Fraud Track on Secure Electronic Check System

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ABSTRACT

The Electronic Check (eCheck) is designed to substitute paper checks to enhance the bank service with new ecommerce features in today’s global economy, especially meeting the great upsurge of Internet and mobile banking services. The eCheck inherits all features of paper checks in an electronic format with some inherent advantages, as well as some new problems, which will be discussed in this article. Although the concept of eCheck has been put forward for more than two decades, the security of the eCheck system is still the key concern of the whole scheme, as well as the forensic trace of eCheck fraud. In this article, one implementation of a secure eCheck system is introduced which can defend most kinds of eCheck fraud and this article novelly analyzes how to trace back the fraud from a forensic perspective.

KEYWORDS

Check Duplication, Check Fraud, Check Modification, Digital Signature, Electronic Check, Forensic Track, Man-in-the-Browser Attack

INTRODUCTION

According to Chaum et al. (1990), Electronic Check (eCheck) was first proposed by Chaum in 1988 and has been highly utilized as an online payment method as of 2016. The first eCheck was paid to US Department of Defense by US Treasury Department in 1998 under the Electronic Check project which was carried out by Financial Services Technology (FSTC) (Anderson, 1998). In Hong Kong, the government has announced to introduce the Electronic Check system in December of 2015 and Hong Kong citizens can pay government bills through the “Pay e-Cheque” Portal (2016), and nearly $540 million has been cleared through this payment rail. As reported by Pymts (2016), the Hong Kong Monetary Authority (HKMA) and the Guangzhou branch of the People’s Bank of China are looking forward to build out eCheck system to facilitate cross-border trade deals between Hong Kong and the free trade zones of Guangdong. By now, there have been 15 banks signed onto Hong Kong’s eChecking cross-border payments system for its trial phase.

Electronic Check, as of its name implying, is an electronic version of paper check, which is introduced to replace the paper check and keep all functions of paper check for online transactions. It is designed to accommodate the many individuals and entities that might prefer to pay on credit or through some mechanism other than cash. A buyer can contact sellers of goods and services. To complete a transaction, the buyer sends an eCheck to the seller for a certain amount of money. These eChecks may be sent using Email or other Transport methods. When deposited, the eCheck authorizes...
the transfer of account balances from the account against which the check was drawn to the account to which the check was deposited.

The eChecks are modeled on paper checks, while they have their own characteristics:

- They are initiated electronically. They use digital signatures for signing and endorsing and require the use of digital certificates to authenticate the payer, the payer’s bank and bank account.
- They are delivered either by direct transmission using telephone lines or by public networks such as the Internet.
- Reduce bad check write-offs, returned-check fees and check collection hassles.

ECheck is not merely a simple electronic version of paper check, but also owns some unique security features. The major advantages of eChecks compared with paper check are as follows:

- First of all, the eCheck meets the needs of clients under the global economy environments. More and more global business activities occurred each day all over the world, therefore, a rapid, convenient, secure and 24-hour available payment instrument is needed. ECheck fits current business practices for all kinds of customers, including individuals, small and mid-size businesses, government and other organizations. Issuing and transferring an electronic check is more time saving and economical than printing and mailing paper checks to customers. Moreover, Ash The Great (2016) points out that the eCheck transaction fee is much less than credit card, which is the most popular online payment method today.
- With the concern of environment, paper check is not environmental-friendly. 70 billion of paper checks are spent per year, and banks in Hong Kong spent up to 1.7 billion Hong Kong dollars on processing these paper checks every year (Ash The Great, 2016).
- Next, eCheck contains the same information as what paper check contains, which can be presented in electronic format, as well as paper format. Although eCheck is a new concept for banking industry, it is based on the same rich legal framework as paper check, which makes it much easier for customers to accept.
- Last but not least, the design of eCheck keeps all functions of paper check and avoids the shortness of paper check system with the security techniques. ECheck makes check forgery and check double-spending difficult or can be detected easily in the eCheck system.

The rest of this paper is organized as follows. Section 2 describes the motivation of developing a secure eCheck system. In section 3, the basic eCheck system and eCheck components will be explained. Then a basic eCheck system is presented in section 4. Section 5 discusses the fraud track of the eCheck system and gives out our modified secure eCheck system, finally making a conclusion in section 6.

**MOTIVATION**

ECheck is not a new technology, but it is not widely used today. Why? It is mainly because of eCheck-specific security problems. Anytime computers are involved with sensitive transactions, there are bound to be security concerns.

- In current eCheck model, eCheck is in the form of an electronic document, which can be easily duplicated, and every copy is a “perfect copy”. It is hard to identify an “original” from a copy.
- Confidentiality is another concern. Attacker may hack into the electronic records or intercept a transmission to get eCheck details, such as payee, payer, account, amount, etc.
X_myKarve: Non-Contiguous JPEG File Carver

Privacy Enhancing Technologies in Biometrics
www.igi-global.com/chapter/privacy-enhancing-technologies-biometrics/39211?camid=4v1a