Further Progress in the Development of the Core Cadastral Domain Model

Christian Lemmen, Paul van Oosterom – Kadaster, NL
Peter van Oosterom, Aap Zwartsengen and Willem Quak – Delft University

Standards
- There are supposed to be huge differences between cadastral and land registry systems
- Look to the common areas:
  - Standardised Model
  - Avoid re-inventing the wheel
  - Enable involved parties to communicate

Technology push vs. Market pull
- Geo-ICT developments: Modeling standards, Database technology, Positioning systems, Internet development, Wireless communication → Geometry accepted in mainstream ICT
- User requirements of Cadastral systems change over time, due to: Change in legislation, Governmental policy, New tasks for the organization, New technology
- Therefore, generic and flexible systems needed → Model Driven Architecture based on conceptual models described in UML

Proposal (FIG Washington 2002)
- Develop standard Core Cadastral Domain Model, including:
  - Spatial part (geometry, topology)
  - Extensible frame for legal/admin part
  - Based on core object-right-subject model
  - Object identification → EXPRESS in UML
  - Accepted by large community: FIG, OGC, ISO, user support, this means, it can be adapted by the industry
  - Maximize co-operation, minimize double effort
Cadastral Data

- Parcel, apartment, spatial unit
- Right (formal ownership, customary, indigenous, tenancy, starter/landholder, freehold, possession, mortgage, usufruct, long lease, restriction type 1, restriction type 2, state, informal, unknown, disagreement, occupation)
- Person (natural, non-natural, group)
- Identifiers
- Value
- Area (GIS area and legal area)
- Classification
- Geographic name
- Person name
- Date (birth, establishment, acceptance, transaction, survey, check-in)
- Ranking order
- Source document
- Forms
- Point
- Boundary
- Face, edge, node: topology

Cadastral Update Process Data

- Transactions
- Customer request (application)
- Quality (accuracy, reliability, collection mode)
- Name of conveyor, surveyor, etc.
- Signature
- Process step
- Archive data in use
- Next open identifier
- Type of instrument
- Distance in km
- Letters to buyer and seller
- Car in use, fuel
- Date and time
- Site
- Buyer/seller do not agree
- Authorisation
- Computer availability
- Topological error
- Production norm
- Time registration
- Objection, complaint
- Salary scale
- Team
- Team member
- Responsible manager
- Status code
- Out of tolerance
- Line code
- Point code
- Transformation parameters
- Historical data used
- Cluster identifier
- IT support

Basic datamodel

- Parcel
- Apartment
- Building
- Updated Unit
- One Point
- Lines
- Polygon (low accuracy)
- Polygon (high accuracy)
- Quality labels

Core Cadastral Domain Model: Geometry

- Real estate object with specializations, e.g. parcel, parcel-complex, volume property, restriction area, point parcel, apartment unit
- Aggregations like parcels set, parcel-complex, apartment complex
- Link to surveying and survey documentation
- Link to OGC standards (Nodes, Edges and Faces)
Core Cadastral Domain Model: Legal-administrative

- RRR is an association class between Person and RealEstateObject
- Mortgage, restriction and RRR are based on legal documents or decisions
- Person are specialised as natural or non natural
- Surveyor, conveyor and money provider are included, specialisations of the Persons class
- A RRR can be temporal

Cadastre 2014 approach is integrated

- 2014 is a generic, abstract set of guidelines
- CCDM is refined into a more specific model, for implementation

Boundary of the system – outside (in this moment):

- Spatial reference system
- Ortho photo, satellite, Lidar
- Topography
- Gas, gas technical, soil
- Pipes, lines and cables
- Addresses (postal codes)
- Building registers
- Natural person registers
- Non-Natural person registers
- Polluted area registers
- Mining right registers
- Cultural history
- (Religious) monuments
- Ship/airplane (car) registers
- ...

Aspects not yet covered

- Processes: how to maintain consistency between two related distributed systems in case of updates: the cadastral production process depends on availability and quality of data at remote servers (e.g. Persons in population database)
- Catalogues with "types of right" (per country?)
- Further modelling of cadastral survey
- Inclusion of a range of spatial units
- Generation of a full XML/GML schema
- Test with real data, in EULIS context
- Harmonise with other domain models, e.g. Topography, Water, Utility Networks
Conclusion

- Current proposal is under development, workshops, reviews, etc
- More attention to process side (in addition to data side)
- Not only the model itself is important, but the fact that there is consensus (also important role of industry)

Thank you