1. Intoduction

The availability of spatial data about utilities in the local SDI

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Abstract

This paper gives an overview of the availability of spatial data about utilities in the local spatial data infrastructures. There are given a research about possibilities of discovery, view and sharing spatial data according to INSPIRE specified web services at the official local croatian geoportals. This web services include: (meta)data discovery services, data view services, data download services, data transformation services and invoke services. Based on the research results the Croatian local SDIs are compared with good practices in the European Union. Guidelines for a better availability of spatial data sets about utilities in Croatia are also provided.

*Keywords*: utilities, Local SDI, Web services

Collected and edited data about utilities are an important environmental management data set at the local level.

It is necessary to implement certain services for searching the required information and quality exchange spatial data about utilities and related data between users in the Local Spatial Data Infrastructure (LSDI) framework.

In Croatia, there is no good political strategy or good practice example in management and inter-institutional coordination of land information on public utility infrastructure under the LIPP framework. As shown by the research of local geoportals, in the developed countries of the EU, such a practice exists and can be further improved by introducing recommendations given in the thesis [1].

This paper gives an overview of the availability of spatial data about utilities in the local spatial data infrastructures, i.e. at official geoportals of Croatian cities. The possibilities of discovery, viewing and sharing spatial data between users according to the INSPIRE specified web (network) services are researched.

1. Local SDI and Web services

Local Spatial Data Infrastructure (LSDI) is the relevant base collection of technologies, policies and institutional arrangements that facilitate the availability of and access to spatial data, and is a basis for spatial data discovery, evaluation and application for users and providers within the local government level.

Everyday needs for spatial data application has led to SDI development which aim to provide a simple and clear dataflow and service availability from data provider to the users. This development rises hierarchical from local to global SDI [2].

Spatial data at the local level are the most detailed space information, which means the level of detail that corresponds to the scale of 1:5000. Because they are the most detailed, they are the most expensive regarding their data collection, processing and maintenance. These data also require very frequent updates because their changes are first noticed. Furthermore, the local data level are the basic datasets for hierarchically higher levels SDI.

In order for all SDI levels to become interoperable the European Commission adopted the INSPIRE Directive (INfrastructure for SPatial InfoRmation in Europe). Its purpose is to provide access for decision-making, evaluation and monitoring, and the member states should themselves ensure the availability, quality, comparability, completeness and consistency of their spatial data [4].

At least three common INSPIRE principles stressed the role and importance of local governments. These three principles are:

* data should be collected only once and kept where they can be most effectively maintained
* it should be possible to combine seamless spatial information from different sources across Europe and share it with many users and applications
* it should be possible for information collected at one level/scale to be shared with all levels/scales; general for strategic purposes.

In order to facilitate data discovery and sharing and the overall interoperability between different users systems web services were established. The web service groups are:

* (Meta)data discovery services
* data view services
* data download services
* data transformation services
* invoke services.

The INSPIRE directive specially emphasizes the importance of free of charge discovery and viewing services.

1. Stakeholders and utilities registers

Facility management are utility registers of responsible institutions who manage spatial data about those utilities.

In Croatia, the utility cadastre is an official public utilities register managed by responsible institutions for the local self government administration unit. This register contains utility maps, the main utilities’ technical characteristics and name of the utility owner or administrator. The chartered surveyors are authorized to collect spatial data about utilities.

There are different management examples of utility registers in the world. Statutory regulated utility registers like the Croatian ones exist only in former Yugoslav countries. So called „call centres“ are established in some countries with the aim of utilities protection, known as „call before you dig“, such as in Great Britain, the Netherlands, Denmark, the United States of America and Australia. Slovenia is a unique example of central data collection and registers about public utilities in their utility cadastre (Slo. Zbirni katastar) at national level.

The system stakeholders related to utilities in the framework of local SDI are providers and users of spatial data about utilities. The data providers are: communal and other public service companies, the local self administration units (cities and communities), the State Geodetic Administration, land registries, surveying companies and other. The users are: citizens, architects, project companies, private investors and others. The local self administration has a special role in the local SDI, and forms together with the utility companies the main stakeholders of large scale spatial data, i.e. local level data [5].

The local governments are both providers and users of spatial data. Their task is to decide which information will be in use, and through its spatial policies determine the content and size of these datasets.

The use case model of utility cadaster, used as a utility register, in LSDI can be shown by model on Figure 1.

The model shows that the utility cadastre layer is only updated by utility companies in their responsibility scope. These utility companies are: Telecommunications network operator, Water supply company, Electric utility company, Gas company, utility company named NN (manager of some remaining public utilities) and the local administration as the manager of street illuminations and road registers. All the registers are managed in GIS and supported by relevant facility management systems.

The INSPIRE Directive addresses 34 spatial data themes needed for environmental applications. These themes are subdivided in the three annexes of the Directive. Spatial data about utilities are included in the sixth theme in Annex III, these datasets are [6]:

* utility
* government services.

The Thematic Working Group for this theme (TWG-US) identified five groups of public utilities, those groups are:

* water network
* sewer network
* oil and gas network
* electricity network
* telecommunications network.
1. The availability of data about utilities – state and perspectives

The aim of the research was to analyze the availability of data about utilities on the official city government geoportals and to compare them with those in other EU countries. The intention is the preview of the current state and the readiness to implement the INSPIRE specifications on the local level. The research included all 127 Croatian cities, and 26 cities in 11 countries of the European Union.

The research included all relevant types of utilities which are known in professional literature and for those with existing registers. These types are all utilities according to the Croatian Regulations regarding the utility cadastre [3]:

1. electric utilities
2. telecommunications
3. water supply pipelines
4. sewage utilities
5. heat pipeline
6. gas pipelines
7. oil pipelines

These types of utility are added to two other local relevant utility types. These types are:

1. roads
2. street illuminations.

Croatian utility data appear in about 35% of the implemented local geoportals, whereas we can find them in all local geoportals in the other EU countries [1].

Based on the research analysis one can determine that the greatest dataset incidence are roads (Croatia 35%, EU 100%), followed by the water supply utilities (Croatia 12%, EU 62%) and sewage (Croatia 12%, EU 50%). It can be concluded that the utility data are insufficiently involved in the local spatial data infrastructures. Other utility types are less or not at all available in the local geoportals as the graphic displays Figure 2.

Figure 2. The data availability of individual utility types



As downloading of web services is concerned, the research data show us that there is no local geoportal with vector or raster data download services supported by WFS and WCS standards. So it can be concluded that spatial data at local level in Croatia are not shared on the Web. In the EU countries the vector data downloading on geoportals is on the level of 54%, while the raster data downloading is only 8%.

1. Conclusion

The main purpose of the local SDI is its being the best solution for the sharing of relevant spatial data between all SDI stakeholders, and it is very important that each spatial dataset is being managed by the responsible spatial data provider.

The survey data revealed a poor availability of utilities data and poor implementation of the network or web service for spatial data sharing in Croatian local SDI's. The current situation should be harmonized with OGC and ISO standards and INSPIRE implementing rules for network services that should be available at LSDI geoportal.

The real value of one spatial data set only gets integrating with other related data sets. This improve their usability and provide a comprehensive spatial analysis, and generally improve the quality of land information. For this purpose, data sets about utilities must be easily accessible to all potential users, and also within LSDI framework integrated with other data sets such as cadastre, spatial planning, orthoimagery, topography, spatial unit register and others.

1. References

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Figure 1: UML Use case diagram as a utility cadastre in LSDI



Source: [1].