UNTAPPED POTENTIAL OF XML TECHNOLOGY FOR ELECTRONIC DOCUMENT CONTROL IN LAND MANAGEMENT

Peresoliak R.

Uzhgorod National University

Introduction

For 6 consecutive years, how is the updated cadastral exchange file based on XML technology functioning and used in Ukraine and which, in turn, replaced the cadastral file of exchange of the previous model - In4 (info). The use of XML should have resulted in a rapid increase in the quality of the document, its fullness, ease of use and functional convenience. At the beginning of the study, the author was supposed to suggest and make a number of edits that would relate to a partial improvement of the structure of the cadastral file of exchange however, at the same time, did not significantly change it. However, the analysis of the existing state of the cadastral file of exchange has revealed a number of structural and model problems, which were corrected in a substantially different format cadastral file sharing. The low level of data quality stored by means of the existing cadastral file of exchange is partly confirmed by other sources.

Given the special place of land cadastre among other inventories, which is the basis for the following inventories:
• Water inventory;
• inventory of natural plant resources;
• inventory of animal resources;
• inventory of natural therapeutic resources;
• inventory of mineral resources, minerals, manifestations, and minerals of man-made deposits;
• inventory of forest resources;
• inventory of natural territories of resorts;
• inventory of territories and objects of the natural reserve fund;
• urban construction cadastre;
• inventory of anthropogenic emissions and the absorption of greenhouse gases.

In view of this, cadastral land cadastral exchange file, in the same way, occupies a special place among cadastral file exchange of other cadastres. Therefore, the requirements that apply to the formation, content and basic functionality of a cadastral file should be high and require additional research.

A detailed analysis of the existing cadastral file of exchange revealed the following disadvantages:
• Features of the environment (Digitals)
◦ 101 (element is present when at least one element of level 1 is available)
• This does not apply to the person who creates the file
◦ 102 (non-subordinate information)
◦ 103 (meta information)
• Index attribute application

◦ 104 (the name of the block depends on the assessment of the medium through which the document was generated)
◦ 126 (environment option replaces the block that will be present in the document)
• Grouping index
◦ 121 (block is a list item)
• A pointer to change the item name
◦ 105 (the same name for blocks of different purpose)
◦ 108 (the name of the block does not correspond to its contents)
◦ 109 (block name is too simplistic)
◦ 110 (the name does not match the unique style of the names)
◦ 111 (Name refers to transliteration)
◦ 113 (The name contains the name of the parent unit)
• Incompatibility with the regulatory act
◦ 107 (the name does not correspond to the name in the normative legal document)
• A pointer to an integrated type
◦ 114 (the block and its contents repeatedly repeated in the document
◦ 106 (the contents of the block repeatedly repeated not depending on the block name)
◦ 119 (the block contains signs of a typical element in an irreducible form)
• Additional characterization of the item
◦ 112 (block is a link to another object)
◦ 116 (the contents of the block depends on the medium option through which the document was generated)
◦ 122 (the block is a comprehensive list of values)
◦ 123 (block value represented by code)
◦ 124 (block value contains spaces)
◦ 125 (block may be represented by a list of values)
• Complication of the document
◦ 118 (redundant element)
◦ 129 (Absence of alternatives)

It should be noted that this classification does not aim to highlight exclusively negative moments in the formation of a cadastral file of exchange, the classification also refers to the features of the formation of the kotrtrii to better describe the features of the internal structure of the exchange file using XML technology.

As a result, it was discovered:
• strong dependence on the environment of the formation of the cadastral exchange file;
• lack of a clear mechanism for introducing changes in the structure of the cadastral file of exchanges when changing regulatory and legal regulation;
• poor typing of objects present in the structure;

• lack of a template approach to objects similar in value;

• excessive complication of the internal structure;

• weak limitation of the action field with the document

Also, it's worth mentioning that XML represents a whole family of technology and not just a way to describe the data (Figure 1). Therefore, the implementation of the structure of the cadastral file of exchange should provide for the possibility of attracting the toolkit XML in full.

Another feature of the cadastral file of exchange and the regulatory system that supports it is that there is currently no mechanism for controlling the structure of the cadastral file of exchange at both the practical and the normative level. This is perfectly traced in the transition from licenses for land management to land surveyors certificates. At the normative level, the transition took place, as well as on the practical - the structure of the cadastral file was changed, however, the normative and legal documents that define and fix the contents of the cadastral file remained unchanged. This loophole makes it impossible to track changes in the cadastral file of exchange and make it impossible for third-party developers to access details, both archival and current versions of cadastral file sharing. This in turn leads to the implicit dominance of some software products over others, which, in turn, is supported by law. As a result, this approach, in our opinion, leads to a deterioration in the quality of the cadastral file of exchange, its fullness and clarity, and also prevents the processing of previous versions of the cadastral file of exchange without prior analysis.

Given the number of problems identified, despite the initial goal of improving and improving the cadastral file sharing structure, it was decided to develop a completely new format for cadastral file sharing, the transition to which could be divided into several stages. At the beginning of the work, a number of basic requirements were set for the new cadastral file to be met. To such an integer was assigned:

• The cadastral file of exchange is systemic, therefore its positive and negative manifestations influence and should affect the system of Ukrainian registers.

• All data structures need to be rebuilt and clearly structured

• Cadastral file sharing should have a clear mechanism for making changes to its structure.

The new cadastral file sharing markup language model is based on several basic elements:

• all attributes are objects

• cadastral file sharing for all cadastres built on the basis of cached file sharing language markup language
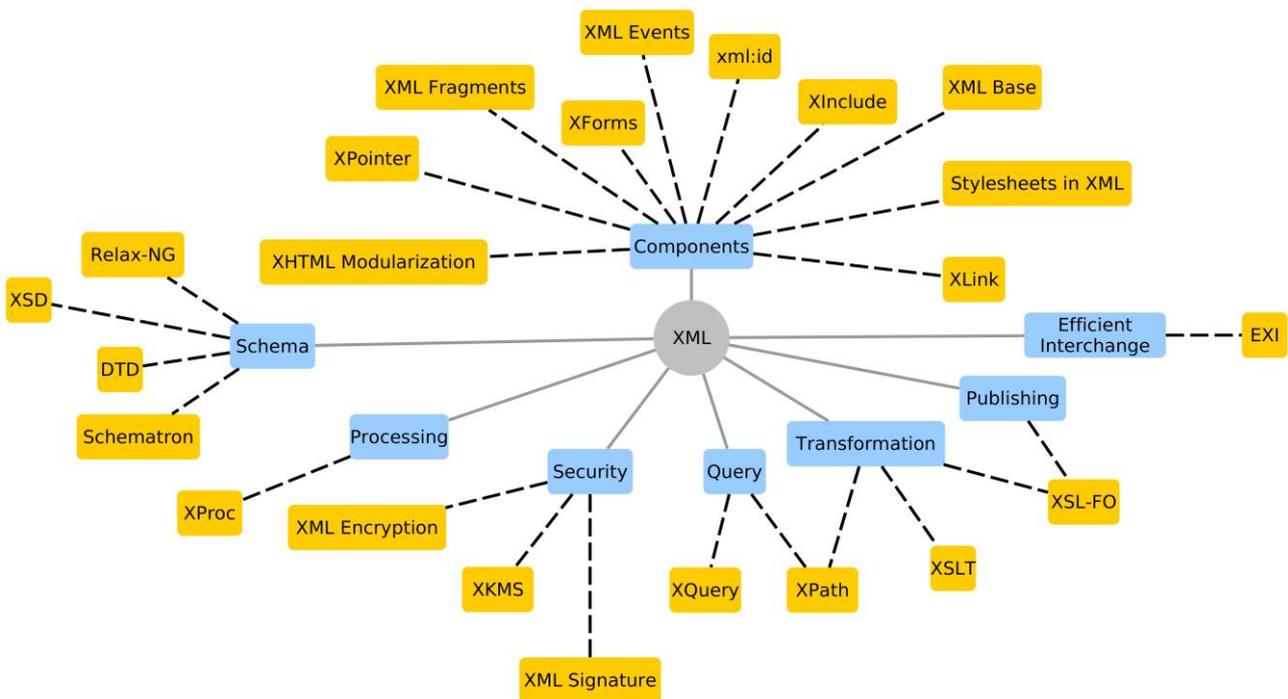

Fig. 1 XML Toolkit

Given the identified number of problems, I do not mind the goal of improving and improving the structure of the cadastral file sharing, it was decided to develop an entirely new format cadastral file sharing, the transition to which could be divided into several stages. At the beginning of the work, a number of basic requirements were set for the new cadastral file to be met. To such an integer was assigned:

• The cadastral file of exchange is systemic, therefore its positive and negative manifestations influence and should affect the system of Ukrainian registers.

• All data structures need to be rebuilt and clearly structured

• Cadastral file sharing should have a clear mechanism for making changes to its structure.

The new cadastral file sharing markup language model is based on several basic elements:

• all attributes are objects

• cadastral file sharing for all cadastres built on the basis of cached file sharing language markup language

Main part

An important feature of the new approach is the use of XMLSchema 1.1, unlike XMLSchema 1.0, which is currently used in the formation of a cadastral file of exchange. These groups include:

• Objects

• File Templates

The object group (Figure 2) consists of two files "data_types.xsd" and "geometry.xsd". Where the first is responsible for defining all objects of the markup language that can be distributed among the eight cadastres of the Ukrainian cadastre system, and the second file is responsible for defining the types of geometry that support the cadastral file language.

The file template group is responsible for collecting all common objects and geometries in a new composite object. Given the variety of possible tracks and the variety of inventories and their exchange files, this type of objects is separated by a separate group of XSD files. The number of these files is determined by the number of required cadastral file sharing. For the period of writing, only one template file is defined that is responsible for the form and content of the cadastral file of the land cadastre exchange.

Also in Fig. 2 it can be seen that despite the number of files from which the UCML is composed, a single point of access for all objects of the language - the file "UCML.xsd" - is defined. This allows you to specify only one file for use with the language and implement all the features of the markup language.

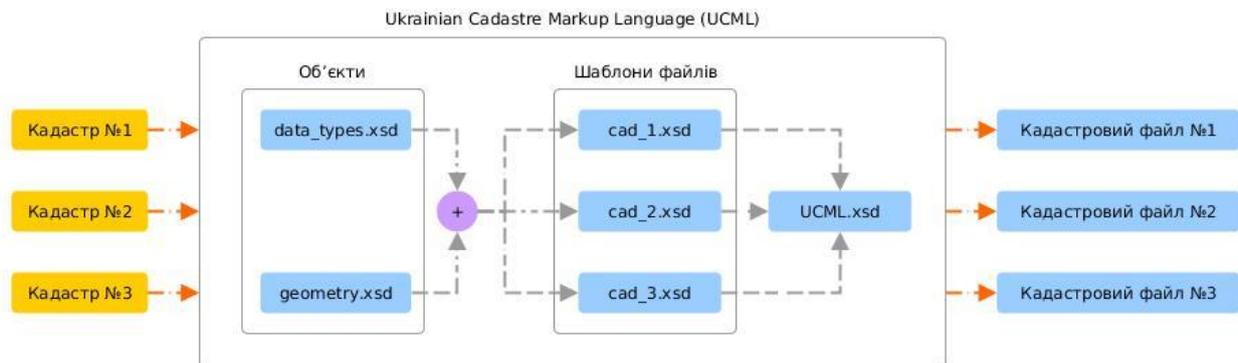Data structures that occur more than once in individual objects

Fig. 2 UCML scheme

UCML defines the following types of objects:

• static objects (objects that have a clearly defined structure, however, may contain other types of objects, including variables)

  ◦ Address
  ◦ CadastralNumber
  ◦ CertifiedPerson
  ◦ CheckingAction
  ◦ Comment
  ◦ Contacts
  ◦ Country
  ◦ Duration
  ◦ Image
  ◦ LandParcel
  ◦ ProjectExecutor
  ◦ Registration
  ◦ RegulatoryAct

• Variable objects (objects that change their structure and completeness depending on the criteria for describing an object defined by multiple XML attributes)

  ◦ Document
  ◦ LandProject

  ◦ LandUnit
  ◦ Name
  ◦ Payment
  ◦ subject

• objects listings (objects that organize several objects of the same type in lists)

  ◦ ApprovalList
  ◦ PertifiedPersonsList
  ◦ ChackingActionsList
  ◦ ImagesList
  ◦ DocumentsList
  ◦ LandParcelsList
  ◦ LandUnitsList
  ◦ PrivilegesList
  ◦ SubjectsList

• objects list links (objects that determine the list of links to other objects of the document)

  ◦ DLinksList
  ◦ GLinksList

A vivid demonstration of differences in the internal organization is a sign that in the embodiment of several

different types of structures represented by one, however, an object modified at different levels, such representatives include:
- Autentification (information about the landlord)
- Beneficiary (the person whose benefit is restricted)
- Chief (responsible person)
- DeliveryPerson (information about the person who received the state act)
- Leasees (description of all tenants)
- LegalEntityInfo (Legal entity identity)
- NaturalPersonInfo (Individual Data)
- Proprietor (owner or manager)
- Subleases (description of all sub-borrowers)

As you know, any XML document, given the segmentation and internal organization of information, can be viewed as a representative of object-oriented databases. However, the implementation of access to the necessary data, as well as the convenience and ease of search, though implemented independently by the XML technology, however, are based entirely on internal data layout. That is, in other words, the internal structure of any XML document defines a range of possible requests for structured information. All of the above items are elements of the same type (person or entity), but for better allocation of the role they are placed in different nodes, and moreover, using the XML terminology, the part is defined as a type of the other part, such as a named instance of the type. This led, as a result, to making it impossible to identify them all within a single simple query, which has the form: "Find all individuals, both legal and physical, who were, to some extent, involved in the formation of certain works on land management."

In view of this, the existing design of a cadastral file, which is implemented on XML, requires additional research and modification. A vivid representative that completely distinguishes the existing cadastral file exchange scheme from the proposed new cadastral file design is the element of an electronic document that contains information on subjects in relation to inclusion in varying degrees to the design of land-use documentation.

Therefore, UCML offers a new approach to addressing this issue. Subject "Subject" is responsible for maintaining information about any person involved in creating a form or correcting a particular type of documentation. Despite the analogies offered by the insubstantial version of the cadastral file of exchange, this object combines different types of data structures that describe the information about individuals or organizations. It is also worth noting that this object, along with existing ones, implements new types of entities that are not included in the incarnate version of the cadastral file, in particular taking into account that information about the persons who agree with the documentation must also be stored by means of the cadastral file of exchange..
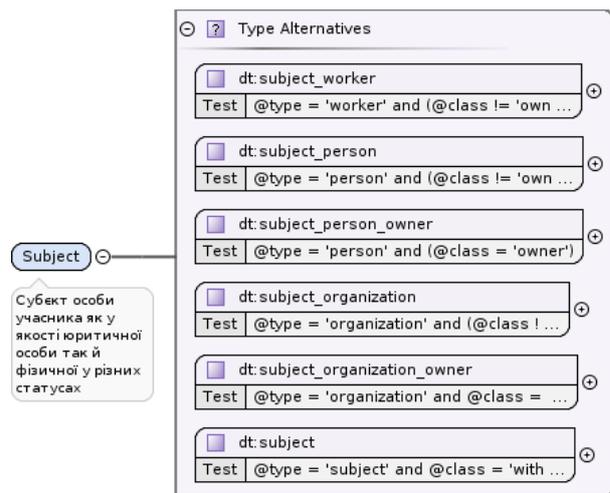

Fig. 3 Class of the subject

"Subject" is based on the base type, which in this case is represented by object "subject" (Fig. 4).
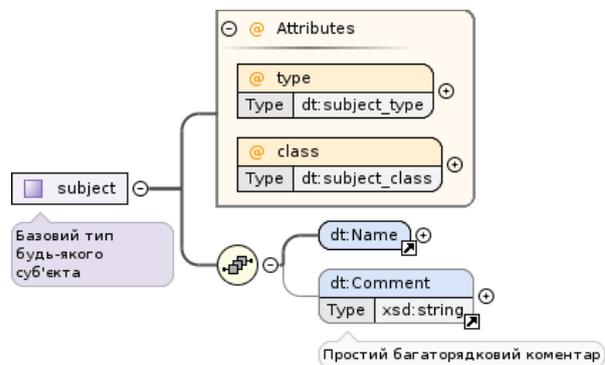

Fig. 4 Basic type of subject

As can be seen in Fig. 3, the base object consists of two XML elements that store information about the name of the subject, regardless of whether it is an individual or legal, and an optional comment. Also, based on the base, this object defines the mandatory XML class attributes "and" type "that are responsible for managing the Subject object. As you can see in the schematics, subject, class, and type are defined by special data types that contain an exhaustive list of possible values and their values are limited to all derivatives from the base class.

The subject_organization object is a subject object and extends its structure to additional XML elements to store the address address and the list of links to the DLinksList documents. The list of valid values for the "type" is additionally limited to one "organization". It is worth noting that the final version of XML attribute values for all alternative values is defined in the "Subject", but for a more rigorous structuring, as well as the ability to clearly define the list of possible documents, this restriction has been given.

Conclusions

The use of XML technology, both for land cadastre and for other cadastres, is the first step towards efficient and high-quality data use. However, for the implementation of opportunities on a qualitatively different level, the approach taken as the basis for electronic document management in land management needs to be changed. In particular, a new approach is proposed for the formation of cadastral file sharing, the transition to a new UCML markup language, and the mandatory definition of the mechanism for publishing changes to the structure of the cadastral file of exchange by fixing the procedure for publishing the cadastral file sharing template (in the case of UCML use - markup language schemes).

References

Шоломицкий А.А. and Лепеш М.Л. "Использование формальных грамматик для анализа кадастровой информации". In: (2013), с. 10–18.

David Mertz. XML Matters: Putting XML in context with hierarchical, relational, and object-oriented models. 2001, с. 7. url: https : / / www . ibm . com / developerworks / library / x -matters8/x-matters8-pdf.pdf.

Ronald Bourret. XML and Databases. Електнонний ресурс. 2005. url: http://www.rpbourret.com/xml/XMLAndDatabases.htm

Tim Bray et al. Extensible Markup Language (XML). 1.1 (Second Edition). 2006, с. 45. url: http://www.w3pdf.com/W3cSpec/XML/2/REC-xml11-20060816.pdf.

XML technology. Електнонний ресурс. url: https://www.w3.org/standards/xml/.

UNTAPPED POTENTIAL OF XML TECHNOLOGY FOR ELECTRONIC DOCUMENT CONTROL IN LAND MANAGEMENT

Purpose. Development of markup language by means of XML technologies and development of a new cadastral file exchange format on its basis.

Methodology. The use of XML technology, in particular XMLSchema, to determine the markup language and to analyze the embedded file schema available through the Digitals software.

Result. The markup language, called UCML, was developed, taking into account the disadvantages of analyzing the current state of the cadastral file of exchange. The markup language has an advanced data functionality, for example, the mechanism for storing graphical information, and also provides as the main format for the exchange files of other cadastres. Defines centralized access to the data structures of the court used to describe the information of other cadastres.

Scientific innovation. For the first time a cadastral file sharing markup language for local application was developed. For the first time, the types of data and their hierarchy that can be used in different areas of data accounting for transmission in the form of electronic documents are clearly defined. The mechanism of making changes to the structure and content of the cadastral file of exchange is determined.

Practical significance. The obtained results allow to improve the quality of cadastral file sharing and cadastral information content, as well as completely switch to the new cadastral file format. This approach allows you to define an exhaustive list of data and their structures that may be contained within all inventories, and also use these structures defined within the same inventory by other cadastres.

Key words: XML, cadastral exchange file, markup language