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THE STUDY OF DATA ABOUT DATA ON SPATIAL DATA WAREHOUSES

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Abstract: In this paper, the organization of metadata of spatial data warehouse (SDW) can't leave support of the technology attached to it. The metadata of a SDW is attached to the technologies such as metadata, geographical information systems (GIS), data warehouse, geographical metadata, metadata of data warehouse and SDW. The metadata of SDW is precisely supported by technology of geographical metadata technology of data warehouse, technology of GIS and technology of SDW. The aim of geographical metadata is to extract information, and the metadata of data warehouse is its reference**.**

Keywords: Meta data, GIS, SDW, OLAP, OLTP, Tools

1. INTRODUCTION

The SDW can't be conventional without supporting of metadata, the metadata plays vital role in implementing the SDW. Initially it directs the SDW how to extract diverse geographical data from different sources, geographical spatial databases; secondly, it directs the application system how to obtain the standard and integration of digital geographical product, and provides user some service about geographical product. In the past, the geographical metadata is only designed for some certain geographical databases, its content and extension can't meet the needs of SDW, and its motive is why the research of metadata on SDW becomes recently a hot spot in the worldwide domain of geographical metadata. It is an important task for SDW to research metadata on SDW, because its can determine the success of the research of SDW.

2. OUTLINE OF FUNDAMENTAL TECHNOLOGY

It plays a vital role for SDW metadata to construct warehouse. It is shared forms to realize unite operation of geographic data. It is an important tool to realize selection and application of geographic data based on standardization and integration. The organization of metadata of SDW can't lose support of the technology attached to it. This paper mainly relates these relative technologies to connect with metadata of SDW as shown in the Figure 1.

2.1 Geographic Information System

It is a growing technology based on computer. It is an integrated technology based on computer science, geography, survey and so on. Outstanding to the GIS research and development (R &D) and application, the GIS subject that belongs to the connection and margin comes into being. It is a technologic system to manage and study of spatial data. The support of hardware to manage and study of spatial data. The support of hardware and software of computer, GIS can function and process spatial data, manage spatial data and research spatial relation among spatial data. It can quickly obtain data to meet user by graph. GIS is a system to save and

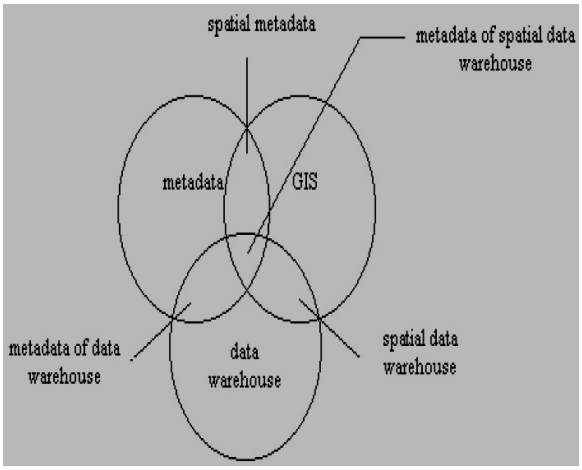

Figure1: Metadata of spatial data warehouse and relative technologies**.**

deal with sets of spatial data. GIS is divided into four (4) parts:

1. Capturing spatial data;

2. Organization of spatial data;

3. Output and display of spatial data;

4. Analysis of spatial data.

2.2 Data warehouse

Data warehouse is a data aggregation of subject-oriented, integrated, steady and managed in order to support units for decision making process. In fact, data warehouse is a managing system of network database and application system; there are lots of complex data which come from different sources in to data warehouse. There is great difference among different sources data such as data type, data formats, data accuracy and data rules etc. These different sources of data are managed by different database management systems. In general, the main task of database is to provide service for online transaction processing (OLTP), its consistency and standard. The transaction processing is small and data capacity to be saved is small. Otherwise, database mainly manages current data set. By contraries, the historical, integrated and unaffected data set is saved in data warehouse for online analytical processing (OLAP) that is data cube. The data set in data warehouse is often modeled multi-dimension data to meet data cube.

2.3 Meta data

Metadata is data about data, there is no differentiate among other data. Many citizens consider that metadata is difficult system and needs to apply information technology (IT) and computer science. In fact, metadata is not a new concept, for e.g. book tag in library, version illumination for book publishers and disk label are metadata. It provides easy intercommunion between data producer and user that makes easy to the user to read. But when metadata is transferred into digital data, it is not easy to manage and apply metadata. The difficulties are expressed as follow: no expedient tool to select data sets from many databases; no technique message for data sets in order to no apply these data sets; no know how to understand and transform data sets when user wants to apply these data sets; no know affiliation information on data production, update and distribution; no visit to data sets by computer network.

These difficulties can be solved and overcome by metadata. It shows that it is an important tool for metadata to have user understand and apply data sets. Metadata can be used to many fields such as an enterprise of data document, data distribution and data browse and data transformation and so on. It plays vital role for metadata to encourage data management, data application and data shared. There is a firm relationship between metadata and data content to be illustrated by metadata. The content of metadata has a large differentiate for different databases.

2.4 Geographic Metadata

When geographic information emerges in digital form, some new difficulties come for management and application of geographic data. These difficulties are included as follows: it is necessary for data producer to possess a tool in order to manage and maintain nobility of geographic data, and to have the lowest effect for production and maintenance of geographic data; if data producer and user exchanges; it is necessary for data producer to have to built data document in order to save some technology information with geographic data; user need know the efficiency approach how to select geographic data, and need know the place how to find geographic data for user application; when user need to understand some digital product information with geographic data. It transforms geographic data in to different format. Under instance, it is very important to have geographic metadata for relating content, quality, status etc. The management and service of geographic metadata becomes necessary method for organization and application of information.

Geographic metadata means descriptive information of spatial data set, and is spatial\attributive\temporal exterior type and detail description to obtain, process, apply data set. It can provide characteristic information of spatial data sets for the generalization and abstraction of spatial data character. User can determine the name, source, structure, scope of data sets by the characteristic information. The difference between geographic metadata and data is that there is a lot of information with spatial location in geographic metadata.

2.5 Metadata of data warehouse

The grouping of metadata and data warehouse becomes metadata of data warehouse. The lifecycle of metadata is divided into three phases: collection, maintenance and equipment. The three phases encourage each other in order to have metadata play vital role in data warehouse.

2.5.1 Collection

The first phase of metadata lifecycle is collection. Its main job is to identify metadata and input the metadata into central database. The collection of metadata should deal automatically as possible as you can; so that there is higher reality for collection of metadata. It is groundwork for collecting proper metadata in proper time to realize successfully data warehouse. Public have no kindness that it will increase a lot of work to design and establish data warehouse. The metadata of data warehouse includes many fields in which there is own collection strategy. The collection of metadata can be deal with automatically in proper condition, but some metadata must be collect in manual.

2.5.2 Maintenance

The second phase of metadata lifecycle is maintenance. In this phase, metadata must track actual change. For e.g. if the structure of relational database table has to change, the metadata describes the table to be updated in order to manage the changes. The exclusive method to insure metadata correction and good maintenance is to have maintenance of metadata which is processed automatically. Hence, it is key difficulty to process automatically metadata. It is concluded that maintenance of metadata must be processed automatically in order to have metadata to keep in good condition in data warehouse environment. It arrive very high automatic level for physical metadata managing the structure of data source and data warehouse.

2.5.3 Equipment

The third phase of metadata lifecycle is equipment that is to provide proper metadata and its applied tool. It is the phase to yield after paying out a lot of work in the phases of collection metadata and maintenance metadata. Under environment of data warehouse, the different metadata for different users are provided. The key factor is to equip metadata to match correctly metadata and specifically

demand. After metadata has been collected and maintained, metadata should be quipped to its user environment of data warehouse. It is very important task to provide proper metadata for users in data warehouse.

2.6 Spatial Data Warehouse

The combination of data warehouse and GIS becomes SDW **[1]**. The business among many subject and units is often posed when people face to modern geographic problem. Hence, the shared operation of each other spatial information, the analysis and generalization of spatial information become very important in general research of geographic problem. In broad, GIS is subject-oriented application and is group by work flow, the data in GIS is often original state. The function of GIS is only process operation of adding, deleting, and modifying etc to data and simple spatial selection and spatial analysis.

For meeting demand of global change and stability development, a unique information view will be built so that correlative data coming from different area can be transformed into unique format and be integrated and be saved according to proper subject. SDW can satisfy these demands. SDW is more difficult than data warehouse in spatial data **[2]**. The heart problem of SDW is multi-source data combine, OLAP and data mining **[3]**.

The metadata of data warehouse is reference information of SDW. The metadata of SDW will be server for SDW. The interdependent graph among these technologic hierarchies is showed in the Figure 2.

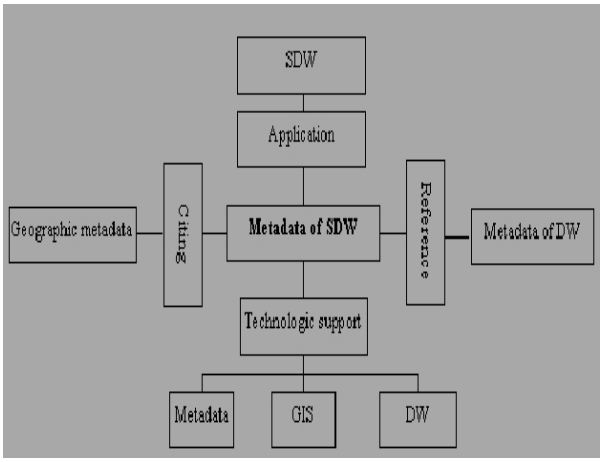

Figure 2: Interdependent graph among these technological hierarchies

The data in SDW will be selected to the user in multi-dimension in order to provide analysis tool for decision-making support, but user is not asked to be GIS professional or computer expert. So SDW should be an open system which supports various operations each other. Currently, there are many GIS systems, different program platforms and database systems are used in these GIS systems and there is no standard in these GIS systems. SDW can integrate data sets coming from different GIS and save them in order to share. The metadata plays vital role in SDW **[4]**.

3. CONCLUSION

For managing geographic data, the standardization is questioned. It is the foundation for metadata of SDW to insure effective management and operation each other of geographic data. Metadata of SDW is built on data standardization. Many countries and units have established standard of metadata content, programmed using operation tools of metadata and founded many metadata databases. These will provide a good condition for research of metadata of SDW.

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