Design and Realization of the Modern Fishery Harbor Geographic Information System Based on SuperMap IS.NET

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Abstract—With the sharp increase of fishery harbor's scale, geographic information and developing information, a system which can manage all information is that necessary. This article introduces the design and realization of the fishery harbor geographic information system. This system is developed under SuperMap IS.NET platform, which is based on WebGIS. We can measure, search and manage fishery harbors by this system.

Keywords- SuperMap IS.NET, web GIS, AjaxContronls

I. INTRODUCTION

Fishery harbor is the important infrastructure for coastal fishing area. It's a part of disaster prevention and mitigation system. Moreover, it's the base of developing fishing area's economy and society. Fishery harbor plays a very important role on preventing disaster and protecting fishermen's lives and property. It protects fishers sailing, berthing and working. In additional, it promotes fishery and fishermen's development. As China steps fast on fishery harbor's development, it requests higher level information management of fishery harbor. Now, fishery harbors' information is dispersive and closed in China. Since the information of building fishery harbor is not connected with spatial information, we cannot find it through geographic information. So, it is that important to create an information management system to manage fisher harbors.

Fishery harbor's geographic information management system is based on WebGIS. Comparing with traditional GIS system, WebGIS realizes more widely access, manage and analysis remote data. This system integrates lots fishery harbor's geographic and base information. It guarantees efficiency by reasonable distribution of computation between server and client. Users could scan, search information of fishery harbor.

II. DEVELOPMENT PLATFORM AND ARCHITECTURE

A. Development Platform

We choose SuperMap IS.NET as the development platform. SuperMap IS.NET contains user interface performance, Web server extension, GIS server, data server and remote management, which supports multi-source data integration, massive data access and server cluster. Other more, it offers high level system stability, capability of massive data access and extension [1]. We use Visual Studio 2005+C#.net which supported by SuperMap IS.NET perfectly to develop under Windows Server 2003.

B. Architecture

System architecture contains data server layer, operation logic layer, Web server layer and Web performance layer. System block diagram shows on Fig1.

Figure 1. System structure

III. DESIGNS OF DATABASE AND REALIZATION OF SYSTEM FUNCTION

A. Design of Database

Data used in system construction include 1:400,000,0 fundamental terrain data(stored in SDB data package), Locality data of fishing harbor and the properties data. One SDB data package consists of two files: the one with SDB extension stores spatial data, the other with SDD extension serve as properties database. Locality and properties data of fishing harbor are stored in SQL Server2005, using SuperMap SDX and spatial database engine to Seamlessly integrate spatial information with properties information. In this way we can classify data with different function logically and manage them more easily, thus the pressure of the database server can be lower and the speed of page accession will be faster.

1:400,000,0 fundamental terrain data include fundamental terrain information such as administrative region, highway, railway, river system etc.

Locality data of fishing harbor and the properties data are showed in Table 1.

Database	Classification	Fieldname
Fundamental information database	Fundamental feature	number, name, level, ownership unit, management right owner unit of the fishing harbor
	terrain feature	location & coordinate of the fishing harbor
Feature information database	investment	Central planned investment, Regional planned investment, Central committed investment, Regional committed investment
	Waters facilities	Harbor basin area, anchoring area, Breakwater structure, length of the revetment, harbor basin depth
	Land facilities	Frozen zone area, composite materials zone area, ship repairing area, oil reservoir area
	Harbor capacity	Annual amount of discharging

	port, fish dischargement pre day, annual turnover of transactions, annual sum of transactions
Disaster prevention and reduction	of ship quantity in it. Fishing boat shelter mode, level of typhoon can be resisted

B. Realization of System Function

The fishing harbor geographic information system mainly contains GIS module and data management & maintaining module. System function design is showed in Figure 2.

Figure 2. Fuction design of the system

Map measurement: Map measurement implement two-point or multi-point distance measurement and region area measurement on the map. Mainly includes distance and area measurement function.

Map browsing: It can display geographic distribution maps of harbors, the administrative regions they locates in, and the road traffic map and important drainage of each harbor.

Data query: Data query function mainly includes two means: map query(figure querying attribute) and figure query. The map query means querying one specific harbor when the map is enlarged to a certain extent. By specific querying operation, related query information can be obtained on system interface. The attribute query could be operated according to the name, fundamental information and geographical location of harbor.

Management of attribute data and spatial data: Management of system attribute &spatial data is operated by using desktop processing tool SuperMap Deskpro. Attribute operation includes add, delete, query, rectify etc. Spatial data mainly includes converting existing data, editing data, map vectorization and data grooming etc.

IV. KEY TECHNOLOGIES OF SYSTEM FUNCTION

The author mainly used AjaxContronls widgets provided by SuperMap IS.NET in the actual development process.

AjaxControls, which is the GIS widget packaged by Ajax used by SuperMap IS.NET, keep MapControl as the core, automatically links related widgets. By invoking related map widget, it can complete corresponding functions quickly and directly. Take the implementation of distance measurement as example to specify the invoking process and the implementation model:

(1) Appending widgets, append DistanceToolControl to ToolbarControl, bounded to current map widget MapControl.

(2) Trigger measurements when the two-point or multi-point distance measurement is going on:

```
varDistanceAction=new
superMap.IS.MeasureDistanceAction()
measureDistanceAction=newSuperMap.IS.MeasureDistanceAction(onMeasureDistanceComplete,onMeasureDistanceError);
```

//complete the manipulation function on Measure Distance Complete and measurement exception function on Measure Distance Error;

(3) Events binding: enter designing page of the Default.aspx, add related codes and click the attribute option of distance measurement widget, select FinishedEventHandler in attributes column and ensure DistanceCompleted

(4) Running test: display the obtained result
Process Flow is showed below:

Figure 3. Distance measuring and calculation

V. CONCLUSIONS

Fishing harbor geographic information system based on SuperMap IS.NET utilizes WebGIS technology to implement seamless integration with other Web information services. Thus more flexible GIS application can be created, spatial information management and release can be implemented, and the service ability and application quality will also be improved. Establishment of the fishing harbor geographic information system provides more visualized, accurate, scientific data for construction of the harbor, and provides reliable reference for daily management and future construction of the fishing harbor.

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