

AN E-COMMERCE APPLICATION IN CHINA

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Abstract: This paper proposes a new stock-jobbing system named Stock-Master system which based on the SMS(Short Message System) of PSTN. For the real-time Stock Exchange, this system expands the system and the protocol of PSTN(Public Switched Telephone Network) SMS. It adds the trade module of CTSI(Chinese Terminal Service Interface) server, operation trade gateway and professional CP(Content Provider) system. This system adopts the terminal ID (Identification) identification, encrypted 3DES, and the exclusive connection serial number. All these techniques are used to ensure the security of the stock exchange. This paper describes the frame, the physical topology structure, the function and the security design of this system, and analyses its advantages and disadvantages in detailed.

1 INTRODUCTION

In recent years, many stockjobbers in China have offered many stock-jobbing tools to promote stock exchange convenience and elevate the operation efficiency. Those tools are mostly developed based on communication system for takeover bid using telephone, network and PDA to assist the customer in improving on takeover bid for easier and more convenience operation.

Telephonic takeover bid system is a real time system with facility approved by most of stock investors. However, investors have to stay in a long time waiting to get a long-winded prompting message to access. Such a system is a lower efficiency.

The network takeover bid system and PDA takeover bid system are not easily and widely accepted by investors due to their costs, network bandwidth and availability, investor's location and capability in despite of its display text.

Aiming at such circumstance of stock market, since 2001, a new Stock-jobbing System based on SMS of PSTN had been widely applied in China. Terminals of the stock exchange system are not only a telephone, but can also be treated as stock-jobbing text display terminals for customers. All

stock-jobbing menu and instant information can be displayed on terminal screen. Alternatively, the terminals can also provide the investors or customers to receive and send short stock message and takeover bid message. The investors can subscribe the message to master stock market trends. The Stock-Master system also could push the message subscribed by investor to his (her) Stock-Master terminal from Internet or other media.

The new service offers a feasible concept to adopt SMS in PSTN to create a new way and easier method to assist stock-jobbing for many stock investors and customers.

2 SYSTEM FRAME

Stock-Master's protocol is based on short message industry standard by the Ministry of Information Industry of China and Enterprise Standard of China Telecom, referring to the international SMS standard of ETSI (Europe Telecommunications Standard Institute). For the system development, the access program in the proposed Stock-Master system is expanded form these reference protocols

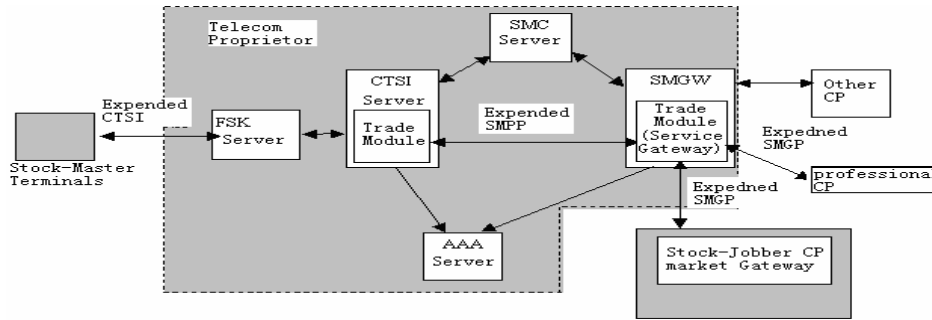


Figure 1: PSTN SMS system structure for case study.

and standards on real time demand of stock takeover bid.

The propose system can support the standards or protocols, such as CTSI (industry standard of Ministry of Information Industry), EC protocol of CTSI (Enterprise Standard of China Telecom), SMPP(short message point to point), SMGP(short message gateway protocol), RADIUS(Remote Authentication Dial In User Service) and some other national or industrial standards about PSTN in China.

PSTN SMS system is constitutive of ten modules as shown in Figure 1. They are FSK (Frequency Shift Keying) Server, CTSI server, AAA (Authentication, Authorization, and Accounting) server, SMC (short message center) server, SMGW (Short message gateway) server, terminal, database server, maintenance node and service development node. Physical configuration of the Stock-Master system is different from the PSTN SMS. It should add a business module of CTSI Server and a professional service gateway module that could be independent from or a member of the SMS gateway and professional CP subsystem. The CP subsystem is an EC service provider, such as stockjobber and bank.

In Figure 1, the interface and protocol of the Stock-Master system consist of two major contributions of the significance. An expanded SMPP between CTSI server and service gateway, and an expanded SMGP between service gateway and professional CP subsystem are added into the original system to improve the overall operation. Just because of these two improvements, the system is able to adopt the real-time trade system for stockjobbers, and to change the storage and transmitting functions of SMS. The two improvements is the most contribution for the real-time Stock Exchange, and it is also the soul of Stock-Master system.

To make the K curve showed in the terminal of Stock-Master real-time, the system expands the CTSI protocol, which increases a transmitting order for the operation data. The operation data are defined.

Table 1: The define of operation data filed.

Length (Byte)	1	1	1	1	Variable length
Content	A	B	C	D	E

Field A=Order code: B1

Field B=Length: the real data length

Field C=Sign: 0(invariable)

Field D=Parts number: 0xFE represents the transmission of operation data. This part does not exist actually, and the data processing depends on the special operation type.

Field E=The format of data parameter

Table 2: The format of data parameter data filed.

Length (Byte)	1	1	1	≤240
Content	A1	B1	C1	D1

Field A1=Operation type: represents different operations.

Field B1=Operation subtype: represents the different types of data in the operation

Field C1=Data length: the length of the operation data

Field D1=Operation data: formats of the operation data differs according to different operations.

The definition of the operation types (Field A1) of Stock-Master in the corresponding information downloading order:

Stock-Master operation type (Field A1) is defined as 0x01

Operation subtypes (Field B1) are:

Table 3: The filed define of Curve K paragraph data.

A2	B2	C2	D2	E2	F21 (5B)	F22 (5B)	F2n(5B)
G21(4B)	G22(4B)	G23(4B)	...	G2n(4B)			

0x01—stock name 0x02—stock code

0x03—stock title 0x04—K curve paragraph

0x06—dealing count

0x07—average curve、trend paragraph

0x08—real-time trend paragraph

Curve K paragraph data(Field D1=0x04): definition of the data format is as follows in table3

The significations of each field in table3 are:

Field A2=length: the total amount of bytes expects this one.

Field B2=the type of curve K (1B): binary value 1=5minutes, 2=15minutes, 3=30minutes, 4=day, 5=week, 6=month;

Field C2=start the date of curve K (3B): the first byte represents the year (0-99), the second byte represents the month (1-12), while the third represents the data (1-31). The decimal number 100 is the module of year. The three bytes are all binary code.)

Field D2=end the date of curve K (3B): the first byte represents the year (0-99), the second byte represents the month (1-12), while the third represents the data (1-31). The decimal number 100 is the module of year. The three bytes are all binary code.

Field E2=the dot number on the coordinate: it represents the dot number on the y-axis, and usually the neighborhood size is equal. So the dots on the coordinate are not too much. When the high four bytes is 0000, curve K represents the stock, while 1000 represents it is exponential.

Field F21~F2n =coordinate value: 5 bytes, denoted by ASCII. The radix point also takes up one byte. The decimal format is like that “xx .xx”or “xxx .x”, and the exponential format is like “x.xEx” and so on.

Field G21~G2n=curve K. curve K is denoted by 4 bytes. Each curve has fixed width (4 points), the highest bit of ha is b7. When b7 is 0, it represents the curve is a broken line; while 1 represents the real line.

The fields of the dealing count curve (Field Operation subtype is 0x04) are defined as:

Table 4: Fields define of dealing count.

L(1B)	B3	C3 (5B)	D3 (5B)
E31(1B)	E32(1B)	...	E3n(1B)

L: length of the dealing count data

Field B3=type of deal count (1B): binary, 0=the deal count on curve K, 1=the deal count on trend curve

Field C3=the highest point in the area of coordinates: symbolizes the highest value in the area of coordinates. It takes up 5 bits of ASCII. Usually the unit is 100 stocks, and it has no radix point.

Field D3= the lowest point in the area of coordinates: the representation is ibid.

Field E31~E3n=deal number: b7=0 represents broken line, b7=1 represents real line, the last 7 bytes represents the height h

In general, to compose a curve K paragraph, the orders should be transmitted to the terminal orderly via CTSI server. The terminal identifies the orders according to the protocols above, and draws the whole curve K in the screen.

For other curves: real-time stock quotations paragraph can be expanded similarly, so all kinds of stock curves can be displayed on the terminal. The following two paragraphs in figure2 are the curve K paragraph and the real-time trend paragraph.

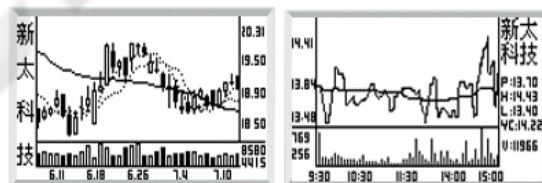


Figure 2: Curve K and Real-time Trend Paragraph.

3 SECURITY MEASURE

There are many kinds of encrypt arithmetic. Considering the terminal’s operational ability of CPU, this system uses the 8bits or the 16bits CPU, and adopts the 3DES for the encryption of data. During the tests, we find that it only takes 350 ms to encrypt the stock account and the password when using the 8 bits CPU.

3DES has a 112 -bit-long encrypt key which is

used to encrypt the 64-bit-long data. The arithmetic of 3DES has a high speed, and it overcomes the disadvantages of DES whose encrypt key is only 56 bits long.

The CTSI server will inquire the terminal ID numbers to decide whether it is Stock-Master terminal, or whether it contains the encryption function. If positive, the server generates a 16 bite unique serial number to establish the connection. The Stock-Master terminal ID which includes the information of stock-jobbers that such information is unique in the process. Each stockjobber has his own information which is different from the others. The Stock-Master terminal can keep the information from expose to the others at the same time.

4 SYSTEM ANALYSES

While the specialized CP system of the stockjobbers is connected, the CTSI server can directly perform better access than the preliminary one. For security concerns to the accounts, the cryptograms of the stock investors and the key data of operation are encrypted by the proposed Stock-Master system through ID recognition, encryption and others. This kind of system has better security quality. It solves the security problems, and accomplishes the requirement to meet the national standards.

The technique of graphic display is embedded into the proposed Stock-Master terminals for stock information inquiry through the real time curve line displayed. This system has more direct and convenient functions than the telephonic takeover bid system by applies the FSK modulation and expanding its protocol from the traditional fixed network telephone calls. The result enables to display the stock curve in real time.

The swift key operation promotes the stock-investors to catch up with time. The utilization of swift key is recognized as a main contribution of the proposed system by the stockjobbers after practical tests.

The proposed Stock-Master system is combined with the stock-jobbers and the information providers together in different kinds of business through the business gateway, telecom gateway, and operator service departments. The plat of the proposed Stock-Master system achieves function capability and conveys its business service to the information terminals.

The proposed Stock-Master terminal adds visible

display on the conventional telephone, which can refresh the stockjobbers and provide convenient operation. The proposed system offers an easier and convenient solution. The convenience of application is an important factor in promotion. The conventional telephonic takeover bid system can be transformed into the proposed Stock-Master system easily.

From the above analyses, the advantages of the proposed Stock-Master system can support potential improvement in stock exchange.

5 CONCLUSION

The proposed Stock-Master system provides a new stock-jobbing e-commerce system. It utilizes the feature that the stock investors are also the customers of telecom operators, and takes advantage of the stockjobber and the telecom operators. The proposed system has many advantages of easy operation, high security and real time performance. The proposed system takes the convenience of operation into account, and enables the stock investors to trade in and off at a lower cost. It is a simple aspect of stock-jobbing EC system, and suitable for promotion in stockjobbers as a tool in stock exchange using telecom.

From our preliminary tests and analyses, the proposed Stock-Master system is a feasible and rational design to improve the stock exchange by adopting advanced technology as to create convenient system in practice. The proposed system is potential for easy promotion into wide application in stock exchange e-commerce system.

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