SuperMap Statistical GIS Solution

SuperMap Software Co., Ltd.
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Google Maps only, enough?

Statistics GIS can play an important role!

- How many corporates?
- Reasonable industrial distribution?
- How much economic amount?
- How many people?
- How many aging population?
- How many high-income population?
- How many women of childbearing age?

...
1 Statistics needs GIS
In 2010, the U.S. National Census uses GPS Technology

- 140,000 census staff
- Handheld computers with GPS functions
- Collection of all housing coordinates, addresses
- Whole process of digital operation
Search, Displaying and Publishing Statistical Data through Maps

The 2008 Presidential Election

County by County Results

Red for McCain, Blue for Obama

SuperMap
Large Number of Foreign Social Applications
(Finance, Insurance, Postal Services, Taxation ... )
Statistics needs GIS

Statistics data has typical geographical features

GIS is a tool analyzing and processing various phenomena distributed in a certain geographic area

Statistical GIS can associate statistics and geographic data, displaying and analyzing statistical data on the distribution characteristics and laws of spatial scales

Associated methods include administrative divisions (provinces, cities, counties), census areas, buildings, etc.
Statistical Data Integration based on the Geospatial

Realizing the integration and comprehensive analysis of various statistical data (population, basic unit, macroeconomic, ...) through spatial location.
Statistical Data Analyze and Display —Table, Chart
The association between statistical data and geographic data can be realized through all levels of administrative divisions and buildings, etc.
Statistical Data Analyze and Display — Thematic Maps
Statistical Data Analyze and Display
—Thematic Maps
Statistical Data Analyze and Display
—Spatial Layout
Statistical Data Analyze and Display
—Overlay Images
Statistical Data Analyze and Display—dynamic association with basic unit database
Statistical Data Analyze and Display — cross region
Resident population: 8,000
Foreign population: 2,000
Highly educated population: 1,500
School-age population: 400
...
Statistical Data Analyze and Display — data integration
2 Statistical GIS Roles
Statistical GIS Roles

- **Statistics display and analyze platform**
  - Display statistical data through intuitive map to analyze the spatial distribution law of social and economic phenomena, which is for further decision-making

- **Statistical survey auxiliary platform**
  - Provide spatial information services for the census and samples and other statistical operations
Statistics Display and Analyze Platform

• Thematic maps
Statistics Display and Analyze Platform

- Assist industry planning and decision-making: GIS-based spatial analysis of statistical information (buffer analysis, neighborhood analysis, gravity center analysis for population)
The conversion from analysis results of statistical model (statistical sampling model, conventional statistical analysis models, clustering model, the Engel coefficient analysis) to maps.
Statistical Survey Auxiliary Method: General survey

Realize the digital management of census district maps, reduce the workload of the census cartography.

Improve the census accuracy, facilitate census data quality checks in accordance with the digital maps.

Associate census data and spatial data using digital maps. Further study the census results at micro-scale.
Traditional hand drawing map of census area

Low precision, time-consuming and un-reusable.
Using census mapping software, to achieve transformation from paper to digital map. The software supports direct mapping, printing, data storage and maintenance.
GIS Goes Throughout the Whole Census Process

- **Pre-census**
  - Update digital topographic maps
  - Create and update census boundaries
  - Create and update address information
  - .......

- **Ongoing census**
  - Assign tasks
  - Make working map
  - Supervise working process
  - .......

- **Post-census**
  - Data quality check
  - Publish statistical data
  - Make data products
  - .......
Sample survey is an important means of statistics, it’s the main business activities in basic units.

Integrate the general sampling models with GIS
- Simple random sampling, systematic sampling, cluster sampling and multi-stage sampling, …

Combine sampling results and GIS, generate the geographic distribution map of the sampling results.
It’s easier for the government departments to view whether the spatial distribution of the sampling results is reasonable or not.
Statistical Survey Auxiliary Method: Sample Survey

Support producing and printing the spatial distribution map of the sampling results. This map is an important reference to the survey staff during field survey.

Analyze the best path for the survey staff based on the spatial location relationship between the statistical targets and urban road network.
Sampling Results and Distribution Analysis
Sample Survey Route
3

Statistical GIS Overall Architecture
Statistical GIS Positioning

Realization of census digital map management, maintenance and real-time updates

Achieve map-based visualization of statistical results, enrich it’s expressions

In support of census information in census areas and buildings, provide spatial-based statistical data analysis and data mining

Achieve publishing of and sharing with various statistical information

Achieve various statistical information integration based on geographic information
System Overall Design

Dynamic system

- Load statistical information of multiple time periods, query and analyze statistical data in the time dimension.

Integrated system

- Show the economic census data, agricultural census data, population census data, regularly report data, annual data, etc.

Platform system

- Support rapid customization and extension as needed.

Closely integrated with the statistical operations

- Increased support for daily statistical business.
The Overall System Design Ideas

- Based on four major core databases
- Three axis as the starting point
- Three expression forms as carrier
- Achieve map-based integrated query of statistical information
Four Core Databases

Statistical geographic database
- Basic terrain database, statistical administrative division database (city, county, town, village) and building databases.
- The latter two shall be established in time series according to year or census period.

Statistical business database
- Census results database, thematic analysis results database and indicators database, etc.
- Establish timing data according to year or census period.

Basic units database

Place names & address database

Other supporting databases
- The Metabase
- User database
Three-dimensional Properties of Statistical Data
Support Conversion Among the Three Forms

chart

table

thematic map
Achieve Map-based Integrated Query of Statistical Information

- Administrative divisions
- Economic census
- Population census
- Agriculture census
- Yearbook
- Others
- Annual & regular report
System Overall Architecture

Application layer (economic census GIS)
- Comprehensive data query and analysis module
- Basic unit query and analysis module
- Features economy displaying and analysis module
- Special report displaying and analysis module
- Thematic map browse and query module
- Public service module

Application support layer
- Single sign-on module
- Authentication and permission management
- Basic GIS functions module
- Address matching module
- Table browse and statistical summary module
- Chart production module
- Thematic map production module
- Data management and maintenance subsystem
- Census area drawing subsystem

Data layer
- Statistical geographic database
- Names & address database
- Basic units database
- Statistical business database
- Metabase
- Others

Network and basic hardware facilities
- Hardware facilities: server, storage, backup, output device, etc.
- Statistical private network
- Extranet
- Internet
Application support layer

Single sign-on

Authentication

Permission settings

Core service modules

Basic GIS module

Address matching module

Table browse and statistical summary module

Chart production module

Thematic map production module

Data management & maintenance
Statistical GIS Platform Application Mode

GIS Platform
- SuperMap iDesktop
- SuperMap iServer
- SuperMap iMobile
- SuperMap SDX+

Statistics GIS
- Standards and specifications
- Analysis module component
- GIS application component
- Statistical data application component
- Metadata management component
- Metabase
- Statistical database
- Statistical database

Statistics department
- National level
- Provincial level
- City level
- County level

Business Applications

Information Service
- E-government network
- Statistical information products (digital map CD)
- Internet
- ... government
- Research institute
- Universities
- Enterprise
SuperMap Application Cases
The first public listed GIS software company in China (Stock Code: 300036)

Focus on the GIS platform and application software development for more than 17 years
2002
Participated in the Second National Census of Basic Units

2003-2007
Collaboration with the National Bureau, received two ‘863’ projects

2008
The census area in the second economic census is divided digitally for the first time

2013
The Statistical GIS platform is deployed to the country and 26 provincial nodes
Complete Statistical System GIS Products

- Statistical GIS platform
- Statistical data publishing system

Unified technical core
Unified data module

Data analysis and publishing

Data processing

Census division management software
Census division mapping software
Mobile survey software
Application Cases

National
- National Bureau of statistics census center
- Investment administration

Provincial level
- 26 provinces, including Beijing, Gansu, Sichuan, Jilin, Shandong, Hubei, Shanxi, Guangxi, Guangdong, etc.

City level
- Shenyang, Baotou, Xi’an, etc.

County level
- Qingshan, Fengtai, Mentougou, Wuhou, etc.
National socio-economic Statistical Geographic Information Publishing System

Mainly focus on macro-scale statistical information and geographic information integration

- Statistical information: macro-scale comprehensive statistical data
- Geographic information: 1:50000, provincial, city and county level

Three types of application mode

- Query and analysis system of C/S structure
- Information sharing and publishing system of B/S structure
- CD-ROM products – “national socio-economic statistics digital map”
National socio-economic Statistical Geographic Information Publishing System
National Socio-economic Statistical Geographic Information Publishing System

- CD-ROM as the carrier
- Intuitively and clearly display and analyze the regional social economic development, for decision-making
- Simple, easy to use
2005-2009, CD-ROM Provides Services for the National People's Congress
The Second National Economic Census GIS for Beijing
Agriculture Census GIS for Beijing Statistics Bureau
Socio-economic GIS for Gansu Province
Statistical GIS for Sichuan Province
Statistical GIS for Qingshan County
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Thank You!