# DESIGN AND REALIZATION OF MULTI-SOURCE T-CLASS IMAGES DATABASE MANAGEMENT PLATFORM

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## 1. INTRODUCTION

At present, the mainstream of effective management and making use of massive remote sensing image data is to create an image database. Like with the vector data, image data has accurate spatial information in the same georeference or datum. And thus we can achieve the overlay display and analysis of DLG (Digital Line Graphic), DEM (Digital Elevation Model), DOM (Digital Orthophoto Map), DRG (Digital Line Graphic) and so on. The effective overlay of these data can enhance the expression of geospacial information of terrain, entities and the phenomenon on the surface.

Image data has become one of the most important data sources of the Earth System Science and socio-economic life, however, the management and sharing of multi-source remote sensing data is relatively slow. At present the institution co-operation with us has about 1.5T multi-platform, multi-sensor, multi-spectral, multi-resolution, multi-temporal multi-source remote sensing image data with the same area and the amount of data is growing. And especially with a large number of ground-resolution of 0.08~0.50m 12-band remote sensing data, M-level DEM data increasing, the problem with the management of massive image data is increasingly prominent.

The proposed of Geographic Information Services makes conflict between the use and management of spatial data more prominent. Based on the above considerations, establishing comprehensive multi-source massive image database is great significance. This research is on design of a basic, framework, standard and service-oriented integrated management platform for T-class image data and realizes the management and sharing of multi-source massive data.

## 2. MAIN METHODOLOGY AND TECHNICAL IMPLEMENTATION

There are two traditional way in management image data. First, data management based on separated files is inefficient and data sharing is poor. Second, the way is with Spatial Data Engine, such as ESRI ArcSDE and Oracle Spatial. It makes the expansion of GIS software convenient, but it is still a

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middleware and the management capability can only reach a few hundred G, and powerless in managing the T-class or larger magnitude of multi-source massive data.

In our design database, the rectification image data is organized according to the concept of layers to manage, referring to GIS hierarchical management style and is stored by tiles,spatial indexing techniques and appropriate pyramid structure. In GeoRaster,there are two ways to store and manage image layers: a seamless image layer patterns and framing image layer model. In practice the two modes can be used mixed.Vetor and raster data is superimposed display by the range of geo-spatial coordinates or map index for the purpose of geographic information sharing.

The management platform of multi-source massive image database based on. NET+TerraLib+Oracle 11g can be better achieved by our experiments and implement.

## 3. SOLUTION TO THE PROBLEM

In the current technology level, the image database based on RDBMS can take full advantage of the database in sharing, secure, concurrent data and achieve functions such as image data display, publish, query, data overlay and so on. When we frequently operate image data and share the results, it will need a large number of data conversion operations and make the system performance degradative. In this situation, a variety of factors must be considered and this is another issue worth studying.

During experiments and implement of the project, the main problem we encounted is about efficiency. Suggestions are as follows:

- Spatial Database Engine. It is an important indicator in the construction of massive image database platform, including the speed of response to user requests, spatial data obtained per unit time and so on, one of core of this platform is the efficiency of spatial database engine.
- Indexing mechanism. For the images and DEM data, different resolution images and DEM data can be created by the pyramid structure and tree-index to achieve seamless roaming between different resolutions. For vector data, R+-tree spatial index can be used to improve the speed of data access.
- Buffer pool mechanism. We can reduce data transmission by the buffer pool mechanism when transmitting data.
- Pyramid mechanism. The 0-level of massive image data with different band and resolution is clearly great difference in the pyramid.
- Balancing Mechanism. When building the system according to three-tier structure or C/S

structure, so-called "fat server" and "thin client" principle can be balanced.

## 4. SUMMARY

On the basis of uniform standards in a unified georeferencing, the huge image database based on NET + TerraLib + Oracle 11g can better solve problems encounted when storing and managing multi-source, mass of the 4D(DOM,DEM,DLG,DRG)data and offer some analysis functions such as superposition operation and so on, making full use of TerraLib and GeoRaster architecture.

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