THE BUILDING OF WATER INFORMATION PUBLISHING SYSTEM FOR ANHUI PROVINCES

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ABSTRACT:

Publishing Water information on internet can provide people real time rain and water information. The author takes anhui province water information as example to research the design of water information database for serving on internet. The system use MS SQL Server 2000 to Manage vector, attribute and image data to make data safe and united. At the same time, in order to query water information by map, text and image method on internet, the system using ASP.NET to build Web program, using C# language to realize program logic of background and adopting ArcIMS to build WebGIS application. Vector information can be accessed from water information database by ArcSDE, attribute and image information can be accessed from water information database by ADO.NET.

1. INTRODUCTION

With the development of INTERNET, Web becomes the main tool to search and query data, timely and accurate hydrological data released by network not only make hydrological stations able to understand the whole basin fact, but also provide a best way for other water needs, and Provide support for flood prevention work.

In recent years, various parts of the hydrological units have done some real-time water information system research, now it is from exploratory research stage to practical development and application of the progressive phase. But, Most of systems are based on text and tables, query forms are single relative. The rise and application of WebGIS provides a new way for querying hydrological information on the INTERNET. The user not only can query hydrological information on map-based graphics, but also get thematic maps of hydrological information. The effects of query method and result are more vivid.

Web-based flood information system is the use of advanced networks, databases and other mainstream information technology, realizes real-time information query and applications. In this paper, the authors take Anhui Province as an example, using the current popular technology of ASP.NET and using ArcIMS to build the water distribution system on web.

2. THE DEVELOPMENT ARCIMS

2.1 Choosing ArcIMS Connectors and Viewers

ArcIMS is a solution for delivering dynamic maps and GIS data and services via the Web. It provides a highly scalable framework for GIS Web publishing.

One of the import questions that come up when planning an ArcIMS strategy for developers is to decide the most suitable connector and viewer combination. ArcIMS provides three viewers and four connectors. Viewers are The HTML Viewer, the Java Standard Viewer and the Java Custom Viewer. Connectors are the Servlet connector, ActiveX connector, ColdFusion connector and AppServerLink connector.

Most of ArcIMS Applications are customized based on the viewer, by modifying the page in HTML and Javascript code to customize and expand the client function. In order to achieve zero-client browser is installed, the water information publishing system uses the method of the custom HTML Viewer and the Servlet connector.

2.2 Embed ArcIMS function into the website generated by ASP.NET

ArcIMS provides the server three management tools, The Author, Designer and Administrator. First, Author organizes map layers together, set the stacking order of layers, pixel color, display settings and label styles, and generates Axl document. Second, Administrator will use the Axl document establishes map services, and launch services. Finally, the use of Designer toolbar creates a Web site.

In. NET integrated development environment of Visual Studio. NET2003, the part of web page design is separated from the logic and procedures of the preparation. In order to embed webpage generated by ArcIMS into the website generated by ASP.NET, The developer builds an ASP.NET Web site and generates a View.aspx file first. Then copy the code of viewer.htm file to View.aspx file. So the Javascript variables and functions are included in ASP.NET webpage. According to the requirement of customer, it is only need to modify the HTML page code and .js file that generated by ArcIMS.

3. SYSTEM DESIGNMNET

3.1 System Architecture

System uses SQL Server 2000 to manage text data and map data, uses IIS as a Web server, uses ASP.NET to build Web

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applications, uses C # language to realize background coding logic. At the same time, the system chose ArcIMS as the map publishing platform, use the Browse / Server model to build System.

From the structure and function, the system uses the traditional three-tier architecture: data layer, Business Logic Tier, and that the layer structure as shown in Figure 1. The establishment of three-tier architecture to separate the application data to improve the stability of the system, but also greatly enhance the system scalability.
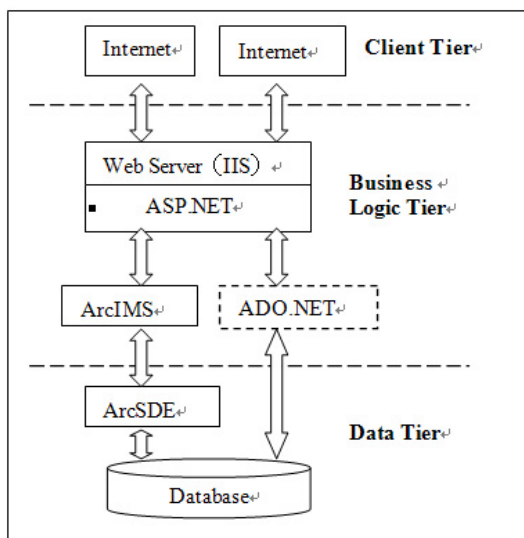

Figure 1. Framework of the system

Data Tier: Responsible for data storage management and Process data, Return data to the Business Logic Tier. ArcSDE is ESRI's technology for accessing and managing geospatial data within relational databases. It connects with Database and returns spatial data to the Business Logic Tier. Other requested text data are accessed by ADO.NET.

Business Logic Tier: Business Logic Tier, including Web server (IIS), ASP.NET, ADO.NET and spatial data servers (ArcIMS), is the core of the system, plays a major task of the application processing, including the HTTP layer to deal with customer requests, and database server connectivity and interaction. Web server provides information on-line, ASP.NET is responsible for explaining ASP.NET applications, Reading the TEXT data is achieved by ADO.NET through database. The spatial data server is responsible for obtaining spatial data from spatial database and translates them into a standard HTML page, then published by the Web server (IIS).

Client Tier: The system will return user's request information mainly in pictures, text and charts format. Because the client side is "thin client", spatial data and thematic map is returned to user client in jpg format.

3.2 Database Design

There are two types of data. The one type is vector data, including the basic maps and hydrological maps. The basic maps include administrative divisions map, road map, water system maps, topographic maps and so on. Hydrological map include rainfall, hydrological and other site distribution maps. They are stored in accordance with the Geodatabase Data Mode imported into database by Arccatlog tool. The system access map data through ArcSDE software. The other type of data is the hydrological text data, Including the distribution of river water tables and reservoirs water table, water table weir gates, gate hoist Table, special water table, the mean number of days the river water table, the mean number of days the reservoir water, etc. attribute data is stored in accordance with the standard code of Hydrological Information Code norms.

3.3 Functional Design

3.3.1 View Function: Maps can be enlarged, reduced, roaming, left, shifted to right, move up, down, full shows. The interface of the website looks like figure 2.
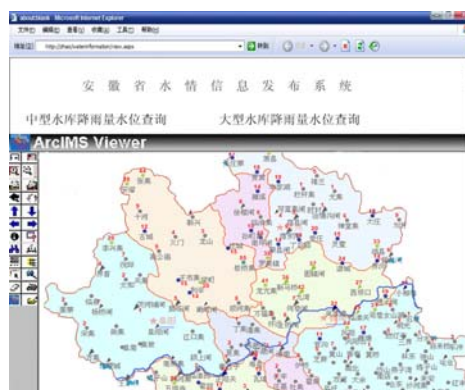

Figure 2. Interface of the website

3.3.2 Inquiry Function: User can view the attributes of vector data elements by clicking-through graphics, rectangular selection, polygon selection function to choose graphics. On the other hand, they can also locate graphics data through searching the attribute data

3.3.3 Thematic Map Functions: The system can generate color maps, charts and histogram classification maps, such as thematic maps. For example, data based on water can be divided into different levels map

4. CONCLUSION

In this paper, based on hydrological information, the authors mainly research the method of building water information system publishing. System stored the graphics data and text data in relational databases, improved data security. At the same time, the system adopted ASP.NET and C# to build program. The speed of request is more quickly and the program is easy to modify. The effects of query method and result are more vivid.

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