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Research of Accounting Electronic Document System Based on OAIS Reference Model

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Abstract: Using electronic method to manage information is the only way for accounting document management. In order to describe OAIS reference model clearly and to build an accounting electronic document management system in accordance with OAIS reference modal, an example is used to analyze the processes of thinking and function realization. In this case, Oracle is introduced as its source database, and Delphi as the development tools. To successfully implement the management system of accounting electronic document, government is suggested to play an important role.

Keywords: OAIS Reference Modal, Accounting Electronic Document, Management System

1. Introduction

With the acceleration of enterprise information technology, the traditional paper-based accounting document management methods is unable to meet the needs of enterprise accounting document management. Information technology has become an important work of the document management platform and technical support, and the core of modern management in the new era. The Digital Archives of International Organization for Standardization is the most popular information document modal based on OAIS reference model. It is suitable for system and organization which is committed to long-term preservation and providing access to digital resources. OAIS reference model support both digital and physical presence of the archive information. It particularly pays more attention on digital information, such digital information is the main body of the document, or is as a support information for physical archive and digital resources[1,2]. In the OAIS reference model, a complete document information storage function is provided, which includes intake, document storage, data management, access and use. It also discusses the transplant of digital information from one media to another media, the data modal of information, the role of software in information storage, the exchange of data information among document system, and so on. It also established the internal and external interface of various document functions, and a series of high-level services based on such interfaces[3,4].

2. OAIS Reference Modal

OAIS reference model is a standard developed by the U.S. National Aeronautics and Space Administration (NASA) and the Consultative Committee for Space Data Systems (CCSDS)[5]. It is provided as a reference modal framework for the access to information resources and long-term information preservation.

2.1. OAIS Reference Modal

As a reference model, OAIS defines a general framework for data storage, such as the function, unified concepts and terminology, etc. The English full name of OAIS is Open Archival Information System. Open means the development state of open mode of OAIS reference model and all of the later developed recommendations and standards. But it does not mean that the use of the

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OAIS information without restriction. In the reference model, Archive and OAIS can be understood as information preservation organization or system, refers to the system or organization which can provide the storage of a long-term preservation of information and services functions for specific user groups. Archive has the following responsibilities: receive information from information producers, long-term preservation of information, determine their clients, ensure the stored information can be understood independently by their clients, that is to say, users would be able to understand information without the help of information experts who produced the information, strict compliance with policies and procedures of stored information, ensure safety of stored document in any emergency, ensure the distribution of information is a true copy or original information can be traced to the original information, ensure the access to the stored information by its clients. The basic entities interact with OAIS can be seen from these duties. Reference model names these entities and their links with OAIS as OAIS environment (including information producers, OAIS, users and management). Based on these entities and the relationships, it defined OAIS functional model, information model and the internal details of each model[6–10].

2.2. Function Module of OAIS

OAIS is composed of the following six main function modules:

(1) Ingest Module Collection or accept submission Information Package(SIP) from producers according to certain format. Such information is established to corresponding meta-data after test. Then meta data is sent to data management module, and the information is converted to defined format Archival Information Package(AIP),and is sent to long-term storage module.

(2) Archival Storage Module: actual storage AIP, is responsible for the establishment of the specific storage and access system, and AIP will be provided to this module while receiving request from access function module. During the technical simulation or data migration, new digital content unit may formed, and my need to re-establish relative metadata with the cooperation with the intake module and sent to the metadata data management module.

(3) Data Management Moduleis responsible for the storage of metadata of digital information unit and such metadata as handling on the long-term protection policies, procedures, technologies and systems, and provides the retrieval and management on metadata.

(4) Access ModuleProvide user interface for users to retrieve metadata and request digital information unit. Provide access mechanism, and transmit AIP to suitable distributed information, and it may also be in charge of the authentication and authorization management responsibility.

(5) Administration Module: Based on policies, standards, procedures, and workflow to monitor and control the operation of entire long-term storage system each modules.

(6) Preservation Planning Module: Monitor the OAIS environment, and provide recommendations to ensure that after a long term, the information stored in the OAIS can still be access by appropriate target users, even if the original computing environment was degenerated[11–18]. The basic structure of OAIS reference model is shown as Figure 1:

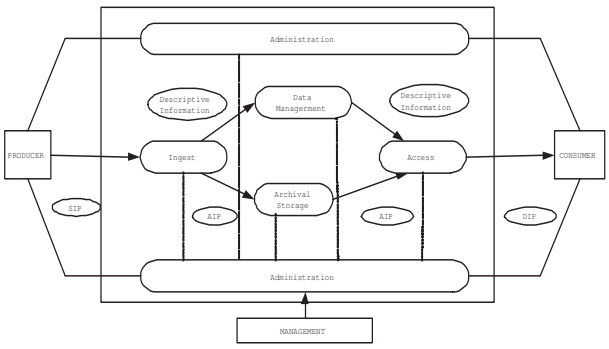

Figure 1 Basic Structure of OAIS Reference Modal

3. Design of Accounting Electronic Document Management

Accounting electronic document management is major to complete the management of accounting electronic files such as vouchers, books, reports, and so on. The archive process of accounting electronic files are: read the end of the financial data table from the source server generation of directory data and metadata composite of electronic original data test of data and original files transfer and archive. First of all, read end table of financial data automatically to middle server using the financial data reading program, and disconnect from financial system server. Then generate metadata and electronic original files in the middle server, and package the original files in PDF format. Finally, after the examination of data integrity and accuracy by various financial module operators, the archive file is sent to a document server by document administrator, and automatically form a resource database and resource library descriptor metadata. The document management processes is shown in Figure 2: According to Figure 2, the steps of accounting electronic management are described as below:

Step 1: According to the archive range defined by the National Archives, the National Resources Committee and

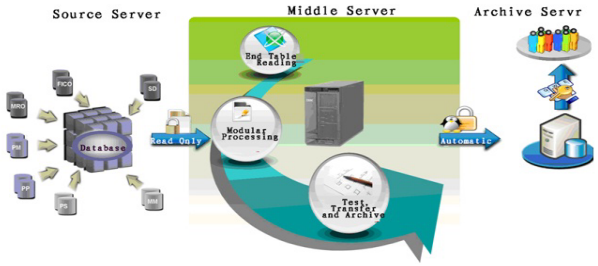

Figure 2 Schematic Diagram of Accounting Electronic Management

the Ministry of Finance, accounting vouchers, accounting subsidiary ledgers, financial reports and other technology asset files are all within the archive protection scope.

Step 2: After the determination of archive data range, according to the original template of paper files and the new requirements of business department, carefully analyze the tables and fields of archived data to be stored, some data is generated indirectly from many other tables and fields, the logic relationships are needed to be found.

Step 3: Determine the data imputation program in accordance with the document management standards and classification standards: 1), vouchers (accounting vouchers, part of the original vouchers, etc.); 2), the financial books (accounting subsidiary ledgers, detail ledgers of vendors and customers, the balance of accounts, etc.); 4), comprehensive statistical reports (plans, statistics, balance, etc.).

Step 4: According to data imputation program, select relative tables and fields from the end table of financial system database, and save it to ORACLE database on the middle server (not including the outside customized printing report data), develop data extraction program on Delphi development platform. Such program is executed on the middle server timely or manual. After finished, disconnect the middle server and the financial system server to ensure the normal operation of the financial system.

Step 5: According to the print and display format provided by the national authorities and business sectors, generate archive digital original files in the forms of EXCEL or WORD. Develop digital synthesis and metadata synthesis program on Delphi development platform, and extract part of the fields to form document directory, integrate part of the properties of the meta-database to produce a catalog and statistic table of original data.

Step 6: Based on data statistic tables, use Delphi language to develop document test platform. Business document managers and document administrators can finish cross-examination of integrated test through document test platform. They can test the extract and synthetic catalog and digital original files randomly to test the completeness and correctness. The transfer of the two sides should tick on the confirm statistics table, or print and sign. This table is also archived as an electronic original file.

Step 7After the test and confirmation, document administrator achieve the document using the executive program developed by Delphi. According to the above classification norms, the directory archives and metadata are synthesized into a file server in the Archives. The synthesized digital original files are packed in PDF format (or server unified package) and integrated into the original resource server. The electronic document management process is described in Figure 3.

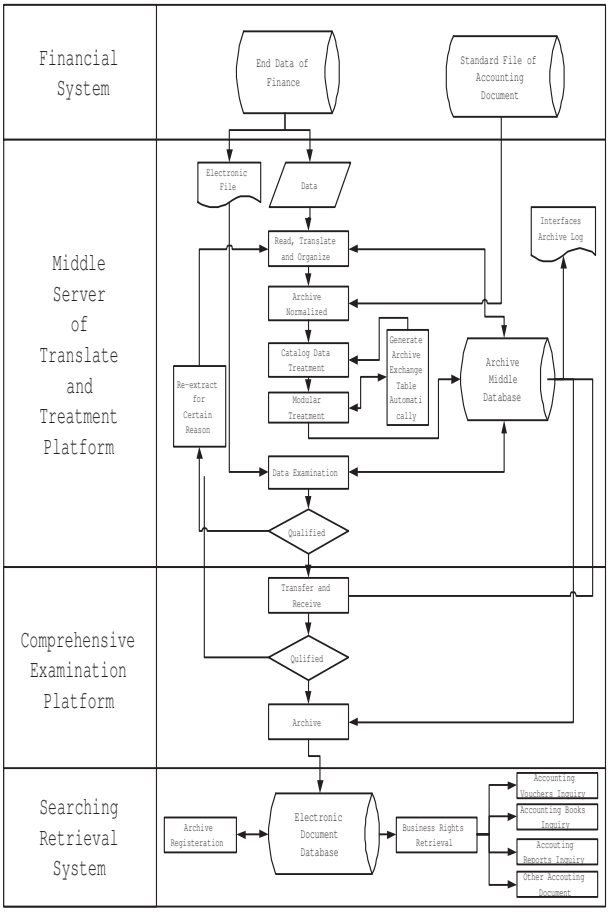

Figure 3 Diagram of Accounting Electronic Document Management

4. Implementation of Accounting Electronic Document Management System

Accounting Electronic Document Management is mainly to solve the archiving and management of the generated

vouchers, books and reports by the financial system for enterprises. It is composed of four parts: document data collection, comprehensive examination, query and usage of accounting records, and rights management. The system module functions are shown in Figure 4:

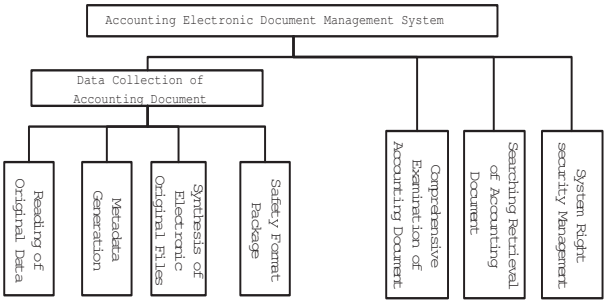

Figure 4 Modules of Accounting Electronic Document Management System

4.1. Data collection of Accounting Document

The archive content of accounting data includes accounting vouchers, accounting books, accounting reports and other accounting archives, part extension to the original documents. Accounting archive data collection interface is installed on a middle server which connects to the financial system server. System read archive data of the end table from financial system database timely and automatically. It is generated to metadata in the middle server and synthesized original digital files. After integrity test, it is finally archived to a file server. The framework of financial data collection process is shown in Figure 5.

4.2. Comprehensive Examination

Comprehensive test function is responsible for the test of the complete collected archive data through a comprehensive test platform. The testing process is as follows shown in Figure 6:

4.3. Retrieval of Accounting Document

File retrieval function implements the searching retrieval and usage of archived business data through B / S mode. It provides imputation retrieval in accordance with the enterprise business processes.

Provide searching retrieval to accounting vouchers, accounting books, accounting reports and related document. The searching retrieval can be not only positive related from vouchers to books to reports, but also reverse related from reports to books to vouchers. For some business, original documents can be back retrieved by accounting vouchers.

As to the customized reports archived by batch customized archiving tool, this module can be used to retrieve data and original files. All customized archive reports are retrieved according to sectors and modules. It can be searched in multi-years. After searching for the report catalog, the original electronic report can be viewed.

4.4. System Right security Management

System right security management is responsible for the management of function rights and data rights of roles and users. It improves system security and normal operation, and provides the system basic function such as data backup and restore.

5. Summary

The accounting electronic document system based on OAIS reference model is in accordance with the Accounting law, Accounting Archive Management Method, and so on. It covers the functions of accounting data archiving, organizing, inspection, searching retrieval, and rights management, etc, and provides a management platform for the digital accounting document of enterprise. Practice has proved that accounting electronic document management using this framework can meet the electronic and digital requirement of accounting archives. However, the government is suggested to make out further relevant policies or measures to regulate and guide the archive content, scope and format.

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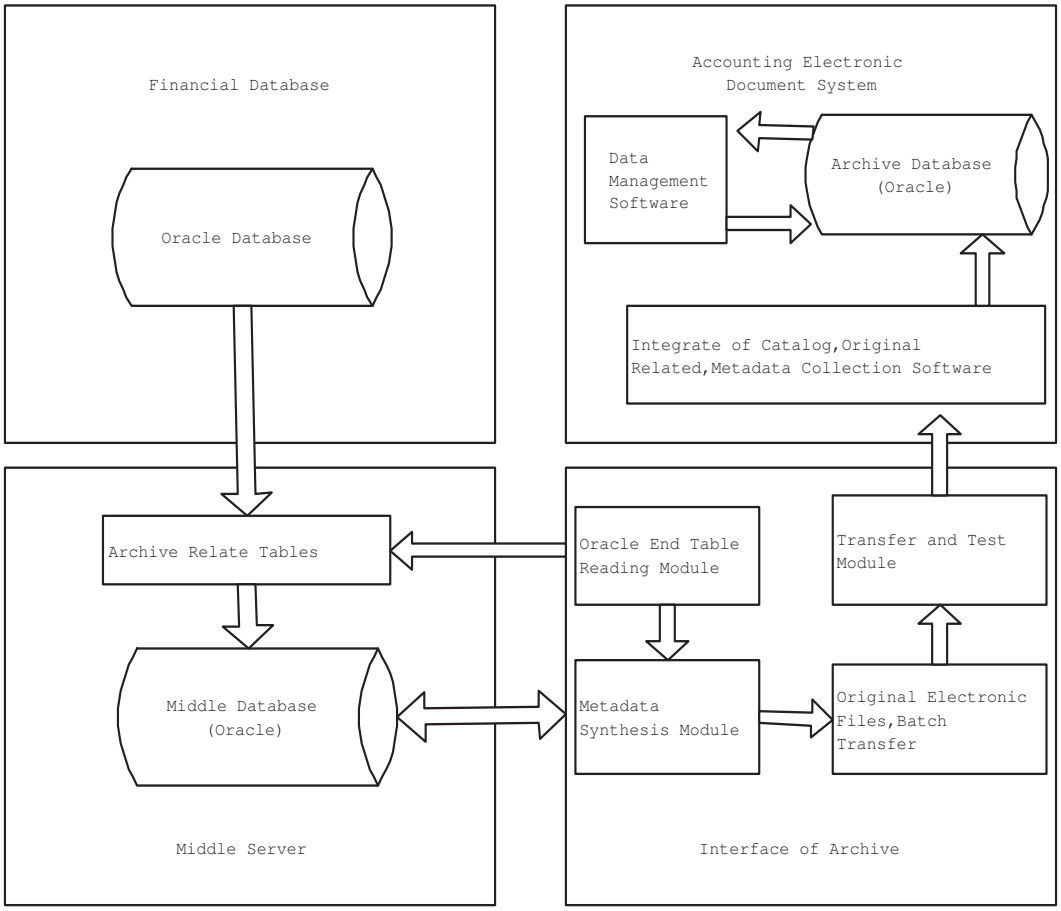

Figure 5 Collection Framework of Accounting Electronic Document

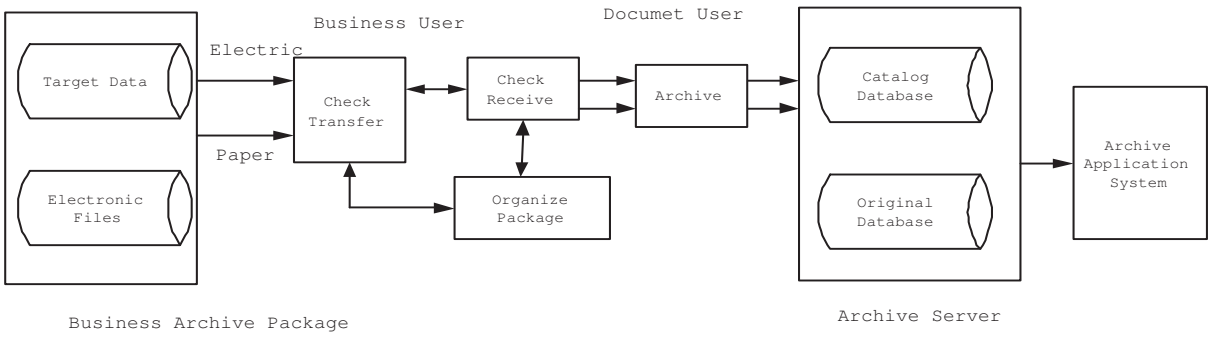

Figure 6 Comprehensive Test Framework of Accounting Electronic Document

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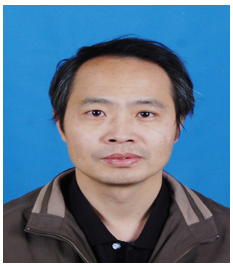

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