Information support of decision support for the executive authorities of the Republic of Bashkortostan on the basis of the GIS technology

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2014
Outline:

1. Background of the development of GIS for the executive authorities of the Republic of Bashkortostan

2. Common structure and functions of the GIS for the executive authorities

3. The main tasks of GIS for the using GIS

11 economic regions of Russia
Republic of Bashkortostan

S=143 600 sq.m.
Population > 4 mln.
Branches of industry of the Republic of Bashkortostan

- Fuel industry
- Agriculture
- Electrical power industry
- Metallurgy
- Light and food industry
Structure of the executive authorities of the Republic of Bashkortostan

President of the RB

Presidential Administration

State Assembly – Kurultai of the RB

Government of the RB

Ministries and departments

MINISTRIES OF THE REPUBLIC OF BASHKORTOSTAN
- Ministry of the Housing
- Ministry of Public Health
- Ministry of Land and Property Regulations
- Ministry of Cultural Affairs
- Ministry of Forestry
- Ministry of Youth Policy and Sports
- Ministry of Education
- Ministry for Nature Management and Ecology
- Ministry of Industry and Innovation Policy
- Ministry of Agriculture
- Ministry of Labour and Social Security
- Ministry of Finance
- Ministry of Economic Development

REPUBLIC-WIDE DEPARTMENTS

STATE BOARDS OF THE RB
The executive authorities of the Republic of Bashkortostan make management decisions on:

- Defining and controlling the location of objects
- Thematic maps
- Spatial analysis
- Predicting the spring flood level
- Bashkir settlements on the territory of the Republic
- Other tasks
- Oil spill simulation

Management decisions using spatial data

Types of spatial information:
- Orthophotos
- Space images
- Plans of objects
- Digital terrain models
- 3D models
- Topographic maps of the Republic
The analysis of the problem of information processing while making decisions for the executive authorities

• 25% of the executive authorities have their own GIS

• Limited functional capacity provided by existing GIS technologies

• Spatial data are not adjusted to a common information base

• Single source of spatial data
The concept of GIS for the executive authorities of the Republic of Bashkortostan

The aim of GIS for the executive authorities of the Republic of Bashkortostan is providing effective reliable and complex geospatial information for efficient thorough investigation, evaluation and validation of management decisions.
Interaction pattern of users and the GIS for the executive authorities of the Republic of Bashkortostan

Patterns of interactions:
- Government Authorities of the RB
- Ministries and Departments of the RB
- Federal institutions
- Enterprises and institutions of the RB

GIS for the executive authorities of the RB:
- General functional tasks
- Specialized functional tasks

Spatial data about the territory of the RB:
- Digital topographic maps;
- Satellite images;
- Attribute information;
- Metadata.

Enterprises and institutions of the RB:
- JSCo Bashkirenergo
- JSCo ANK Bashneft
- JSCo Uralsibnefteprovod
- JSCo Salavatnefteorgsintez
- JSCo Gaz-servis
- Gazprom Transgaz Ufa Ltd.
- Municipal Unitary Enterprise Ufavodokanal
Tasks of the GIS for the executive authorities:

• **Information and referral tasks** that allow for standard e-map control functions, navigation and search, displaying the characteristics of the object, as well as building complex queries based on multiple characteristics.

• **Functional tasks** that specialists working for the executive authorities have: modeling of natural and man-made processes and phenomena, route construction, zoning, building analytical reports and so on.

• **Tasks of sharing spatial data from external spatial resources** - OpenStreetMap, public cadastral map of the Russian Federation, ESRI satellite images and others.
Types of users of GIS for the executive authorities of the Republic of Bashkortostan

Developer of GIS EA RB
Software: IDE (.NET, Java, Flex)

Centre GIS EA RB
Software: ArcInfo
Software: ArcGIS Server, ArcSDE, DBMS

Basic Spatial Data: photo, metadata, digital maps
Special Spatial Data: photo, metadata, digital maps

User 1
Software: HTML-client (web-browser)

User 2
Software: HTML-client (web-browser)
Special spatial Information

User 3
Software: ArcInfo/Editor ArcGIS Server, ArcSDE
Special Spatial Data: photo, metadata, digital maps

Executive bodies in GIS
Software: IDE (.NET, Java, Flex)

Level 1
Level 2
The structure of the GIS for the executive authorities

Prototype of the GIS for the executive authorities of the Republic of Bashkortostan

- User interface for working with basic and specialized (thematic) spatial data in information and reference mode
- User interface for solving functional tasks of specialists in executive bodies
- User interface for working with metadata
- User interface for connecting specialized (thematic) spatial data of the executive bodies

Prototype 1: Geo-data for the executive authorities of the Republic of Bashkortostan

- Basic spatial data
  - administrative division
  - communities
  - railroad communications
  - vegetation
  - water objects
  - isolines and hypsometric data
  - etc.

- Specialized (thematic) spatial data
  - Metadata

Specialized GIS for individual bodies of executive power, departments and enterprises

- Ministry of Education of the Republic of Bashkortostan
- Ministry for Nature Management of the Republic of Bashkortostan
- Ministry of Communications and Media of the RB

- Specialized (thematic) spatial data
  - Radio broadcast stations
  - TV broadcast stations
  - Base stations of mobile operators
  - Base stations coverage area
  - etc.

Other executive authorities of the Republic of Bashkortostan

- Ministry for Nature Management of the Republic of Bashkortostan
- Specialized (thematic) spatial data
  - storage lakes
  - rivers
  - lakes
  - etc.

Users

- Citizens of the republic
- GIS specialists
- GIS administrator
Integration of different geospatial data in GIS for the executive authorities

Geographic information systems for executive bodies

Data warehouse of GIS for the executive authorities

The basic spatial data about the territory of the RB

The thematic spatial data of the executive authorities

Data exchange

OpenStreet Map

Public cadastral map of the Russian Federation

ESRI satellite images

Certain executive bodies’ own geographic information systems
Architecture of the GIS for the executive authorities of the Republic of Bashkortostan

Executive authorities and enterprises of the Republic of Bashkortostan having their own specialized GIS

- GIS-server, DBMS
- Thematic spatial data
- HTML-client (standard web-browser)

Internet/Intranet

Executive authorities

- Thematic spatial data
- HTML-client (standard web-browser)

Watching internet

Enterprise

- GIS-server, DBMS
- Thematic spatial data
- HTML-client (standard web-browser)

Enterprise

Citizens of the Republic of Bashkortostan

- HTML-client (standard web-browser)
- Mobile client

Executive authorities and enterprises of the Republic of Bashkortostan without their own specialized GIS

- GIS for the executive authorities of the RB
- Web-services
- Software
- ArcGIS Server
- ArcSDE
- DBMS

Service catalog of GIS for the executive authorities of the RB

- Basic Spatial Data
  - Cartographic data base
  - Attribute data base
  - Metadata

Thematic spatial data

- Cartographic data base
- Attribute data base
- Metadata

Watching internet

Internet/Intranet

Watching internet

Internet/Intranet

Watching internet

Watching internet

HTML-client (standard web-browser)
Types of spatial information integrated by GIS for the executive authorities

- The basic spatial information about the territory of the republic
- Special spatial information stored in its own geographic information systems for the executive bodies
- Specialized spatial information developed by GIS for the executive authorities and stored in the data warehouse.
Basic spatial data about the territory of the RB included in GIS for the executive authorities

- Satellite images of the RF (ArcGIS Online)
- Orthophoto of the town of Tuimazi
- Open Street Map
- Flood zones

- Geographic map of the RB 1:1 000 000
- Geographic map of the RB 1:100 000
- Base map of the RF (Register)
- Public cadastral map (Rosreestr)
Thematic spatial data included in GIS for the executive authorities of the RB

Ministry of Ecology and Nature management of the Republic of Bashkortostan

- Specially protected natural areas
- Waste disposal facility
- Hunting areas
- Fishing ground
Thematic spatial data included in the GIS for the executive authorities of the RB

Information Technology Agency of the Republic of Bashkortostan

Video transmitters

Radio transmitters

Base stations of mobile operators

MTS

Билайн

Сотел

Мегафон

СМАРТС

Press and mass media agency of the RB

Local newspapers

Regional media

Advertising publications

Republic-wide newspapers

Republic-wide magazines

City and associated newspapers

State TV channels

State radio channels

Municipal TV and radio channels
Examples of using GIS for the executive authorities of the Republic of Bashkortostan
Results of displaying the attributive and map information about the communication objects

Map keys

- Base mobile operator stations
Example of integration of basic and thematic data of different executive bodies in GIS for the executive authorities (The data is browseable for users with authorization in both governmental agencies)

Map keys
- Basic mobile operator stations
- Specially protected natural areas
Universal search of spatial objects
(on the example of communication objects)
Predicting the spring flood level of the Belaya and the Ufa rivers
Predicting the spring flood level of the Belaya and the Ufa rivers

Temporary platform for the wood waste of the city

Flood zone
3D model viewing of potentially dangerous objects
USATU 3D model
Prospects for further development of GIS for the executive authorities of the Republic of Bashkortostan:

1. Filling the GIS database for the executive authorities with additional basic spatial data:

- Digital maps of the territory of the Republic of Bashkortostan M1:1 000 000, M1:200 000, M1:100 000, M1:50 000, M1:25 000;
- Digital maps of the neighboring territorial entities of the RF M 1:10 000;
- Orthophotos of the territory of the republic;
- Space images of the territory of the republic.

2. Phased linking of the executive bodies of the Republic of Bashkortostan to the GIS for the executive authorities of Republic of Bashkortostan.
Thank you for your time!

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