Design and Analysis of Security System for Electronic Payment Software

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Abstract: Nowadays, electronic payment has become an important way to purchase. It is popular for the convenient operation without cash depositing and withdrawing. Security system for payment software is designed to ensure the safety of transactions. This work is mainly about the use of popular payment software and the design of relevant security system. Potential risks of transactions are also discussed to deal with security problems of electronic payment software.

1 INTRODUCTION

The development of computer and the Internet has made online sales the most popular way of trading. As traditional market trading gradually shrinks, online shopping has become a habit of many people and will also be the mainstream approach of commerce in the future. Thus, the design of online payment has become a hotspot issue of software development to meet the needs of online trading. Supporting security system is necessary for payment software to ensure the safety of transaction and property. The design of security system for electronic payment software is also analyzed in the work.

2 FREQUENTLY-USED ELECTRONIC PAYMENT SOFTWARE

The phrases "E-business" and "online trading" have been frequently used in people's daily life as online trading and online shopping are becoming a common way of business transaction. Then what is the most popular payment software in the age of online business? What do they mean by electronic payment software?

2.1 Introduction of frequently-used electronic payment software

Major shopping websites have adopted common payment software in online transaction. For instance, transactions with Taobao are processed through Alipay. Alipay here performs as the third-party payment platform where the money for transactions is temporally deposited. After the purchase of customers, the money of payments is kept by Alipay instead of customers and sellers, which is a buffer mechanism for the safety of transactions. Alipay is the earliest and typical electronic payment software with this mechanism (Guan Liancheng, Chen Suling, Zhou Yahui, 2008). Its design has been followed by other payment software afterwards, such as Tenpay. Some other functions are also adopted in payment software for fast and convenient online transaction. Therefore, electronic payment software can be categorized according to their functions.

The first kind of payment software has functions of paying and depositing, such as Alipay and Tenpay. Payment software as such is featured with self-contained depositing function, through which money can be directly paid to sellers. Such payment software actually performs as saving accounts with payment function. In order to protect property of customers, this kind of payment software should be equipped with stricter security protection.

The second kind of payment software is based on Internet bank accounts. Traditional banks also run the business of Internet banking in the age of Internet. Internet banking, similar to Alipay and

Tenpay, is actually another kind of electronic payment software with paying and depositing functions, but in need of higher level of protection. Besides, there is extra limit for the use of Internet bank accounts. For example, payment through Internet bank accounts needs to be processed through special channel in some online malls. In other words, Internet banking is the third-party payment platform for transactions in online malls. Alipay and Tenpay, different from Internet banking, are direct payment platforms based on the websites of Taobao and Yixun.

Different from payment software mentioned previously, there is another kind of payment software, namely third-party payment software. The so-called "third-party" is defined according to online shopping websites. From this point of view, Alipay is actually a direct payment system for Taobao. A third-party payment requires agreements among relevant parties to be processed. Therefore, a third-party payment platform needs to cooperate with online shopping websites involved in transactions.

2.2 Important issues when using electronic payment software

Both direct payment software and third-party payment software need network protocols to perform in online transactions. Then what matters should be paid attention to when customers use electronic payment software?

Firstly, payment software should be used in a safe condition. The fast and convenient operation of payment software brings about security issues. All kinds of payment software and Internet bank accounts are based on Internet and influenced by online risks. Logging on accounts of electronic payment software in a virus-affected computer increases the risk that customers' account might be stolen. Accounts of electronic payment software such as Alipay and Internet banking should be used in a safe computer to secure transactions and properties.

Secondly, payment software needs to be used on the base of Internet protocols to process transactions. For example, tripartite agreement is not required when customers do shopping in Taobao with Alipay. But shopping cannot be done with Alipay in Jingdong online mall because there is no tripartite agreement between Jingdong and Alipay. Therefore, customers should select payment software according to their own needs, and there is also compatible electronic payment software available. Generally, Internet banks have agreements with more online

malls. Accounts of Internet banks are not operated by online malls and can be used in many other circumstances. Alipay and Tenpay, however, are designed for specific online malls. All in all, permission and scope of application of payment software should be checked before transactions. Payments cannot be done without agreements in some online malls.

3 DESIGN OF SECURITY SYSTEM OF ELECTRONIC PAYMENT SOFTWARE

Based on the analysis of frequently-used payment software, security of payment is the priority of such software. Due to the interactivity of computers, online attacks and viruses seriously threaten the safety of computer use. Then what can be done to secure online payments? How are secure systems designed for specific payment software?

3.1 Brief introduction of security systems of electronic payment software

Security systems for electronic payment software are designed to secure the process and safety of transactions. Frequently-used payment software is already equipped with security systems by developers to ensure the safety of payment (Li Wenbin, 2009). The security systems based on payment software include digital certificate protection system, system risk test system, USB key for Internet banking and password protection. These security systems are very useful for electronic payment software.

3.2 Digital certificates—the core of security systems of electronic payment software

Alipay is selected among various kinds of electronic payment software to analyze security systems of electronic payment software. Digital certificates are at the core of such payment software. Digital certificates are usually required to be installed when customers use Alipay. Payment through Alipay cannot be processed without digital certificates. What is the principle of digital certificates then? And what are their main functions?

In fact, digital certificates are the most important protection mechanism for payment software.

Security status of web environment of computers is checked during the installation process of digital certificates. In other words, security of web environment can be checked by digital certificates. And then, each computer can be equipped with only one digital certificate. In a computer without digital certificates, payment cannot be processed even with correct accounts and passwords. This effectively enhances security levels by preventing accounts from being stolen. Besides, verifications through mobile phones are required to install digital certificates. Certificates cannot be installed without verification codes sent to customers' mobile phones. Therefore, at the first stage, digital certificates are critical, which is the core part of security systems for payment software.

3.3 Password protection and third-party protection as supplementary measures of security systems

Digital certificates are surely the most important parts of security systems for electronic payment software. However, digital certificates alone cannot ensure a safe environment (Zhao Xueshu, 2007). Generally, some supplementary measures are added to security systems to protect payment of transactions and help customers when they forget their passwords. The most frequently-used measures are password protection and third-party protection.

Passwords protection is very common and important for payment software by changing passwords and security protection. Currently, general way of protecting passwords is setting questions for password changing. When customers set password, they can set questions and answers for password protection at the same time. Besides, password protection can be achieved through messages sent to customers' mobile phones. When customers change their passwords, they make the changes on their mobile phones accordingly. In this way, payment software is further secured.

Third-party protection is also important with relatively intensive concept. Anti-virus software is necessary for computers. In fact, a safe web environment is the priority for online shopping and payments. Third-party protection is employed to provide such safe environments. In addition, there are many phishing sites on the Internet. Third-party protection measures alert users when they come across phishing sites, preventing them from property loss.

4 SYSTEMATICAL ANALYSIS ON THE SECURITY OF ONLINE TRANSACTIONS

Security system is of significant importance for online payment. Internet has been well developed to provide users with convenient and economical service. However, security issues are always major obstacles for the development of Internet. Once the security of Internet use is guaranteed, users will be more confident in electronic payment software, which is very important for the future of Internet. Furthermore, security measures of electronic payment software are continually developing. Protection measures based on hardware play effective role in protecting customers' properties. In short, security systems for electronic payment software are significant in the long run.

5 CONCLUSIONS

In the work, the importance of safe online payment is highlighted based on the analysis of electronic payment software. Further research is conducted on a widely-used payment software—Alipay. Digital certificate and password protection are discussed in the research, exploring other protection measures. In short, safe payment is a critical precondition for the long-term development of payment software. The improvement of security system and protection measures is an important task in the development of electronic payment software.

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