Out of the UML box:
Intuitive and Data-driven Modelling Tools for INSPIRE

Thorsten Reitz, wetransform GmbH
Is UML bad?

Observations:

- UML is a very powerful modelling language that is hard to master
- Implications of modelling decisions (association type, re-use of existing structures) are not transparent
- Large models are hard to navigate
- Long cycle from conceptual design to implementation
- Implementation discontinuities
A new generation of Modelling Tools

Objectives:

- Continuous improvement in small iterations
- Enable data-driven design decisions
- Get design feedback as soon as possible
- Lower entrance barrier to casual users
- *Uses UML as metamodel*
When should you care?

- Evolution of a Data Model
- Easy creation model extensions
- Definition of Profiles
- Rapid Prototyping and Evaluation
Iterative Design

„One baby step at a time“
Applying Agile to Modelling

1. Organise

2. Analyse

3. Compare

4. Design

5. Validate

6. Operate

Start

Retrospective

Release

Iterate
Ingredients of an Agile Standardisation Process

- **Model-driven**
  - No Schema Language Mismatches between steps

- **Data-driven**
  - Inform every step with real-world data

- **Usage-driven**
  - Instantly validate data fitness-for-purpose

- **Collaboration**
  - Versioning, Forking
  - Comments, Tasks, Notes

- **Accessible**
Model KPIs

„You can only improve what you can measure“
Overall Methodology

Create a Factual basis
for design changes in future iterations

- Analyse Schemas
- Compare Schemas
- Analyse Data
- Create Hypotheses
- Test Hypotheses
- Document Recommendations
Schema and Data Analysis

- element depth
- use of base types
- reference types
- use of choices and substitutions constructs
- statistics of property type and occurrences
- statistics of frequently used concepts like Voidable, UnitOfMeasure
- statistics on geometry properties usage
- Schema coverage through known data sets
- Structural Overhead in encoding
- ...

INSPIRE Conference 2017, Kehl, Germany
Lower Entrance Barriers

„Extensions for a five year old“
Easy INSPIRE Extensions

- Touch-friendly View
  - Based on UML Model
- Recommendation Engine
- Easy re-use of components of other schemas/models
- Supports subset of UML/XSD concepts
  - Classes, Choices, Enumerations
  - Inheritance, Aggregation, Reference
Recommendation and Patterns

- Provide suggestions
- Automatically implement modelling patterns
Example Project: BKG „Fitness for Purpose“ Study

„Concrete Recommendation to improve the Data Specifications“
Identified Problems by Use Case

Data Management
• OO vs. Layers
• OO vs. RDBMS/ODBMS

Data Harmonisation
• Missing Codelists
• Semantic mismatches (classification)
• Semantic ambiguity
• Networks/Topologies

Data Exchange
• Resolution of file-external references
• Support for dataset fragments

Data Analysis
• Complex attribute structures
• Multiple geometries per „layer“

Data Portrayal
• Nested properties
• Code list references
• Complex geometry model (Building)
• leastDetailedViewingResolution

Data Publishing
• GetFeatureInfo and complex schemas
• Some geometries and constructs not supported
(Some) Recommendations

- Flatten some structures where cardinality is usually 1
- Simplify attributes representing measures and remove obligation to provide UnitOfMeasure for attributes that are Voidable
- Simplify xs:choice elements in data models
- Reduce use of substitution groups
- Avoid features with multiple geometry attributes
- Provide middleware to support alternative encodings
- Provide code list references in XML Application Schemas
- Provide alternative data models for View Services
- Use alternative logical models for specific elements
Questions? Feedback?
+49 6151 155 408

info@wetransform.to
www.wetransform.to

www.linkedin.com/company/wetransform-gmbh
https://twitter.com/tr_xsdi