OGC Web Services Initiative, Phase 8 (OWS-8):  
Aviation Thread / Digital NOTAM Refactor and Validation Tool  

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Introduction

• Present Digital NOTAM Refactor Effort in OWS-8
  – Domain Modelling
  – Validation Tool

• Learn about the Domain Modelling Cookbook and modelling / validation tools
Domain Modelling

• The value of formal information modelling
  – Share information across a “universe of discourse” (ISO 19101)

• Conceptual Domain Modelling vs. Physical Domain Modelling
  – Capture concepts, allow for their reuse
    Standardize definition of a mountain
    Share the definition so we all know what we are talking about
  – Map concepts to useful systems
    my system tells me where mountains are so I don’t fly into them
• CSIRO has been at this for a while now.
• Domain Modelling Cookbook – a tool for teaching others
• Introduce concepts
  – Modelling practices
  – Model hygiene
  – Sustainable model management
• Practical examples
  – Existing model: Digital NOTAM
  – Blank slate: FarmML
Exploring Digital NOTAM

- Concepts are well described
  - Digital NOTAM Event Specification - DNES
  - Expanding on AIXM

- Some devil in the details
  - Differing approach to formalizing the model
  - Blurring of conceptual and physical models
  - Method used for packaging / dependency

- Approach: Develop the cookbook, apply it to Digital NOTAM

- Document this refactoring effort in an Engineering Report (OGC 11-106)
The Modelling Tools

- **HollowWorld**
  - Templates for domain models
  - ISO Harmonized Model

- **FullMoon**
  - Conformance Checking
  - Generate Application Schema

- **SolidGround**
  - Model authoring tools
  - Plug-in for Enterprise Architect
  - Many helpers
Recommendation: FullMoon

- Improve conformance of the model
- Ensure formal notation of the UML so a physical model (XSD) can be generated
Recommendation: Temporality

- AIXM temporality model builds on existing standards for temporality in GML
  - Not represented in the model
  - Ideally would be introduced into the appropriate ISO standards
    - ISO 19103
    - ISO 19109
    - ISO 19136 DynamicFeature package
  - Changes could eventually filter down into OGC standards:
    - Filter Encoding: time-sensitive query
    - WFS: time-sensitive feature request
  - See also OGC 11-093 – OWS-8

Aviation Architecture ER
Validating Digital NOTAM

• Digital NOTAM is Flexible in form
  – The Event and associated features can appear anywhere in an AIXM document

• Validation Rules
  – Generic: “All Timesheets shall get timeReference=UTC ...”
  – Scenario Specific: “Navaid shall contain at least an ...”

• Schematron
  – Generic technology
  – Define the rules once for any application

• Limitations
  – Can only test what is present in the document
  – Difficult to test aggregation based constraints
DuckHawk - Validation Tool

- XML Schema and Schematron Validation
- Automated testing and reporting
- Preconfigured for Digital NOTAM
- Test WFS or local files – test set
Proposed: WPS Profile for Validation

- Validation tool needs automated invocation
- Considering solutions came up with WPS Application Profile for validation of GML Application Schemas