A Data Model of Flood Prevention Information System

Mrs. ZHU Yi

(China   Academy of   Surveying & Mapping,100039, Beijing P.R.C.

zhuyi@sun1000.casm.cngov.cn)

Abstract : This paper introduces the data model of the Flood Prevention Information System .With the popularization of Geographic Information System (GIS) and Office Automation (OA) applications, the governments find that the integration of these systems could be help in providing comprehensive and view-direct information to support decision making. So, in 1992, financed by the State Council, The China Academy of Surveying & Mapping and the Secretariat Office of the State Council started cooperation in developing the software system named GeoWindows. As a development platform, GeoWindows can ease the development of application systems aimed in integrating governmental data with geographic data. As one of its application, we developed the Flood Prevention Information System (FPI) in 1995. Installed and put into operation at site of the State Council in 1996, FPI has been continuously improved and upgraded, to be a very important career in providing real-time information during flood season.

In early GIS applications, geographic data are generally saved in files, while attribute data are organized with desktop DBMS (such as MS Access,Foxpro etc). With the geometrical increase of geographic data sets (nearly 10G bytes in FPI), the traditional file-based data model can not manage such big file system effectively. Hereinafter, we introduce a typical data model fully based on relational database(for example ,ORACLE system or Microsoft SQL Server 7.0 etc.). The data model is abstracted from FPI, and separated into two layers:

Data model of GeoWindows

Data model of application system

To simplify description, we use the Database Definition Language (DDL) of Microsoft SQL Sever 7.0 (or ORACLE etc.) to describe the data model. You can translate the DDL into what of any other database management system, such as Oracle, Informix and DB2, without difficulty.

The information of FPI is an integration of two kinds of data. One is basic data processed as a part of GeoWindows, such as geographic data (administrative areas, rivers, railways, high ways, resident locations, borders, etc.), image data and DEM data. The other is application specialty data such as meteorological data (nephogram, rain status, rain forecast, typhoon spread, etc.), flood prevention facilities (reservoir, hydrology station, etc.), flood report, satellite telemetry flood data, historic disaster data (drought, flood, wind-hail, frost, etc.).

With the new relational data model, we improve performance and functions of FPI in the following aspects:

Security control

Concurrence control

Data integrity

Data safety

Data share

Network communication

The shortages are:

Higher database maintenance expense

Data redundancy

Longer data access delay

But thanks to the flying enhancement of CPU speed and hard-disk storage capacity, we do not have to hesitate in adopting the advanced relational database technology to solve the problems we came up against with no solution just five or three years ago. The new geographic data model based on relational database will become a fashion of GIS application development in the near future.

This is a test working,but we expected it has a broad foreground in the near future.