The Cadastral Data and Standards based on XML in Poland[*]

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SUMMARY

The standards based on XML (Extensible Markup Language) have been getting very popular lately, so some basis of XML and its general use were presented in the paper. XML is being used in Poland and some researches concerning XML application have been made. The use of XML is ordered by polish regulations concerning real estates tax register. Some scientific researches concerning ground and building cadastre database modeling were also performed. XML was used there for cadastral geodatabase export from Visio software and import into ArcGIS.

The Geography Markup Language (GML) is an XML grammar for expressing geographical features. There have been some requirements for using GML for data transfer in Poland. They resulted from PHARE 2003 European Union project. According to PHARE 2003 project specification, cadastral data written in GML should be sent to County Surveying and Cartographic Offices. These data include generally parcels and land development fields geometry. Scientific researches were made for transforming cadastral data into GML. They are described in the paper, too. Standards based on GML are also used for geographical presentation of cadastral data in Poland via internet.

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1. EXTENSIBLE MARKUP LANGUAGE (XML)

Previously, there was no standard and commonly accepted way of recording and transferring formatted documents and complex data structures. When the Extensible Markup Language (XML) was created these problems become possible to solve. Extensible Markup Language is a metalanguage destined for markup languages defining [W3C, 2009]. Generally, it completes insufficiencies of HTML. Since its first drafts, XML has been becoming a very popular standard for information recording. It seems that during the data integration process in the EU, according to the directive on establishing an Infrastructure for Spatial Information in the European Community (INSPIRE) [Directive, 2007] and European Commission regulation on implementing metadata [Regulation, 2008] XML will have an increasing application. It is also worth mentioning that XML is mentioned as namespace means a collection of names [Regulation, 2008].

The standards based on XML have been getting very popular lately. XML itself is the computer language used for designing data formats. XML is very flexible, so it may be used for writing any data. With XML we may create and oversee data hierarchical structures.

The structure of document must be known to enable its interpretation and meaning. In the beginning, the XML document structure was defined with document type definition (DTD). DTD contains the definitions of all used elements and structure of XML file. Nowadays, XML Schema Definition becomes more popular. XML Schema Definition provides means for defining the structure, content and semantics of XML documents.

One of notations based on XML is XMI (XML Meta-Data Interchange). XMI is a standard XML data exchange mechanism. XMI includes definitions of all used elements and enables writing XML file as an XMI file.

2. THE EXAMPLES AND POSSIBILITIES OF XML APPLICATION IN POLAND

Nowadays, XML is not commonly used in Poland, except for Geographic Markup Language (GML), which is based on XML. The legal regulation concerning XML is the order of the Ministry of Finance on the tax register of real estates [Order, 2004]. This order defines regulations on real estates tax register managing and the range of its information. The computer system managing tax register should enable the export of register data for comparison with ground and building cadastre data, according to the surveying and mapping law [Act, 1989]. The order [Order, 2004] includes XML schema file containing the structure of tax register data exported file. Some software enabling tax register export into XML file has been created, so exporting this data is technically possible, however the authors do not know statistics on its implementation.

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The other example of XML application in connection with cadastral data are researches on cadastral data modeling, applying geodatabase creating schema proposed in [Perencsik, 2004]. This method is generally based on creating geodatabase schema in Unified Modeling Language (UML), its export into XML (XMI) and then import into ArcCatalog, where the geodatabase structure is created. Such a geodatabase is ready for filing with both spatial and nonspatial data and may be processed with ArcGIS or database software. Such works were performed by several researchers, in Poland. Its results are described in [Cichociński, 2006], [Dębińska, 2008], [Chojka, 2007] and [Bydłosz, 2008a,b]. The process of creating a geodatabase containing cadastral data model is described in [Dębińska, 2006] and [Dębińska, 2008]. This database is destined for real estates experts. The process of modeling some chosen cadastral data (land parcel, building) and relation between them is described in [Chojka, 2007]. The works on the prices and values register for real estates modeling are described in [Bydłosz, 2008a,b]. The prices and values register for real estates is the part of ground and building cadastre in Poland and its model was created according to technical instruction G-5 [Instruction, 2003].

3. GEOGRAPHIC MARKUP LANGUAGE

The Geography Markup Language (GML) is an XML grammar for expressing geographical features. GML serves as a modeling language for geographic systems as well as an open interchange format for geographic transactions on the Internet. As with most XML based grammars, there are two parts to the grammar – the schema that describes the document and the instance document that contains the actual data [OGC, 2009]. First works on GML started in the late nineties. Since then it was an object of many transformations. Nowadays, it is an important tool for geographic data recording or transfer and makes probably the most popular open specification for geographic data presentation. GML delivers many tools for geographical objects, coordinate systems, geometry, topology, time and units description. Moreover, the Technical Committee ISO/TC211 accepted GML version 3.2.1 as ISO 19136: 2007 standard [ISO, 2007].

The first works concerning GML application in polish cadastre concerned cadastral bases modeling. These explorations were described in [Kmiecik, 2004], [Kmiecik, 2005] and [Chojka, 2007]. The way of cadastral database modeling was proposed in [Kmiecik, 2004]. The result of this works was the creation of simplified cadastral database and then land parcel with two buildings situated on data recording in GML. The continuation of these explorations was described in [Kmiecik, 2005]. The cadastral database model was prepared with UML, exported to XML (XMI) and then its conversion to GML was performed. The original project of tool supporting the GML schemas modeling was proposed as well. The application of model containing some cadastral data (land parcel, building and road) building was presented in [Chojka, 2007]. The database schema was build with UML, then transfer from UML to GML was performed applying UML/INTERLIS-editor and finally generated GML file import into ArcGIS was made. The obtained results were not entirely satisfactory, for the resulting GML model was not complete.

Poland as a member of European Union is obliged to implement EU directives. One of them is directive on Infrastructure for Spatial Information in the European Community (INSPIRE)

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[Directive, 2007]. This directive does not directly force using GML but building and developing Infrastructure for Spatial Information in Europe will probably increase its popularity.

Referring to the directive [Directive, 2007], the government of Poland wants the geographical data concerning land parcels and buildings to be easily accessible. So the geoportal [Geoportal, 2009] was created. One of geoportal layers called "*cadastre*" is planned to contain land parcels and buildings geographical data in the whole Poland. Land parcels data are generally accessible now. These data are planned to be accessed via internet. There are also some regional portals enabling access to the geographical cadastral data. These portals were presented during eSDI-NET+ workshop held at AGH University of Science and Technology in January 2009. The URL addresses of these portals can be found at eSDI-NET workshop site [eSDI-NET, 2009]. The geoportal and other portals giving access to cadastral data via internet use WFS or WMS standards accepted by OpenGIS Consortium [OGC, 2009]. The OpenGIS Web Feature Service Interface Standard (WFS) defines an interface for specifying requests for retrieving geographic features across the Web using platform-independent calls [OGC, 2009]. The OpenGIS Web Map Service Interface Standard (WMS) provides a simple HTTP interface for requesting geo-registered map images from one or more distributed geospatial databases. The WFS specified feature encoding for input and output is the Geography Markup Language (GML) [OGC, 2009], although other encodings may be used.

4. PRACTICAL COMMENTS

Nowadays, Poland as EU member is obliged to implement EU directive concerning Infrastructure for Spatial Information. According to polish present regulation (except tax register), there is no obligation to use XML or GML. However, the software development, especially GIS software results in increasing number of applications that make use of XML or GML. It seems that software development direction is not going to change and works concerning XML or GML applications for cadastral data will continue. Authors think that researches on application of XML and GML for cadastral data modeling should be continued.

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BIOGRAPHICAL NOTES

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