THE USE OF METADATA AND ONTOLOGIES IN SPATIAL PLANNING

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SPATIAL PLANNING IN POLAND

Levels:
- national
- regional
- local

The most important is local spatial development plan an act of law

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LOCAL PLANS – A LOT OF DIFFERENCES

symbology

single family development

housing and service development

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definition of building height:
„from natural surface to roof ridge”
„vertical dimension of buildings is 30 m”
„maximum 3 storeys”

different interpretations:
„architecture of new buildings has to content to existing development”
Problems with standardisation:

• technical
• legal – lack of knowledge, low awareness among planners
• unsatisfactorily effective activity of committees for town planning and architecture
• unlimited creativity of planners

Strong need to standardisation both for publication and recording
HOW LOCAL GOVERNMENTS COPE WITH IT?

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Explore the possibility of using metadata and ontology

1. Formal recording of plans in unambiguous way for informatic systems – a possibility to exchange plans between different systems
2. Possibility to search areas of given criteria in local, regional or national scale through web service
3. Find regulations and restrictions for defined areas
4. Possibility to integrate plans with other web resources

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METADATA

XML files:
- local plan – dataset
- features in a plan

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SUMMARY

- Metadata have to be created on a feature's level – only searching by title, text, spatial extend, keywords - need to create glossary
- Need to implement inheritance in catalogue services
- No possibility to search by restriction criteria and provisions of plans
- Recommendation to create a profile of metadata for spatial planning
- In metadata we can only integrate data through links to other resources
- We can consider to insert the text of the plan in the abstract element of metadata
- Disappearing border between data and metadata
ONTOLOGIES

• “...a formal, explicit specification of a shared conceptualisation” (Gruber, 1993)

• formal representation of a knowledge, by a set of concepts within a domain and the relationships between those concepts

• XML/RDFS/OWL - open standards of the semantic web

• evolution of the semantic web has encouraged the development of ontologies

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Experiment with OWL - Protege*

§ 14
1. The designation for the 3MN area is:
   1) primary – single family housing,
   2) supplementary:
      a) green area,
      c) parking.

Detailed considerations:
1) only one building is allowed,
2) maximum height is 10 meters,
3) number of stories is two.

*carried out under the research project of finance by MNiSW with T.Kubik, W.Paluszyński
THESAURUS

SKOS and spatial planning ontology

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MODELLING OWL WITH PROTEGE

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QUERYING

- OWL DL Reasoner e.g. Pellet, Hermit
- SPARQL
- SWI Prolog

SWI Prolog

Question:
Is there a plan, which has area with primary designation of single family housing designation and 2 storeys buildings, where supplementary designation is green area. If yes how many buildings we can built there?

```
rdf(ZP, 'http://www.w3.org/1999/02/22-rdf-syntax-ns#type',
    'http://wogis.org/Plany.owl#ZoningPlan'),
rdf(PA, 'http://wogis.org/Plany.owl#isPartOfPlan',ZP),
rdf(PA, 'http://www.w3.org/1999/02/22-rdf-syntax-ns#type','http://wogis.org/Plany.owl#PlanArea'),
rdf(PA,'http://wogis.org/Plany.owl#hasPrimaryDesignation',PD),
rdf(PD, 'http://wogis.org/Plany.owl#hasStories',
literal(type('http://www.w3.org/2001/XMLSchema#positiveInteger','2'))),
rdf(PA,'http://wogis.org/Plany.owl#hasSupplementaryDesignation',SD),
rdf(SD, 'http://wogis.org/Plany.owl#GreenArea'),
rdf(PD, 'http://wogis.org/Plany.owl#numberOfBuildings',
NB).
```

Answer:
ZP = 'http://wogis.org/Plany.owl#ZoningPlan_KlinRat',
PA = 'http://wogis.org/Plany.owl#PlanArea_KlinRat_3MN',
PD = 'http://wogis.org/Plany.owl#SingleFamilyHousing_01',
SD = 'http://wogis.org/Plany.owl#GreenArea_01',
NB = literal(type('http://www.w3.org/2001/XMLSchema#positiveInteger','1')).
creating metamodel of spatial plans containing definitions of classes, properties and restrictions allows to record a plan in a formal language of description logic

possibility for plan`s validation

local plan in OWL can be integrated with other resources in web

OWL rules can be insufficient to plan description

it is a possibility to create software for planners based on the metamodel

using reasoning algorithm it is a possibility to search features with certain categories

results are promising and require further work

SUMMARY

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Thank you for the attention

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