Modern Accounting Information System Security (AISS) Research Based on IT Technology

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Abstract. The prevalence and application of IT technology in accounting information system promotes the development of accounting information system in networking aspect. On one hand, the network-based accounting information system promotes the diversification of accounting information processing, transmission and query. But on the other hand, it results in accounting data security issues during accounting information processing, transmission and query process. B/S network model of accounting information system is one kind of network architecture which is raised as network development. The advantage of the B/S network model focuses on the distributed feature of the overall network architecture, which means that a mass of data information are stored in the safety database server. This paper brings forward the risks control model of accounting information system based on B/S network architecture to solve the information security issues during data transmission of accounting information system.

Keywords: B/S network Architecture; accounting information system; information security; IT technology

1 Introduction

“The world of information technology is constantly evolving. The challenge of security breaches is now overwhelming and has reached critical levels despite the many years of attempting to contain the issue. Recent research shows that security needs to be tightened as the number of security breaches in organizations is increasing.”[1]. As the rapid prevalence and application of computer technology and network communication technology in corporation management and accounting information processing, accounting information system develops from traditional accounting information system to modern accounting information system. Accounting information processing facility promotes from simple pocket calculator to modern facility, such as computer networking and so on. The development of IT technology has essential impact to accounting field. Because of the promotion of accounting information processing facility as well as network development of accounting information transmission, the security issues of accounting information system become more and more critical and important. Therefore, it becomes a key issue with highest priority.
2 The Evolution from Traditional Accounting Information System to Modern Accounting Information System

2.1 The Information System and Information Process

Information process is the activities that the information system obtains the data of accounting entity and its activities, then stores and maintains these data, compiles reports which will be helpful for the management. Professor Anita S. Hollander classifies the information process into three categories roughly in Modern Accounting Information System: “record data relevant to business activities, maintain and keep accounting entity relevant and latest data, report the information which are helpful to execution, control and appraising the business process.” [2] The information system and process is illustrated in Figure 1.

Fig. 1. Information system and information process

2.2 Information Processing and Transmission of Traditional Accounting Information System

Traditional accounting information system is founded on the basis of accounting cycle and accounting equation raised by Luca Pacioli. The core is chart of accounts. The charts of accounts are used for classification and summarization the financial measurement results of the assets, debts and the owner’s equity of accounting entity. Financial reports are used to transfer the summary data of accounting entity to the user of accounting information. The characteristics of the traditional accounting information system are that the main accounting data are manually recorded, maintained and reported. Only some preliminary facilities, such as pocket calculator and abacus can be used as limited assistant.
Under the precondition of small amount of accounting entity and simple business, traditional accounting information system requires less accounting persons for daily maintenance. However, as the expansion of accounting entity and more and more complicated businesses, the manually information processing, paper-based accounting documents and documents transmission shows the shortage gradually.

2.3 Information Processing and Transmission of Modern Accounting Information System

As the prevalence of IT technology, some accounting entity adopted computer technology and network communication technology during accounting information processing and transmission, applied IT technology to accounting field. Then traditional accounting information started to convert to modern accounting information system. Because of the application of high technology in accounting information processing, modern accounting information system covers the shortages of traditional accounting information system to a certain extent. Firstly, the application of IT technology decreases the quantity of accounting employees and decreases the dependence to manual information processing; secondly, this technology decreases the quantity of paper and space for storing the paper documents; thirdly, the efficiency of accounting processing and transmission is improved. However, security issues of accounting information come along with modern accounting information system as well.

3 Distributed Accounting Information System Based on B/S Network Environment

3.1 B/S Network Model

B/S network model (Browser/Server model) is constitutes by database server, browser and web server. B/S model “realizes the communication between system and users by means of client model (the client interface to use accounting information), the client browses the information in web server by means of browser on local computer. The database server acts as a backstage server, which will communicate with web server rather than directly with the client. Therefore, the communication rate is decreased to release mitigate network load”[3]. The advantage of B/S model is that the entire network features the distributed characteristics, so a mass of information are stored in safe database server. The network architecture is illustrated in Figure 2.
3.2 The Characteristics of Accounting Information System Based on B/S Network Environment

Comparing to accounting information system under stand-alone (or local area network) environment, the accounting information system under B/S environment features the following characteristics:

The Transmission Area of Accounting Information is Increased Sharply

The accounting information system develops from local area network to wide area network which increases the transmission area of accounting information sharply. At the initial stage, the accounting information can be shared internally inside corporation, transmission of financial information between superior company to inferior company. After adopts the wide area network, the accounting information can be shared with outside relevant organizations and communication all over the world.

Change of Financial Management Mode

Corporation businesses have exceeded space limitation because of networking accounting information system. The traditional financial management mode is changed in the aspect of management modes, so business cooperation, remote processing, on-line management and so on modes can be realized. On-line working, remote working, distributed working and mobile working can be realized as well.

Diversification of Accounting Information Query Mode

Networking accounting information system can realize remote financial reports, remote audit and on-line financial information query and so on diversification query modes in the aspect of accounting information supply.
3.3 The Risks to Accounting Information System Based on B/S Network Environment

Although accounting information system has a lot of advantages based on networking environment, these advantages shall be ensured on the basis of security of accounting information. The risks of accounting electronic data under networking environment mainly from the following three aspects:

Physical risks. It is the security issues of the physical equipment and the environment in the phases of accounting electronic data generation, storage, processing, transmission and usage. The environmental factors, such as temperature, humidity, electromagnetism etc., the nature factors, such as flood, fire, earthquakes etc. and the personal behaviors, such as steal, destroy etc. lead to risks to physical security.

Risks to accounting information system. The operation system of the accounting electronic data storage, processing and transmission equipment have a lot of vulnerabilities because of the limitation of technology, so it is easily to be attached by viruses, Trojan virus and Hackers. The viruses endanger greatly to remote network accounting information transmission because viruses feature the characteristics of strong concealment, wide diffuse area, huge destructive force.

Risks during application process. In the traditional accounting information system, facticity, integrity and definition of financial responsibility of accounting information are ensured by accounting record on paper, signature/stamp on the accounting records, audit system and internal control system. While under network environment, modification, illegal interception, acquisition, move, forgery, delete and concealment can be done without any trace so the risks of accounting information distortion are increased.

4 Accounting Information System Risks Control under Network Environment

4.1 The Current Measures to Mitigate Accounting Information System Risks

At present, there are mainly two measures to mitigate accounting information system risks:

Physical control

Physical control mainly aims at the risks on physical aspect. In order to avoid accounting electronic data risks because of physical equipment problems during generation, storage, processing, transmission and usage, suitable network architecture and reliable network hardware shall be preferred in accounting information system design. The selection of network architecture shall ensure the security and reliability of the system. In the mean time, in order to avoid steal and damage etc. personal actions, accounting entity shall establish corporation internal control system under network environment. Backup system must be implemented strictly for accounting
data. The above measures must be implemented strictly to ensure the security and integrity of accounting data.

Control in Application Process

In order to ensure the security of electronic data during accounting information system application process, the following measures are carried out generally at present:

Separate data storage and data processing. Put the confidential and data which is vital to corporation and information system operation in a well controlled environment and isolate to the computer room.

Password control according to different roles of operation persons. All persons authorized to operate the computer will be controlled by password.

Operation and access right limitation. System administrators properly allocate operation right considering actual quantity of data processing and quantity of persons involved. Before leaving the working site, the operators shall logout the system according to regulations to avoid intended/unintended operation by the others.

Operation and access log control. In order to ensure that all authorized and unauthorized operation and access will be trackable and increase the security of computer system, all attempt and operation shall be supervised and recorded by security software.

Other measures can also be carried out to prevent various hostile attacks, such as setting fire wall, electronic key, network notarization and so on.

4.2 The Creation of Risks Control Module on Accounting Information System Based on B/S Network Environment

The characteristics of B/S network accounting information system are distributed, a mass of accounting information data is stored in safe database server. Because actual safe database service cannot balance between data processing performance and data private protection, so it needs new solution to protect privacy. New theory is raised therefore. Based on encrypting partitioned sensitive data of accounting electronic data, the client data across many logically independent database servers can be vertically broken down. The client executes queries by transmitting appropriate sub-queries to different databases based on metadata. The system architecture is showed in Figure 3.

Fig. 3. System architecture
The main modules in this system are accounting electronic data extractive module and cryptographic module according to information security strategy. The two modules are on different levels, so the functions are different as well.

The accounting information system based on B/S network is very complicated, while we can simplify the system architecture relations between systems as illustrated in Figure 4.

**Accounting electronic data extractive module:** The main functions include original data collection, preliminary businesses processing, and data report in the sub-system of accounting information system. In order to ensure the creditability of the data, it needs to distinguish ID of the operator during the process. The system will analyze the accounting electronic data automatically and transfer to accounting information center to encrypt.

**Accounting electronic data encryption module:** The main functions of this module is to encrypt the electronic data which being submitted to accounting data center and carry out security processing, which includes code abstraction and verification.

**Accounting electronic data storage module:** The main functions of this module are to manage the storage and query processing for the encrypted accounting electronic data. It includes two portions. The metadata will store the electronic key of encrypted information, mode information and the statistic information used for query optimization and so on; the query processing will analyze the query data and send them out integrating with the metadata.

**Fig. 4.** Relations between system module

The system faces kinds of threats while it developing to wide area network. “Typical threats that might put an organization’s mission at risk include fraud, erroneous decisions, loss of productive time, data inaccuracy, unauthorized data
disclosure, and ultimately, loss of public confidence.”[4] We must carry out the corresponding risks control measures to ensure that the system can be operated safely and reliably in accounting information system network developing process.

It is a new mode to construct accounting information system based on B/S network. It makes up the shortage of LAN accounting information system. However, the security concerned to every walk of life, so everyone shall work together. As “the core software and hardware of our information system depend on the imported, so it has great potential risks to let out the secret; the encrypting technology is out-of-date and protective capability is low” [5]. Therefore, we have a lot of work to do to establish the safe, reliable network accounting information system.

References