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Verification Of The Standard Vector Data Model For Interoperability Of River-Geospatial Information

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VERIFICATION OF THE STANDARD VECTOR DATA MODEL FOR INTEROPERABILITY OF RIVER-GEOSPATIAL INFORMATION

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Recently, two international standard organizations, ISO and OGC, have done the work of standardization for GIS. Current standardization work for providing interoperability among GIS DB focuses on the design of open interfaces. But, this work has not considered procedures and methods for designing river geospatial data. Eventually, river geospatial data has its own model. When we share the data by open interface among heterogeneous GIS DB, differences between models result in the loss of information. In this study a plan was suggested both to respond to these changes in the information environment and to provide a future Smart River-based river information service by understanding the current state of river geospatial data model, improving, redesigning the database. Therefore, primary and foreign key, which can distinguish attribute information and entity linkages, were redefined to increase the usability. Database construction of attribute information and entity relationship diagram have been newly redefined to redesign linkages among tables from the perspective of a river standard database. In addition, this study was undertaken to expand the current supplier-oriented operating system to a demand-oriented operating system by establishing an efficient management of river-related information and a utilization system, capable of adapting to the changes of a river management paradigm.

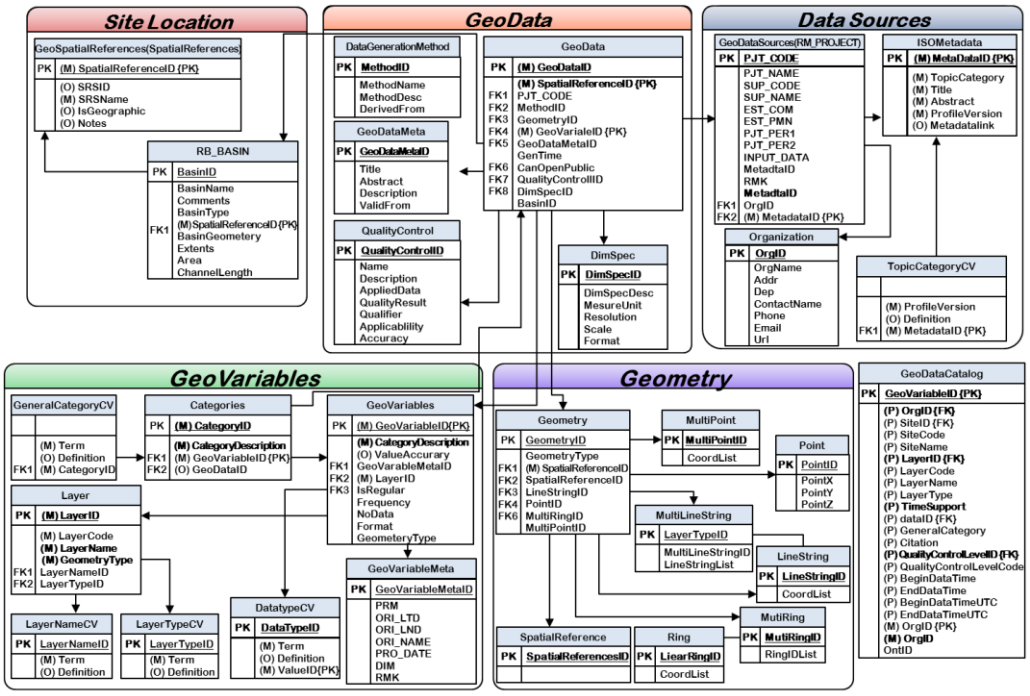
INTRODUCTION

The purpose of standard data model is to develop a conceptual reference model for river geospatial information to support the interoperability when vector data information is created and use. Standardization or standard-related study are regarded as main issues in geospatial information applications. Two international standard organizations, ISO and OGC, have done the work of standardization for geospatial data. Within the South Korea, many organizations and individuals river geospatial informations such as basin boundary, water level point, and river network. These include the Ministry of Land, Infrastructure and Transport RIMGIS (River Information Management Geographic Information System; http://www.river.go.kr) and WAMIS (WAter Management Information System; http://www.wamis.go.kr/). These national data repositories contain a wealth of data, but, in general, they have different data storage systems and formats, different data retrieval systems, and different data publication formats (Horsburgh *et al.* [1]). This standard can be useful to provide interoperability for cadastral information and to prevent the dual investment for development of cadastral information and

services in the public sectors. The Geospatial Data Model presented here provides a new and consistent format for the storage and retrieval of river geospatial dates in a relational database designed to facilitate integrated analysis of large data sets collected by multiple investigators.

GDM LOGICAL DATA MODEL

The logical data model for GDM is shown in Figure 1. The GeoData table at the center stores the numeric values for observations and links (foreign keys) to all of the data value level attributes. Most of the attribute details are stored in the tables surrounding the GeoData table to avoid redundancy. The relationships between tables are shown, along with all of the required primary and foreign keys. Each of these relationships has a name, which is indicated by an arrow (Horsburgh *et al.* [2]).

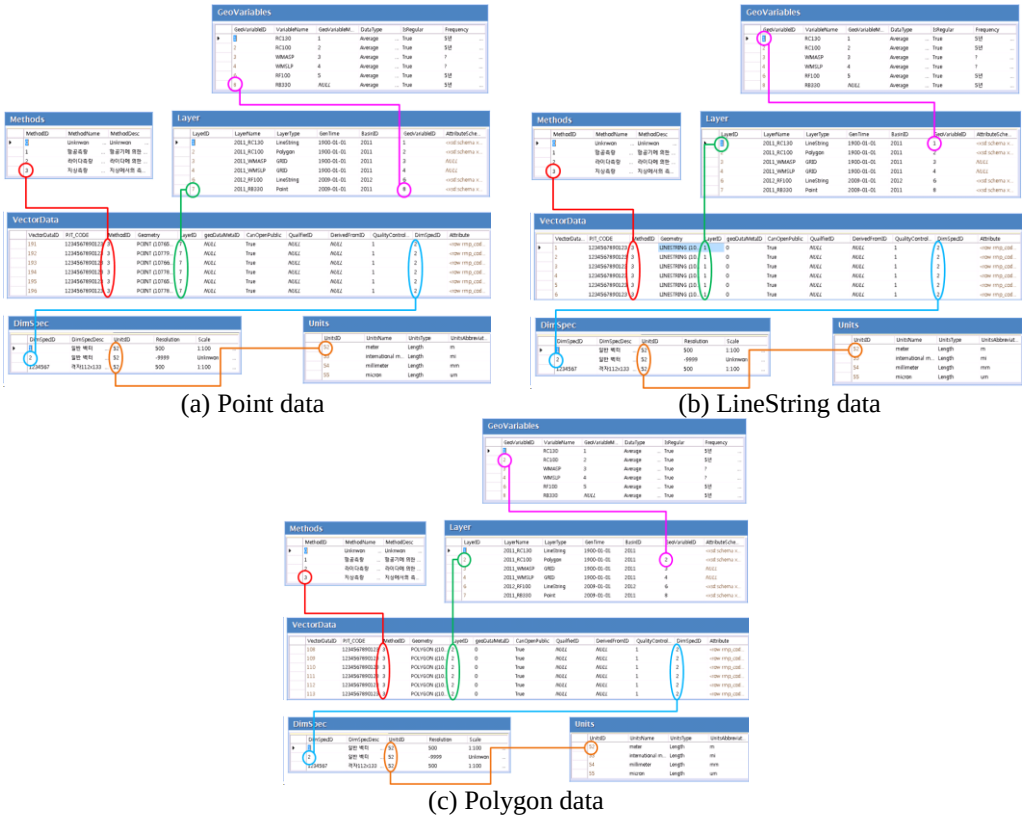


PK: primary key; FK: foreign key; M: main data; O: option data

Figure 1. Geospatial Data Model (GDM) logical data Model

GDM IMPLEMENTATION

Figure 2 in the following sections demonstrate the capability of the GDM data model to store different type of vector data. Figure 2 shows excerpts from tables illustrating the population of GDM with point, linestring, and polygon data.



(a) Point data (b) LineString data

(c) Polygon data

Figure 2. Excerpts from tables illustrating of GDM with vector data

CONCLUSIONS

This standard data model describes the entities, the attributes, and relations of entities for the creation and use of the river geospatial information. In summary, it defines the conceptual data model for river geospatial information. This standard data model can be useful to provide interoperability for river geospatial information and to prevent the dual investment for development river geospatial information and services in the public sectors.

ACKNOWLEDGEMENT

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