A Study on the Applications using Open GIS Component

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ABSTRACT

This paper described some applications using Open GIS Component that was called MapBase. There were 4 applications : KSDI(Korea Spatial Data Infrastructure) funded by MOIC(Ministry of Information and Communication), National Plants Resource Management System supported by Korea Forest Service, 7-Underground Facilities Management System of Cheongju funded by MOCT(Ministry of Construction and Transportation), and National Disaster Management System supported by MOGAHA(Ministry of Government Administration and Home Affairs. Because they wanted to access heterogeneous spatial database, it was necessary to select MapBase as their base methodology. The main feature of MapBase was component S/W which provided the interoperability and reusability among GIS applications as well as non-GIS information system through common specification. In this paper, we showed some applications' architectures and functions to increase understanding MapBase. That would help you to make application using MapBase.

Keywords : GIS, Component, MapBase

1. INTRODUCTION

GIS(Geographic Information System), which describes phenomena directly or indirectly associated with a location relative to the surface of the Earth, has been developed in various fields for more than 30 years. The examples of applications are land management planning, education and training, ecological modeling, forestry application, water resources management, decision support system, federal government application, state and local government application, health care application, and so on.

Korea initiated "The First National GIS Master Plan" on 1995. Based on this plan several GIS projects and research works such as digital topographic and thematic mapping, GIS technology development, GIS standardization and human resource development, GIS application system, and so on, have been carried out[1].

After 1995, the development of GIS in local government, which is Seoul, Seong-nam, Jeju, Kangwon-do, Kyounggi-do, Pusan, and so on, is rapidly increasing and the application range is drastically enlarged covering vast areas, including administrative management, everyday life, cultural arena, and so on[2]. The GIS has

now become a critical strategic tool useful in the field of regional information.

The local governments used various GIS software such as GEOMania, ZEUS, Arc/Info, SmallWord, MapObjects, GeoMedia, MGE, MapInfo, and so on. The departments in local government also used different GIS software. However, in the development progress of GIS, local governments require the interoperability among heterogeneous systems to offer better-quality service to people.

To satisfy such trends, we developed some GIS components, MapBase, that were conformed OpenGIS's standards. And they were applied successfully several projects in Korea such as KSDI(Korea Spatial Data Infrastructure), National Plants Resource Management System, 7-Underground Facilities Management System of Cheongju, and National Disaster Management System. Every projects were funded by another Korean government offices.

In this paper, we describe the purpose, the architecture, the participants, and the implementation of each project that used MapBase

2. KSDI

This project was funded by MOIC(Ministry of Information and Communication), and its period from December 2000 to August 2001. Ssangyoung consortium achieved this project[3].

Its main purpose was to build an interoperable geospatial data processing system used among local governments and related organizations. 4 local governments, Seoul, Suwon, Seongnam, and Incheon city and 1 private company, Korea Telecommunication, participated in this project and offered their GIS data to each other.

In this project, 4 major results were developed such as spatial gateway, spatial node, data provider, and application development.

Spatial gateway was a web server that supported spatial data searching, clearing house service, spatial node registration and management, user management, and data server accessing.

Spatial node executed registering and managing spatial data server, building and managing metadata, and searching metadata, and so on.

Data Provider was accessing heterogeneous data stores installed each participant organizations with diverse spatial data formats. Three Data Providers for ZEUS, GEOMania, and SDE were used in this project.

There were two applications : Web based application and desktop application. They performed normal GIS functions by using above 3 functionalities.

MapBase was used for implementing desktop application and connecting heterogeneous data sources.

3. National Plants Resource Management System

This project was supported by Korea Forest Service, and its period from January 2001 to June 2001[4].

There were 3 major contents in this project.

The national plants resource information building was first mission of this project, that building database for 19 organizations that have plants samples, and 15 organizations that have plants information.

Next role was the network building for national plants resource information. In this work, Korea Forest Service wanted to make home page and install data server for those.

The last work was the implementing GIS application for national plants resource. This system had to access several data server installed in the different organization with different data formats, and to get plants information from them. Korea Forest Service also sought to offer high-quality national plants information to people and government offices that want to use it.

MapBase was used for connecting heterogeneous data sources that scattered in the whole country and implementing GIS application that showed the settlement area of specific plants, etc.

4. 7-Underground Facilities Management System of Cheongju City

This project was funded by MOCT(Ministry of Construction and Transportation), and its period from November 2001 to October 2002.

Its main purpose was to build an interoperable geospatial data processing system used among local governments and related organizations. 1 local government, Cheongju city, and 5 private companies, Korea Telecommunication, DAEHAN Oil Pipeline Corporation, Korea District Heating Corporation, Korea Electric Power Corporation, Korea Gas Corporation, participated in this project and offered their GIS data to each other.

While KSDI built an interoperable system among local governments and organization, this project built an integrated system in one local government among several organizations. This system might help each organization to increase safety when they dig the earth. ZEUS, ArcSDE, Shape, GEOMania Millennium Server, SmallWorld, GENASYS were the target data sources to be connected by the integration system.

MapBase was used for connecting heterogeneous data sources that scattered in Cheongju city and implementing GIS application that overlaid diverse layers getting from different organizations, etc.

5. National Disaster Management System

The first step of this project was supported by MOGAHA(Ministry of Government Administration and Home Affairs, and its period from December 2001 to February 2002. And another project is running on by ETRI and KTData from March 2001 to present. The former project used the results of the latter. So, this system has good estimation as the cooperation between governmental offices because MOGAHA funded it and MIC supported the technical section of that.

There are two kinds of disaster. One is natural disaster such as typhoon, flood, heavy rain, storm, storm wave, and etc. The other is artificial disaster such as fire,

explosions, traffic accident, environmental pollution, and etc.

MOGAHA requested the building integration among relative organizations to increase the effects of disaster management system The integration happened among Korea Meteorological Administration, Han River Flood Control Office, local governments, Korea Institute of Construction Technology, Korea Highway Corporation, National Maritime Police Agency, Korean National Police Agency, etc. They had their GIS system with diverse data format.

MapBase was used for accessing heterogeneous data sources that scattered in different locations and implementing GIS application that specified disaster area and analyzed it.

6. Conclusion

In this paper, we described the building integration system to use GIS data in local governments. It is necessary to offer the quality of administrative service to people. The most important thing in this integration was the interoperability among heterogeneous GIS system. Because each GIS system had its unique spatial data format, many people have felt that it is impossible to access directly different data sources. To resolve this problem, each application accepted MapBase that was Open GIS component. MapBase supports the interoperability among diverse data sources and basic GIS functions. And we have to accept the requests that were happed in the project progress and revise MapBase. To extend the use of MapBase, more standards are needed in GIS applications of local governments.

REFERENCES

[1] M.S.Jung, 2000, Cooperation of Central Government and Local Government for GIS Development in Korea, *5th International GIS Seminar*, pp61-88.

[2] E.H.Kim, 1999, Development of the Common Model for Reuse of GIS Components in Local Governments, *Journal of the Korea Open Geographic Information Systems Research Society*, Volume 1, Number 2, pp.81-98.

[3] MIC, 2001, Development of a Korean Spatial Data Distribution Infrastructure, Project Report.

[4] Korea Forest Service, 2001, Development of National Plants Resource Management System, Project Report.