The research on the technique of geospatial information service component

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Abstract. The product design and development process of geographical spatial information service based on the service componentsinvolve many key technologies. In this paper, spatial database engine under the condition of multi-source heterogeneous and service oriented comprehensive spatial data query are studied. According to the characteristics of multi-source and heterogeneous, we adopt the reasonable way of spatial data organization and storage and the good class hierarchy to realize the flexible database access mode. Then, the comprehensive query implementation of spatial data based on service-oriented is expounded, and then we associate multiple spatial data by keyword stock.

1 Introduction

Geospatial information servicecomponent is a concept put forward under thecurrent complex application models and computing environment. The traditional object technology and component technology can't meet the application development of geospatial information service products under theenvironmentof service-oriented computing. Although the service-oriented framework better solve the problem of cross-platform andinteroperability with heterogeneous data which is under service-oriented computing environment, the main implementation technologies, Web Service based on the SOAP protocol and the HTTP protocol haslow data transmission efficiency and can't meet the needs of LAN applications on performance. Geospatial information service components can provide the services of geographic information and access methods to local calls and Internet access remote calls, etc. By the geospatial information service components, we can realize cross-platformaccessand geospatial data manipulation.

2 Spatial database engines under the condition of multi-source heterogeneous

The Spatial Database Engine (Spatial Database Engine, SDE) is the underlying supporting technology of geographic space information service component.SDE working principle is: client side send a request to server side, serverside process the incoming requests and transform it into an affairs which relational database can handle, and then the corresponding requestis completed by the database, finally, the server side transmit the processing result to client side in real time.

2.1 Spatial data storage physical model

Spatial data generally can be divided into two kinds of vector data and grid data. For spatial data storage, there are two common ways in a relational database: one is the use of WKB(Well-Known Binary) to store the spatialentity; the other one is the use of standardized SQL92 to store them. (1) Vector data storage.(2) Grid data storage. The raster data format is simple relative to the vector data, but the amount of data is larger.

2.2Heterogeneous database access interface

For network application data storage, data may be distributed stored in each node on the network in the form of heterogeneous database, spatial database engine of geospatial information service components should shield the upper application from the heterogeneity of the underlying data storage and provide a unified access interface.

At the same time, every database has differences in the definition of SQL syntax and the adopted reserved keywords. These differences lead to some SQL statements' performing in a database, and illegal statements in the other database. In order to solve this problem, it is necessary to decompose and translate the SQL statement and then check and execution. The specific process is as shown in figure 1.

When receiving the query request, the system will decompose and translate it into the corresponding SQL statement according to the different database types, and execute and return the query resultsafter checking. To realize the process of translation, we need the corresponding relation of database parameters, and the parameters of the corresponding class structure are shown in figure 2.

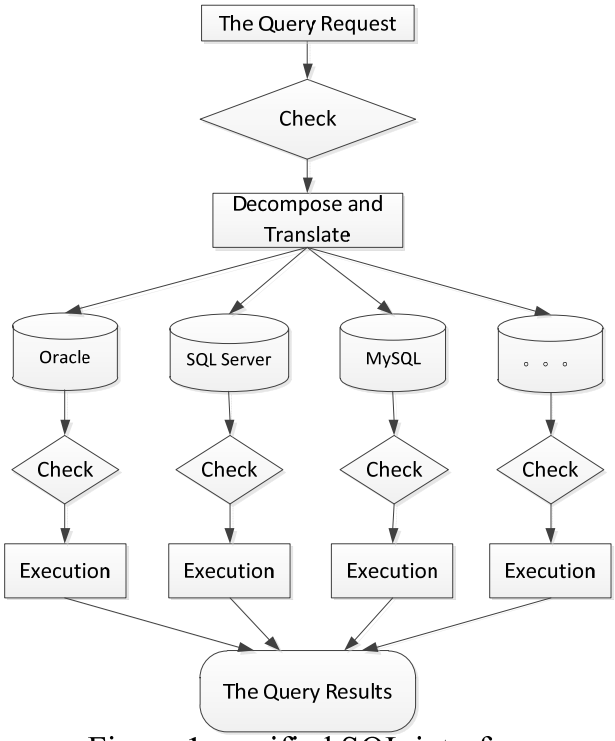

Figure 1 a unified SQL interface implementation process

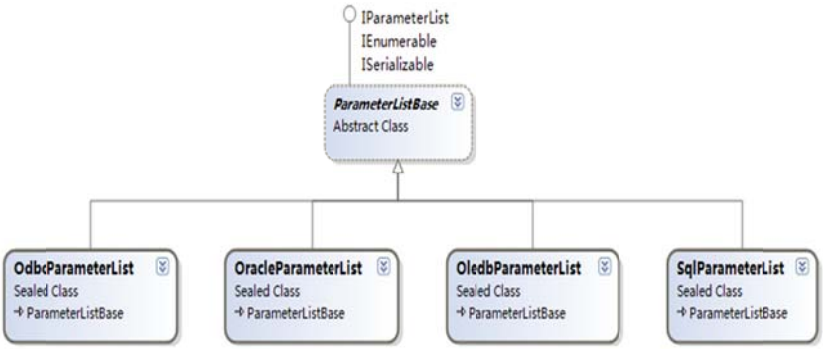

Figure 2 everydatabase SQL syntax parameters UML relationship diagram

3A service oriented spatial data integrated query

In a service oriented spatial data integration system, it is very common situation that user queries involve multiple spatial data sets, we need to analyze and mine diversified data and extract users concerning data from many data sets to provide a comprehensive query which has many query modes like figure to text, text to figure and text to text. As shown in figure 3.

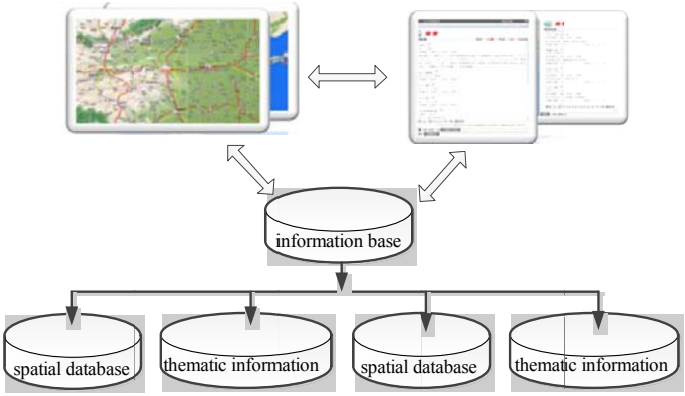

Figure 3 figure library integrated query mode

3.1Multiple spatial data correlation

The information retrieval of Geospatial information is usually divided into two classes:query based on attribute and query based on spatial location (spatial relation query). Query based on attribute is setting certain conditions on attribute information of spatial objects to query and locate spatial position, mainly including character field query,numeric fields query and complex query. Character field query statements often use "=" and "LIKE" to SQL query. Numeric fields query statements often use comparison operators (>, <, =, < =, > a) and operators (+, -, *, /). Complex query often statements often use logical operators"AND", "OR" OR "NOT".

3.2Establish key word stock

For the thematic information failed to set up relationship with spatial data by ID value, we need to mine the underlying geospatial information from the text by full text retrieval like place names, and then we associate them with geospatial information. As shown in figure 4.

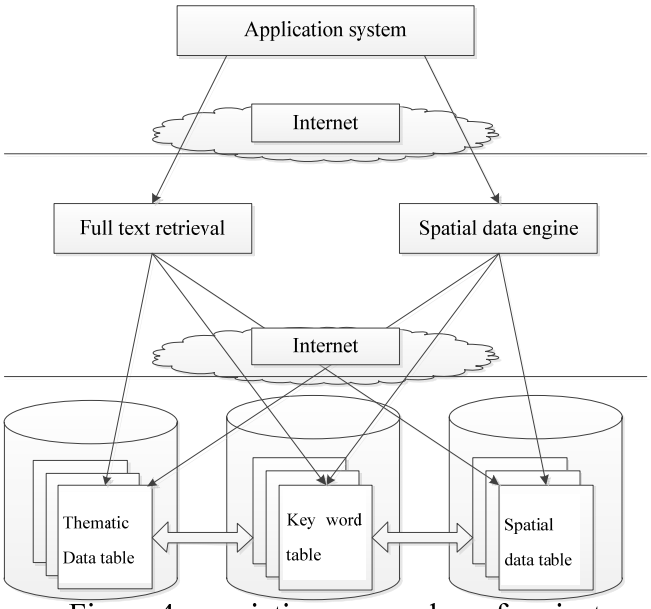

Figure 4 association approaches of project information and spatial information

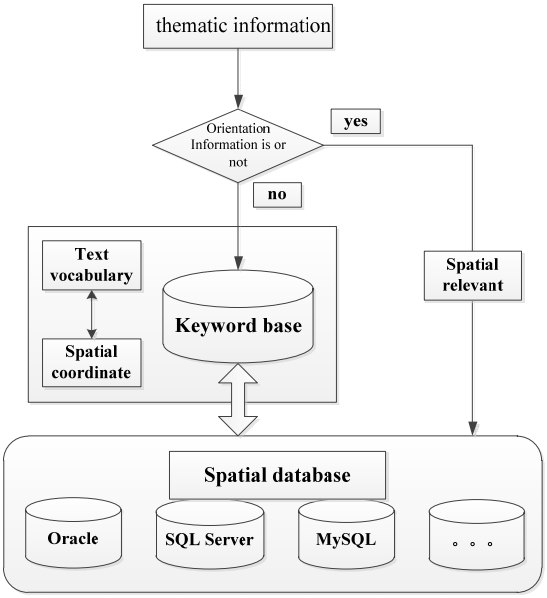

Figure 5 the application of key word stock

The concrete realization method is set certain keywords listin advance, and then the informationrelevant spatial orientation isfound out by comparing thematic information and keyword table.The specific process is as shown in figure 5.

4 Conclusions

Geospatial information service component is a concept put forward under the current complex application models and computing environment, it has a complex application environment and diverse demand. To meet the diverse demand in the complex application environment, the product design and development process of geographical spatial information service based on the service componentsinvolve many key technologies. First of all, in this paper, on the condition of multi-source heterogeneous, spatial database engine technology are expounded, according to the characteristics of multi-source and heterogeneous, we adopt the reasonable way of spatial data organization and storage and the good class hierarchy to realize the flexible database access mode, so as to realize spatial data uniform access on the condition ofmulti-source and heterogeneous. Finally, the comprehensive query implementation of spatial data based on service orientation is expounded, and then we associate multiple spatial data by keyword stock.

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