

# The Design and Research of Real Estate Information System of Jinan City Based on Internet

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**Abstract:** On the basis of analyzing the good and bad of existing real estate inquiring system on Web, this article, taking "Jinan city" as an example, set forth how to realize the union of internet, real estate and GIS by means of Java and ASP technology.

**Key Words:** Real estate information system, Internet GIS, ASP, Java

## 1. Preface

Internet GIS is a kind of GIS centered on Internet. It uses Internet environment to supply GIS Function (such as analysis tools and mapping function) and to gains spatial data and other datas for all function of GIS.

With the rapid development of Internet, real estate enterprise and real estate trade, one kind more advance communicational tool is needed, which will build a bridge among companies of real estate exploitation, houses sell enterprises, customers buying houses and users renting houses. It makes customers who want to buy houses be able to completely, quickly, and exactly find out the information of real estate, and supply scientific gists for management. So, if people can get the information of real estate lively, vividly and directly by method of GIS with the help of internet, it will enrich the internet information resource, standardize and prosper real estate market. It's a nice ideal, Because how to realize is very difficult. Now, the vast existing real estate information only have simple introduction by words, and its image information mostly is static ,so it can't meet the demand of Web trade.

## 2. Model analysis of real estate information system based on Web

real estate based on Web may be regared as an union of spatial information system and MIS. From the angle of spatial information, Internet GIS mainly has the following methods in recent years.

### 2.1 Internet GIS based on CGI

The Internet GIS on the basis of CGI is a kind of expansion of HTML. It needs GIS Server to run on the background and uses CGI script to link GIS server and Web server. All GIS operation and analysis on client are finished on GIS server. The work principle of CGI is as the following: The user of Web browser sends out demands of URL and the request of GIS data operation; Web server accepts these demand and transmit users' demand to GIS server by using CGI script; GIS server accepts demands and deals with GIS data such as to magnify, reduce, navigation, inquiry, analysis and so on. It also makes the operational results be transferred into GIS or JPEG images; At last, GIS server make GIS or JPEG image return to Web and show it on screen. MapObject and ArcViewIMS and Proserver are Internet GIS which are based on CGI.

### 2.2 Internet GIS based on plug-ins

GIS plug-in is an executable GIS software to amplify Web browser's function on browser. The main function of GIS plug-in is to make Web browser be able to process non-seam GIS data and offer situation to communicate between Web browse and GIS data. GIS plug-ins directly process GIS vector data that come from server. At the same time, GIS plug-in can produce its owner data to be used by Web browser and other plug-ins. Plug-ins must be firstly setup on client, then be used. The working principles of plug-in model: Web browser sends requirement of manipulation for GIS data display; Web server receives the asking of clients then processes it and sends the GIS data back to Web browser. Client receives GIS data transmitted from Web server and perceives the type of GIS data ;looking for plug-in (or helper) relating to GIS data at local

system. If corresponding GIS plug-in having been found, it will be used to display GIS data ;Otherwise, it is necessary to setup and load corresponding plug-ins for display. The manipulation of GIS such as zoom in/out, query, analysis can completely by corresponding GIS plug-in. The autodesk's mapguide is a kind of Internet GIS based on plug-ins, and it is also the Web GIS based on the manner of ActiveX Control.

### 2.3 The Web GIS based on Java-Applet manner

GIS Java Applet is a small application program that automatically be downloaded from server to client when browser linked to particular Website, and runs in the environment that supporting Java's Web browser .GIS data Applet is programmed in OOP language-Java and mates with client in order to operates GIS data and communicate with high server program .GIS Java Applet is the byte code that stay inside web server at the beginning. At the common situation GIS Java Applet is included in HTML code, and it can be gained and aroused through reference label-<APPLET>.The working principle of GIS Java Applet model: The Applet program that enched inside Web browser sends application for spatial data and attribute data; high application program server will analyze the asking and extract data after accepting it,then send it back to client. Local Java applet begins to process it and to complete the GIS manipulation after client receives the data. The internet GIS based on GIS data Applet has the Active Maps and Bigbook.

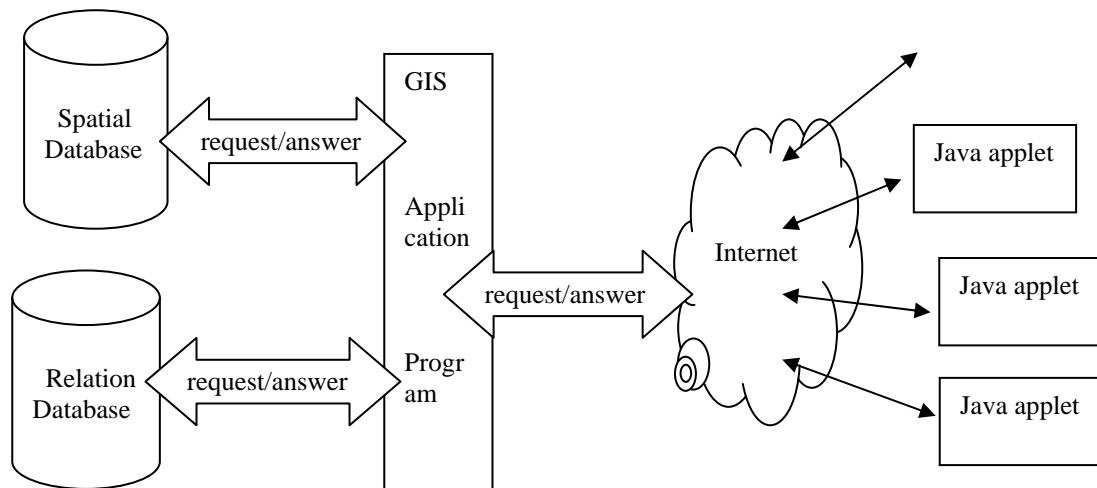


Fig.1

It is more reasonable that using vector data because the types of real estate information are plentiful and it is benefit to client's query. We adopt the scheme based on Java applet in Jinan city's realty information on Internet issue. Its structure of three levels sees the fig.1 : the high is comprised of RDB, Spatial DB and server of GIS application program. The RDB and spatial DB are cooperated. RDB can be any popular RDBMS. This paper adopts MS SQL server2000.The spatial database makes the use of the advanced object database to save and manage the spatial data. GIS application server is also a multitude thread application on the basis of Java, so it has very good stability and high efficiency and at the same time it may meet the amount of client visiting in the Internet.

## 3. The Design of system

### 3.1 The designing principle of system

- (1) Practicality: The facilitical operation, the friendly Interface and the accurate contents;
- (2) Extension: It includes the extension of data and function;
- (3) Cross-platform capability: the unrelated character between operation system and platform, meet the clients of the biggest range and use the realty datus;
- (4) Hypermedium capability: the user can not only search the information related with the spatial position conveniently but also obtain the information of the transit of city and the planning of small region;

- (5) The ability of informational bidirectional flow: The users can not only search information, but also provide the necessary tool which obtains the back-feed information of user and then provides the warranty of the decision of the government department;
- (6) The distribute attributes of the client/server: Some simple operation can be finished on the client, but some complicated operation (such as the shortest path) can only be finished on the server, then the result can be passed on the client.

### 3.2 The Internet topology structure of system

The Real Estate Information System of Jinan City on the basis of Internet is a typical application of Internet three-layer Database: migrate from client/server model to B/S model. B/S model is a new system platform model on the basis of Web technology. It makes the server of the traditional C/S model divided into a data server and one or several application server (Web server), so make up a client/server of three-layer structure.

The first layer client is the interface between the user and the whole system. The client application should be a general browser software, such as Netscape Navigator, IE of Microsoft and so on. Java Applet can communicate with the high application server of the second layer GIS.

The second layer GIS application server will setup the corresponding thread to respond the request and dynamically produce corresponding data, and return them back to the client browser. If the request that the client handed in includes the extracting and saving data, GIS application server needs finishing the processing work with the database server.

The task of the third layer database server likes client/server model, it also takes charge of coordinating the request of different servers and manage the database.

### 3.3 The data flow of system

The data of Real Estate Information System of Jinan City Based on Internet includes GIS data (image data related with spatial position) and multimedia data. The GIS data includes vector and raster data, the multimedia data refers to word, sound, picture and video and so on. About how to persevere the updation of data, the most important point is to provide a kind of rapid measure to update the present data. Therefore, The data flow of the whole system see fig.2.

The capture and update module of data takes charge of the entering and updating of the GIS data and multimedia data. Data manage module is in charge of the organization and dispatch of data. Data issue module responds the request of and sends the data to the user.

### 3.4 The function module of system

As fig.2 shown, the system is made up of eight function modules: The Status Quo of City Zone responds the basic situation such as the geographic basis, the municipal facilities, the public traffic, the land use and so on. By the form of vector map, the city planning primarily uses the form of image and word to respond the historic review and the present city planning of Jinan city which include the general planing, the recent construction planning and regional detail planning and so on; The reconstruction of the old city zone primarily includes the browse of reconstruction region, futural projects, constructing projects, constructed projects, migrating projects, recalled projects and the important incidents of the reconstruction of the old city zone. The exploitation of new region primarily includes future projects, constructing projects, constructed projects and recalled projects; Management information module primarily includes the management institution, the management statute, the development planning of exploitation, the annual exploitation planning, the brief introduction of realty and the reality of exploitive management; The norm land-value module primarily includes the introduce of the basis land value, the map of land value in the residency region, the map of land-value in the business region, the map of land-value in the industrial region; The exploitation condition module includes the level matched with municipal installment, the assureable level of public installments, the connection of public traffic and so on, the statistical analysis module respond the migration of city by the statistics.

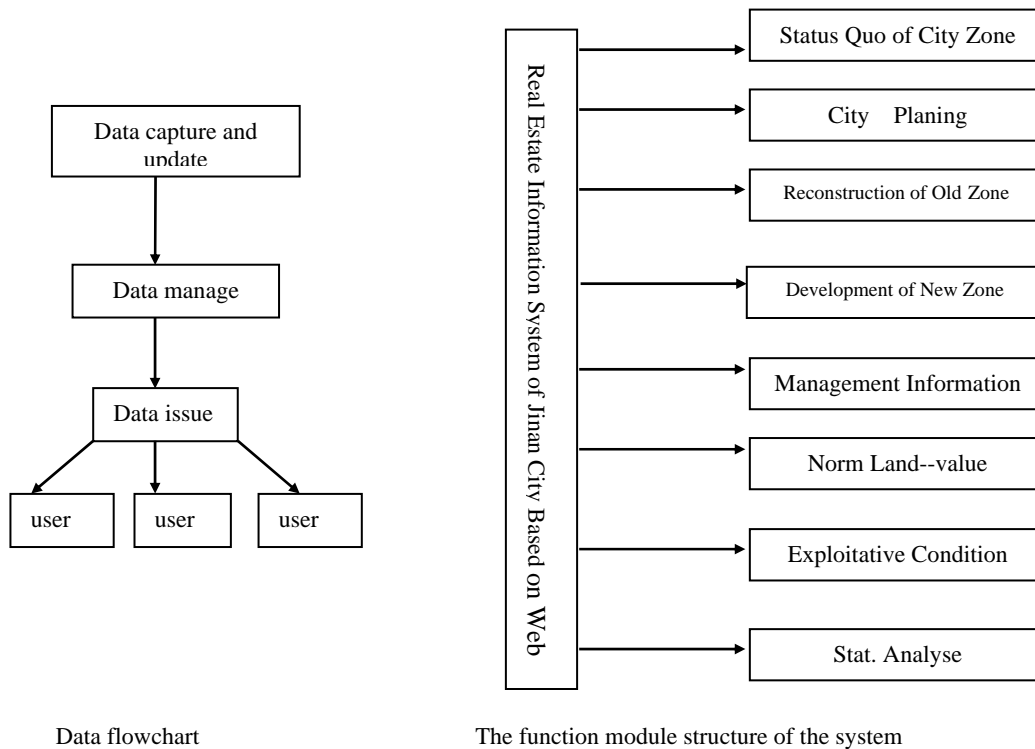


Fig.2

### 3.5 The difficulties of system

It can not be denied that ASP has unique advantages in exploiting Internet database. But there are some difficulties in applying the technology to develop management informational system of the realty.

#### 3.5.1 Dynamic data servers

As a rule, it is easy to develop MIS by ASP, but when it relates with the image data, it is difficult to develop the system which combines MIS with GIS. One important reason is that the present Internet GIS softwares are almost modified on the basis of the traditional GIS softwares, so the attribute data of many GIS softwares are based on the file management, However, the more important in this system is the attribute datas, the spatial datas are only severed as location and provide the realization of sensibility for users. Therefore, in order to develop practical system, we must abandon the structure model of the traditional GIS and use data base to manage spatial data and attribute data, and keep pace with each other. In the realization, the spatial data and attribute data of a city is always changing with time , if the system can provide a function which can keeps the spatial data consistent with the attribute data, it must provide the dynamic data server in the system. The updated data must momentarily update the background database. The foreground user can get the data which they may interest in by the data List and the data retrieval and learn the information of the realty.

#### 3.5.2 The momentary transportation of data

GIS spatial data is different from other types of data. In GIS data is the “Blood” of system. How to make the data transfer, especially transfer like text data transfer rapidly and correctly in the complicated Internet situation, need solve many problems. At first, the server must provides the function which obtains all kinds of datas for these different types of data source, and condense the data in order to reduce the transferring amount on the premise of keeping the data integral

secondly. Because condensing the data is limited, It must use oriented-topic management measure to class the data so as to dynamically transfer the data and achieve the momental transfer of data in the course of the user operation. Thirdly, as far as the program of the client is concerned it must use the class dynamic-loading technology and the functional component of timely transfer.

### 3.5.3 Interactive, dynamic 3D scene

VRML, as a kind of model language, describing the real world, provides the rule and method setting up virtual 3D space. The problem is how to realize interactive dynamic 3D scene by the present technology, and make the user to enter the virtual residency of actual 3D on the basis of tow-dimension platform location, so stimulated the itch that the customers bug houses. The key is to realize the unite of 3D GIS and two-dimension GIS in the Web.

### 3.5.4 The use of multimedia technology

The multimedia information includes information such as word, sounds, movies, video and so on, and respond the information of buildings from the profile. How to connect the object of GIS with the attribute data by using ASP technology, dynamically produce regular net-page, timely query the multimedia information of GIS objects is the key to the system which accomplish the unite of GIS and multimedia.

### 3.5.5 The fuzzy query technology of GIS objects

The fuzzy query is to query the satisfied houses by the conditions which the customers provide. For example: The customers can make some request, such as, for the house's location, the house's price, the house's type the house's area. The system selects out these houses which the customers are satisfied with in order that the customer can select conveniently. The key point is to make a certain standard for the data, and make the data as minimal as possible on the basis of meeting the condition of query.

## 4. Result

Developing the Real Estate Information System of Jinan City Based on Internet has important economical and social significance. On the basis of analyzing the present exploitation and management informational system, the paper concretely analyses four kinds of structure models of Internet GIS, classes the Internet topology structure of system, data flow and function models, and at the same time also analyses the key technology and the difficulties of the system, at last it make the use of Web GIS software platform SMARTMAP to develop the system, see Fig.3.



Fig.3

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