheduling. It ensures the stability and throughput of platform and enables the platform to satisfy the large-scale, real time transaction application. The multidomain ability of the Tuxedo enables the physical extension of system application, even if the application scale expands considerably in the future.

VI   SUMMARY & CONCLUSION

By now the platform has established connection with saving system, credit card system, accounting system, and securities system, and has provided many service channels including self-service banking, mobile banking and internet banking. All of them have been put into production and have indicated great feasibility, reliability, advantage, performance and convenience of platform.

REFERENCES

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Diagram 3: Illustration of transaction flow