

SPATIAL DATA SHARING AMONG LOCAL COMMUNITIES

WSPÓLNE KORZYSTANIE Z DANYCH PRZESTRZENNYCH PRZEZ SPOŁECZNOŚCI LOKALNE

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The functions of spatial information systems developed in Poland for local governments should cover a growing spectrum of spatial data infrastructure requirements such as:

- cooperation between different levels of local government,
- wide range of data and functions sharing (e.g. for properties, investments, environment),
- compliance with EU regulations (e.g. for water/waste management, land records) as well as business needs (e.g. foreign investments).

The paper presents the concept of operation of such system and its real-life implementation as well as lessons learned after two years experience. The presented solution is widely used in Poland in large municipalities as well as in rural counties. To demonstrate its operational features in the paper, the county of Polkowice (Lower Silesia, Poland) has been chosen as example.

The idea of the system is to build a common spatial data infrastructure (i.e. data structures and access procedures) for various organizations operating at the local government level – from small villages to the county management level. The basic functional scope of the system is composed of the following subsystems:

- Land records
- Survey data management
- Property taxation and local taxes
- Roads management
- Local government investment
- Utilities management
- Environment management
- Public safety
- Cultural heritage

The above list is by far not complete and extensible due to the following design strategy:

- All data (tabular, geometry, multimedia, documents) is stored and managed in one relational database
- Access to all data is made possible (based on assigned roles) through the Internet (or Intranet)
- The system has easy to use and configurable tools for data creation and analysis – also in off-line environment (e.g. portable computers)
- The internal architecture is compatible with the Open GIS requirements
- The system is inter-operational to a maximum degree
- The management of data versions and history is supported by the system architecture – independently of the chosen database type
- The system-wide project and application definitions are based on XML structures
- The basic functions of the system are available as Web Services

The implemented solution is based on the following technological building blocks:

- ESRI: ArcGIS 9 (ArcGIS Engine, ArcSDE, ArcIMS, ArcPad)
- RDBMS (currently: Oracle Server 9i)
- Microsoft Internet Information Server

From the beginning of the system design, the problem of data and functions sharing has been considered as primary technological and organizational goal. The steps to resolve it were:

- certified access (SSL) to the system database
- contracts between the legal data owner (county head) and the organizations requiring access to the data (municipalities, private/public bodies)
- publishing metadata of the system data
- publishing the data standards for data providers

Although technology by itself does not always result in greater functionality, it has been observed that basing the system on WWW technology opens new application areas for many public users such as processing of survey work order, commercial data transfer and decision-making.

A feature considered to be of great and growing importance is the management and publication of metadata. The mechanism used for its updating is based on metadata synchronization available in ArcGIS as well as its publication in ArcIMS Metadata Server.

The very usage of metadata implies ordering and classification of all spatial and tabular assets. The lack of standards in this domain in Poland leaves the system designer to his own decisions. In the presented solution, an ISO standard based format has been selected as considered to be safe in the future.

One of the more complex organizational-technical issue is the building of a distributed spatial infrastructure system for small local government organizations with a fairly large level of operation autonomy while at the same time relying on spatial data from higher administration level. It should be noted that the current state of high-speed public networking is still far from covering all the needs in this respect. In addition, the autonomy of local operations and data may be an obstacle in outsourcing it fully to another level of organization.

The local autonomous bodies are not just data consumers, they are often active data providers such as road management units maintaining their own road metrics based on survey data.

To achieve the above goals a distributed subsystem (named JEDLINA) has been developed. The subsystem is aimed at local government and features:

- data editing and loading at the local level
- data harmonization and synchronisation with the higher level organizational units
- data and functions sharing at the local level

The architecture of the JEDLINA subsystem is based on a low-cost subset of the central system functions. This decision is based on real needs and financial potential analysis of users at local level (e.g. versioning or advanced topology is not always indispensable). Cooperation is based on the same database environment and its mechanisms (e.g. Oracle).

The paper presents methods of access to data and functions through catalogued Web Services, which ensure openness and scalability of the system.

STRESZCZENIE

Systemy informacji przestrzennej tworzone na potrzeby samorządu terytorialnego i spełniające wymagania stawiane infrastrukturze danych przestrzennych w Polsce powinny zapewniać m. in.:

- współpracę pomiędzy jednostkami samorządu terytorialnego danego poziomu i rodzaju, np. miast w województwie,
- wzajemne udostępnianie danych i usług, np. w zakresie nieruchomości, inwestycji i środowiska,
- zgodność ze standardami europejskimi, np. w zakresie zarządzania wodociągami i kanalizacją, a także prowadzenia inwestycji.

Niniejszy artykuł omawia koncepcję, opracowanie i wdrożenie systemu tego rodzaju, a także wnioski wynikające z jego dwuletniego praktycznego działania. Prezentowane rozwiązanie jest stosowane w dużych miastach, a także na obszarach rolniczych. Funkcjonalność systemu została przedstawiona na przykładzie Gminy Polkowice.

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