Presenting a combined E-Government framework using DSS and GIS

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Abstract: Both Geographic Information System (GIS) and Decision Support System (DSS), play an important role in matters of governance or electronic government (e-Government). But GIS and DSS are usually work independently, interactive relationship between the two is intangible, so e-government applications in GIS is inconvenient and inefficient. This paper presented a new idea for the design of software platform based on the integration of GIS and DSS according to the objective of e-Government Construction, introducing the function of integration objectives, methods and technical ways in different levels of this platform. This document is seeking a new path towards the development of GIS electronic government affairs, also describe the successful application in a number of G-government project, such as: General situation of the national information system.

Keywords: GIS. DSS. E-Government. Software integration.

1. Introduction
GIS is one of the building technologies for e-government, is also a tool to help to administer and analyze macro for all levels of government. This affects the national economy and management, disaster prevention and management of governmental affairs [1]. But GIS and Decision Support System (DSS) are usually work independently, interactive relationship between the two is intangible, so e-government applications in GIS is inconvenient and inefficient.

Under this situation, we have to build a software platform for spatial decision support system within the network environment, and closely integrated decision support system (DSS) technology with geographic information system (GIS) technology, so we can provide comprehensive information and enforcement policy for government services. The total volume of building E-government targets and management system requirement to adopt a unifying platform system structure, database structure design, and module design features and elements of development, also the foundational spatial database as a thematic framework for the...
integration of spatial information, the information economy statistics, a matter of government information and multimedia information to create a comprehensive spatial information warehouse database, implementation of GIS, DSS and the tight integration of live and function call, depending on the electron secure platform for Government Affairs, Spatial decision to create a single software platform for e-Government applications.

General design software platform is held by the following principles: to meet the overall requirements for electronic public affairs and Digital construction. To comply with national standards and specifications, and share information and the principle of multi-protocols. To use integrated application model C / S and B / S systems. To support the information management structure with more objects and multi-level standardization and application of personality. To implement distributed management and maintenance. [5-7]

1.1 Database Design
The work item database design is to achieve the following work:
(1) To confirm the proposed principle. Based on extensive relational database features we have implemented the principles of database design, at the same time pay attention to apply for GIS and DSS, integration, application of function applications.
(2) to select the content database. Depending on application and system characteristics, spatial data content of this platform are selected as thematic data, spatial data and attribute data, documents and multimedia data, etc.
(3) The concept / logic database design, physical database design and set up demonstration test database.

1.2 administration and data management
Meet unified storage and management of spatial data and non-spatial data and how it differs from the purely relational data management is also different from the message file. It is important to solve the problem of effective management of spatial data in a relational database and the specific techniques involved are as follows:
(1) the creation of spatial data demand mechanism. The key to the organization of spatial data is the index and query data, and good or bad performance spatial index performance directly affects the whole spatial database and GIS platforms. The vector spatial data index, stratified index encoding mechanism and the mechanism forums are based on the entity list, index map layers, it is better for spatial data query efficiency. For networks of spatial data index + tree, tree CELL, quads, etc. tree index mechanism as R, R are used as spatial index tree structure is stored in the box and surround the code for each object are stored in the node tree.

(2) data compression. Regular controls the amount of GIS data, high or low performance of the system are very great relationship with the network transfer rate. In order to reduce network load, we consumedly reduce the amount of transmission network using a data compression of spatial data, so that system performance will increase. Since the vector data to a lower level of redundancy and compress its potential is great. To compress audio, video, animation, multimedia data, the system to achieve higher compression ratios such as 50:1 even higher by any compression algorithm. We can supply different resolution data layer methods and reduce the amount of on-line data visualization with respect to the use.

(3) The use of a large relational database technology. The issue of large capacity for spatial data can be returned to a very large pool of entries and 100,000 to achieve even a few million records. So we can put the record into the database buffer in the server, then the customer receive data after the data in the database cache, and then custom program to start, taking turns to give the process in the background. Data transfer and data transactions are asynchronous, the customer has no further use for waiting in advance of customer data spread and are processed at the same time and need. When you release the handle customer system resources, so the system can lower consumption.
1.3 software development.
In order to apply the properties in DSS and GIS applications, to achieve close integration of their functions shall platform components to achieve functional integration of GIS and DSS. Component idea to make a repeatable software application, each component has its specific interfaces and services that can provide a valid mechanism to create the software. The general definition of the method call to the software used, it can pass through the link library, application program, system software and network component still provides a valid way to separate the software blocks, each block contains, or any service can be used by object-oriented design method and develop a program that simplified a complicated system. To implement the method of the software function, because the system contains spatial data in a relational data or statistical data), attribute data for spatial data adopting the relational model are appropriate and using the SQL command to implement in question is effective. Given the range of complex relational spatial data is difficult using a relational model. But object-oriented method of abstraction, packaging, encapsulation, polymorphism is feasible for processing spatial data. Therefore, mixing with Object Oriented relational model is suitable for the implementation of integral management of spatial data and attribute data.

2 platform architecture
Using the structure of the service platform to receive B / S, system maintenance to take C / S structure, as shown in Figure 1. Software platform is divided into three parts: Generate application tools, application server and client module. These tools are concerned with spatial data as inputs, process, edit, application threads to create / modify the server side. Application Server running on the server that receives and analyzes the client's request, then gets spatial and non-spatial data from database and send them to the client. The complicated spatial operations could be done in the client, such as spatial analysis, the application server to call server side component for the operation. On the client side module is composed by the display and user interface.
Figure 1. Software platform architecture [1,2]
Through the structure of a unified design, database design, modular component design and development functions are methods of making narrow GIS and DSS, the integration of live and function calls, set union zoning software platform.

3 running on the platform hardware environment
To obtain the GIS as the foundation and framework to use a function call to the implementation of tight integration with DSS, the integration of the features exhibited on three levels: data layer, application layer, and maintenance services layer. thematic development of the database is the key to the building, takes database platform as the primary source of data, processes the correlation data in the database and put the result into the application server by topic , final reports at all levels of users through a web method, user all accesses take to follow strict safety mechanism.

The system provides a single tool for maintenance to implement thematic information interface devices and make their own operation, the thematic information each node of the tree can connect with a variety of spatial data, non-spatial data and corresponding operational command to create a theme object entity is used to describe spatial location attribute information and operational command.

They are provided by a single maintenance tool thematic information system can be completed thematic tree formation, register, increment, delete, copy, modify, etc. the operation node to node of the tree theme can add spatial information (range), with no spatial information (table, text, thematic graphics, multimedia) and spatial issues, spatial analysis and comprehensive information on the data warehouse analysis, etc. operation.

4 Conclusion
This platform won a series of successful application of e-government projects, applications, search for a new way of GIS development towards e-government issues. For example: General situation The national information system. Flood and drought Avoid Information Server System. West Development Information System Server and so on. This paper shown some combined system in E-Government approaches with involving Decision Support Systems (DSS) and Geographic Information Systems (GIS).

Although the platform also designs, there is still a problem, you need to improve system flexibility, custom features, etc. in the future.

References:
[1] Liu Jiping, etc. The study and application of complex spatial data management for decision making for e-government. The science of surveying, 2005 (30)