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Towards Planning Scheme about Ark Urban Construction Digital Archives

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ABSTRACT:

At present, the degree of openness of urban construction archives is not high. It is urgent to establish a portal that reflects the relevant functions of urban construction archives to the public, so that more people can understand the functions of urban construction archives. Through the portal of the urban construction archives, the society can better understand the urban construction work of Ark District and the relevant procedures. Recently, the management mode of urban construction archives mainly adopts manual management mode, including the receipt, sorting, identification, storage, utilization, compilation and research of archives. The archive management is not very scientific, and the work efficiency is low, resulting in the archive resources cannot be fully utilized. The digital construction of Ark Urban Construction Archives covers all aspects of the urban construction archives, focusing on the establishment of a comprehensive digital application platform for urban construction archives in the whole district, aiming at efficient business management and reliable resource services, and meeting the needs of archive users (units or individuals) and archive managers. At the same time, the digitalization of archives is also a process of unified planning and step-by-step implementation.

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I. INTRODUCTION

Urban construction archives, as ones that preserve some data of different carriers such as texts, charts, drawings, audio and video with preservation value formed in urban planning, construction and management activities, play an indelible role in urban construction and development [1-2]. However, with the continuous development of economic construction and urban construction of China, the scale of urban construction archives, the types and media of archives preservation are also growing and expanding, and the corresponding requirements for archives preservation are also improving [3-4]. Therefore, how to use the latest information technology to serve the construction of archives has become an important topic of the current construction of archives, so as to not only improve the level of archives preservation, reduce its preservation cost, but also better serve the public.

With the continuous development of urban construction archives, the collection of urban construction archives is increasing. At present, hard-copy archives are mainly used, and the storage conditions for hard-copy archives are very strict. As most of the storage media of the library collection are paper documents, which are not only difficult to be permanently stored and backed up, but also vulnerable to external environment damage. In addition, they occupy a large amount of space. With the increasing number of archives, storage costs and management costs are increasing [5].File query is still not very convenient, and file management personnel are still required to participate in the query, resulting in high file query costs. It is also inconvenient to implement the paid service of file query. During the retrieval process of manually querying the file information, the retrieval process is generally as follows [6].The retrieval process is generally to check the file directory at first, and then check the dossier directory, according to the file directory records of the file number information to find the storage address of the file in the warehouse, and then notify the warehouse for certification, handle the relevant procedures. Paper documents bring difficulties to retrieval and reading, and in this process, the way of inquiry is not completely enough. Furthermore, both the recall rate and the precision rate are low, and the documents are easy to be lost, damaged or unable to find the required information, which makes it difficult to fully use the archive resources to provide good services to government departments and the public.

At the same time, the existing saved file information is very isolated. For example, paper files are saved by book files, while audio and video files may be saved by video tapes and VCDs [7]. If the images scanned and entered by paper files are saved, they may be saved by computer storage equipment. For the files saved by film

microfilm [8], the information in them must be read by a unique film scanner before being queried. Therefore, how to use the information technology among them to achieve the query and preservation of these file information on a unified platform and reduce the cost of file query and preservation has become a major issue in the construction of file information.

According to the current situation and existing problems of the Ark Urban Construction Archives of China, we get the construction goals of the Ark Urban Construction Archives Image Management System as follows.

(1) Build a complete file image management system, input all paper, film, photos and other files into the computer through the system for saving, and the saved files can be automatically recorded and conserved.

(2) The processing system can be used to provide paid services for file query.

(3) In order to ensure the authenticity of archive preservation and the efficiency of query, it is also necessary to ensure the mutual transformation of archive analog and digital storage modes.

(4) Establish a core system for business data and content data integration and data backup independent of equipment.

(5) The system structure is a three-layer system structure, which is application customer processing layer, application service processing layer and data storage and management layer to avoid the system being affected by changes in business systems and other related application systems, finally ensure the relative independence of the system.

(6) Establish a three-level storage architecture with server disk array or external array as online, optical cabinet as online, and optical disk as offline.

(7) A set of standard intermediate function libraries is used to enable the parameterized and modular design of application programs and support multi-channel, multi front-end and multi device access.

II. THE DESIGN AND IMPLEMENTATION METHOD

2.1 The construction principle

(1) Principle of independence

The implemented file management system is a relatively independent and interdependent auxiliary management system with the original business system. The systems are interconnected through data interfaces, so as not to affect the operation of the original business system, neither to change the workflow of the original business system, or to increase staff and workload, and to coordinate with the operation of the original business system as the design principle [9].

(2) Principle of openness

On the basis of the independence of the system, the openness of the system must be guaranteed. The openness of the system is reflected in two aspects.The first is the openness of the platform. The system is developed on the Windows platform and is an open system on the operating system layer. Data access can be achieved through the system API to achieve convenient system function increase and upgrade. Andthe second is that the system can be organically combined with other application systems, and the access interface can be reserved for future business system upgrading through reserved interface.

(3) Principle of data integrity and correctness

The integrity and correctness of system data mainly have two aspects.One is the fault tolerance performance of the system. And it is necessary to ensure the integrity and correctness of each file image informationbased on the particularity of the file system. The other is the integrity and accuracy of index data. Based on the above reasons, we must have a complete backup and recovery strategy for the data applied and generated by the proposed system.

(4) Principle of safety first

The security of the system mainly considers two aspects. First, the security of system operation and other operations. The second is the security of system data. The system takes into account the combination of openness and security, and follows the design principle of security first. Under the networked (enterprise) environment, strict security measures are set between all levels for data management and application, information transmission and processing.

(5) Principle of scalability

The scalability of the system is reflected in two aspects. One is the scalability of the system scale to adapt to the expansion of the user service volume. The other is the system can adapt to the change of user business types and processes. The system can adapt to the expansion of the scale of urban construction archives and the development of management in the future.

2.2SystemArchitecture of the proposed digital archives project

The system adopts the architecture design of combining Client/Server and Browse/Server [10]. The application in LAN adopts C/S mode, which can improve the system performance. The application is extended to the browser structure in the WAN, i.e., the Web application handles the user interface, and the database layer is responsible for database management.
At the same time, according to the business requirements of customers, the access interface can be reserved for future business system upgrading through the reserved interface in the electronic comprehensive management system of archives. This not only meets the existing query needs of Ark Urban Construction Archives for archive images, but also can implement the expansion of urban construction approval and other businesses of the urban construction archives in the future, laying a solid foundation for the future business development of Ark Urban Construction Archives and adapting to different business characteristics in different regions. The network structure diagram of urban construction digital archives is illustrated in Fig. 1 as follows.

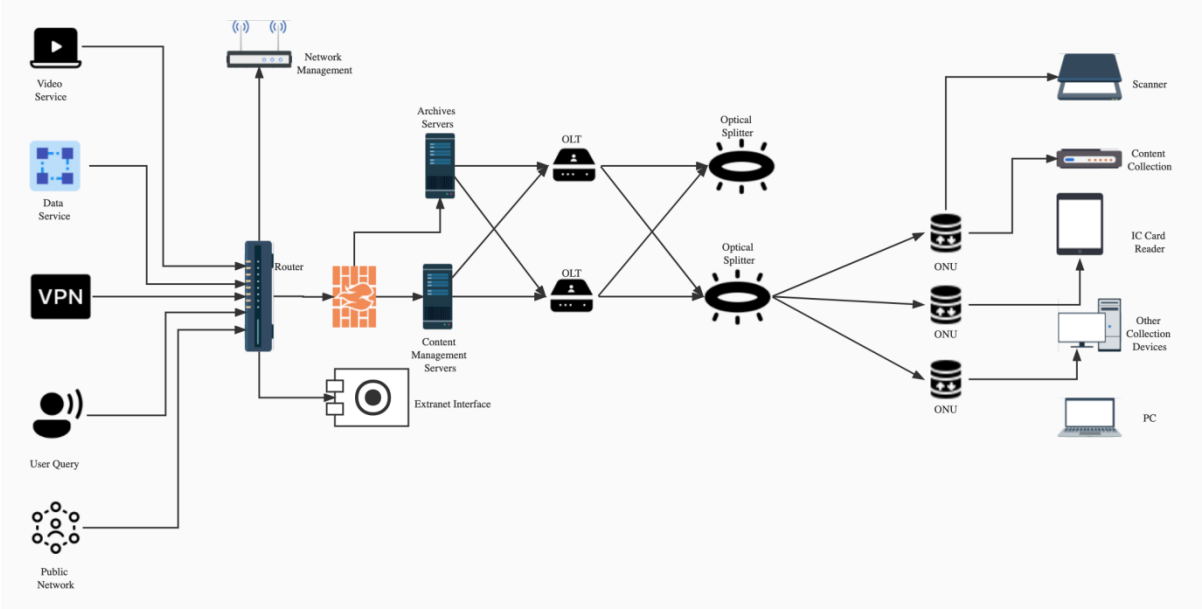

Fig. 1 Network structure diagram of urban construction digital archives

2.3The business process of imaging system

In addition to the traditional procedures and systems for the handover, sorting, inspection, storage and warehousing of archives, the system adds the work of archive image collection, quality inspection, archive index entry and archiving. The process is described as follows:
After the files received from other companies are sorted according to the directory order in the files, the staff first enter their file contents (including hard-copy files) into the system and perform quality inspection on these electronic information. Supplementary entry is required for unqualified items. When entering, one can enter relevant keywords (such as file category, project name, construction unit, project location, project time, etc.) for the classification of urban construction archives according to the Urban Construction Archives Classification Outline. Then, they will be bound according to the Archives Arrangement System formulated by the archives. After the binding is completed, the hard-copy files can be put into storage and put on the shelf for safekeeping only after they are checked and verified by a specially assigned person, and the files shall be registered and entered into the written file management system. At the same time, the file index entry personnel will enter the index information of the digital file into the system and archive it in a volume. At the same time, the serial number, catalog number and archive number are generated according to the system settings. For the file content, index and other information generated by the system, the system can query or print them in Webmode or IC card mode. Compared with the manual business process of the urban construction archives center, it has the advantages of reducing the cost of hard-copy archives query and storage and high information sharing in terms of query utilization, storage, although it has added the work of archives entry, manual indexing [11], etc. Thebusiness process of image management system is expatiated in Fig. 2.

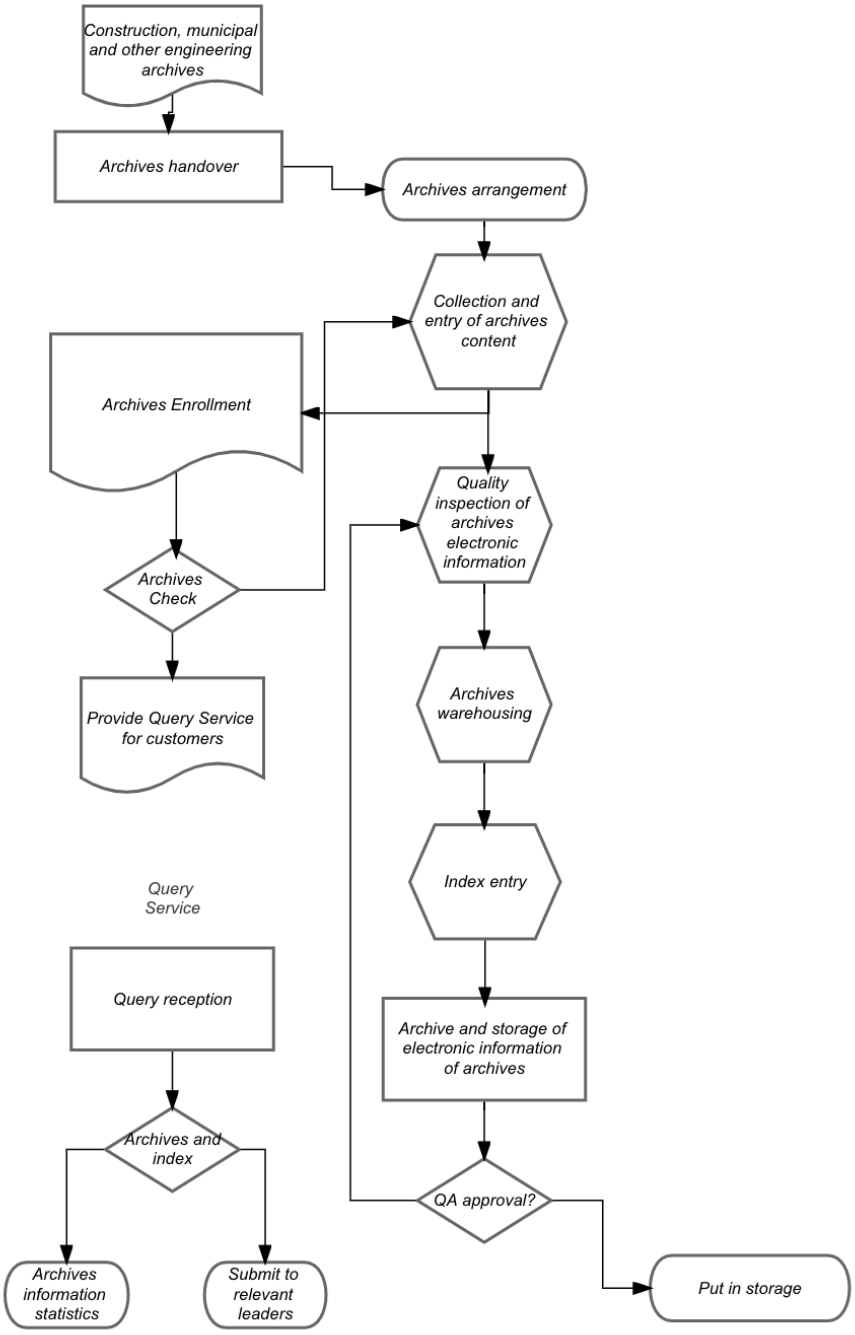

Fig. 2 Business process of image management system

2.4Physical archives management

(1) Warehousing registration

According to the contents of the transferred files, assign the file serial number (existing or up-to-date) to which the document belongs, and determine the type (opening, change, etc.). At the same time, the corresponding barcode (such as serial number type code) can be printed and pasted on the first page of the file. The file and its corresponding barcode are also recorded in the database. When warehousing, the barcode gun can be used to identify the barcode, and then the location information of the file can be recorded.

(2) File addressing

When entering the warehouse, the barcode gun shall be used to identify the barcode, and then the location information of the file shall be recorded. You can find the location information through the file code, or one can find the file volume through the location information.

(3) Borrowing registration
When borrowing and returning, the file is found out at first, and then the barcode gun is used to identify the barcode. The system will automatically record the barcode of the volume, and the clerk can enter the lending return information of the volume. The borrowing return registration of this volume is completed, and customers can query and make statistics through the registration information in the future.
(4) Destruction registration
Urban construction archives will be destroyed after a period of storage (such as short-term storage archives under 20 years). Before destruction, the clerk find out the file, identify the barcode with a barcode gun, and the system will automatically record the barcode of the file. The clerk can enter the destruction information of the volume, and then the volume can be destroyed normally. Customers can query and make statistics by destroying information in the future.

2.5Comprehensive query utilization

Comprehensive query utilization mainly includes definition of billing method, billing query registration, billing query, billing query settlement and billing query management as illustrated in Fig. 3.Billing methods can be flexibly added, modified and deleted, such as billing by the number of enterprises queried, billing by the number of pages queried, or billing by the time queried. Each billing method can set the query price and print price, and set the range (unit) of various prices. For example, charging by the number of enterprises queried can be defined as 100 yuan/customer, charging by the time queried can be defined as 10 yuan/5 minutes, and printing price can be defined as 10 yuan/page.
Billing query registration is the process of assigning query equipment (such as IC card and query machine), query authority and query content to the query person. The information of the inquirer can be recorded during registration. Inquirers can scan and enter the valid certificate or letter of introduction of the inquirer. At the same time, the query contents (such as enterprises) are allocated according to the requirements of inquirers, and the query and print secret levels of the inquirers are set according to the their nature. Especially for archive resources involving *Confidential* and *Top Secret* (such as underground communication cable diagram in urban underground pipeline archive resources), the qualification of inquirers should be strictly reviewed. After the review, the staff of urban construction archives management shall inquire about relevant contents.
Billing query is basically the self-service query of the inquirers. The inquirersqueries according to the query equipment allocated during registration. The query system automatically lists the enterprises to be queried. The inquirer selects the enterprise to be queried, and the system lists the files of the enterprise whose secret level is lower than the inquirer's secret level (such as enterprise opening, enterprise change, etc.). When the inquirer selects the file, the system lists the documents in the file with a lower security level than the inquirer's and the pages with a lower security level than the inquirer's. The searcher can see the corresponding image on the selection page. When displaying an image, if a confidential area is defined on the image and the security level of the area is higher than that of the searcher, the image will be displayed after the area is deleted. The inquirer can set a print mark on the image with the confidentiality level lower than that of the inquirer, so that it can be printed at the time of settlement, or cancel the print mark. The billing query system automatically collects billing information (such as recording the query time, the query enterprise and the queried image) after the query starts. The current query fee and printing fee are calculated according to the billing method, and the information is displayed at the bottom of the screen to prompt the inquirer. When the inquirer finishes the query, the system records the information to the database.
Billing inquiry settlement is a process in which the inquirer pays the inquiry fee, receives the printed materials and inquires about the fee bill. The counter collects fees according to the billing information of the inquiry device (card number, terminal number) in the billing system. And print out the image of the print mark set by the inquirer (the deleted area is also not printed out) and the inquiry fee bill.
During the registration, query and settlement of billing query, the billing query management module can be used to monitor the usage of the query equipment and control the status of the device at any time, including ready to query, being queried, ending query and settled. At the same time, customers can view the current and historical usage of the query equipment through the billing query management module, including time, query person, query content, billing status, etc. Customers can also view the materials scanned and entered when the inquirer registers.

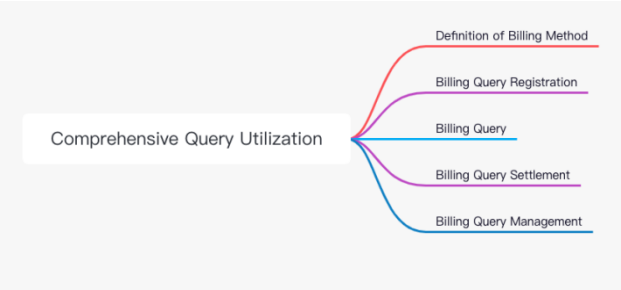

Fig. 3 Fives functions in the comprehensive query utilization module

III. RESULTS AND DISCUSSION

Through the construction of digital urban construction archives, the overall degree of information of the archives is improved, so as to improve the work efficiency of the archives. Through the digitalization of archives, the archives storage ability and utilization ability of the urban construction archives can be greatly improved. The completed Ark Digital Urban Construction Archives can not only serve the public better, improve the social image, but also promote the standardization of archive informatization construction [12]. Through the Internet, public users or government users can query the archival information released by the archives according to their authority, and obtain the archival resource information.It can be browsed or printed according to the needs, and free query or charge query can be implemented according to different situations. At present, the construction of "Digital Riverside" is in full swing. The digital construction of urban construction archives is a part of the whole "Digital Riverside" construction. By accelerating the informatization construction of archives, we can contribute to the construction of "Digital Riverside".

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