CityGML and LADM – Some Food for Thoughts

Thomas H. Kolbe

Chair of Geoinformatics
Technische Universität München
thomas.kolbe@tum.de

LADM Workshop at TU Delft,
17th of March 2017
CityGML – 3D City & Landscape Modelling

Application independent Geospatial Information Model for virtual 3D city and landscape models

- comprises **different thematic areas**
  (buildings, vegetation, water, terrain, traffic etc.)
- **data model (UML)** according to **ISO 191xx** standard family
- exchange format results from rule-based mapping of the UML diagrams to a GML3 application schema
- Version 1.0.0 was adopted in 2008 as an international standard of the OGC, version 2.0.0 was adopted in 2012; version 3.0.0 is under development

CityGML represents

- 3D geometry, 3D topology, semantics and appearance
- in 5 discrete scales (Levels of Detail, LOD)
CityGML and LADM

- CityGML represents the (most relevant) topographic features *as built / with their actual shape*
  - semantic models in CityGML are decomposed along their thematic boundary surfaces – *these can be directly surveyed / observed*
  - geometry model of CityGML is Boundary Representation (BRep) with absolute world coordinates (which is managed / analysed well within GIS and Spatial DBMS)

- CityGML does not include concepts to express rights, restrictions, and responsibilities (RRR)

- **LADM** provides a strong modeling of RRR, but has a general / abstract model of *Spatial Units*

- hence, **LADM and CityGML are complementary**
Thematic Modelling in CityGML

This class could be associated with the LADM concept Spatial Unit
CityGML and LADM

► One implementation of the (next) LADM conceptual model could be as a CityGML Application Domain Extension

- this would allow to have a joint representation and exchange of the 3D topographic objects and the RRR’s they are associated with
- software systems that can handle CityGML ADE could directly handle CityGML together with LADM
- \textit{SpatialUnit} could become an ADE Extension Class for \textit{CityObject} \rightarrow all CityGML feature types will inherit the properties of SU
- of course, a CityGML LADM ADE would not be the only implementation of the (next) LADM conceptual model

► Technical Aspects / useful CityGML concepts

- Mechanism for Systematic Extensions: CityGML Application Domain Extensions (ADEs)
- New in (upcoming) CityGML 3.0: Historization and Versioning
Questions

► Is the ISO LADM Standard considered an Abstract Specification or is it a conceptual model with an implementation of an exchange format?

► If it is not considered an Abstract Specification, it should become one
  ● then, it can be realized (and become part) of the different international and national geospatial modeling standards
  ● the “LADM as a CityGML ADE“ approach would fall into this category