VO-DML Status
Ready for RFC (almost)

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IVOA Northern Spring Interop, 2016

Overview

- Summary of VO-DML
- Recent decisions on open issues in language
- Document
- Models expressed in VO-DML/XML
- Scripts for validation, documentation generation and beyond
- Scripts for generation of VO-DML from UML/XMI generated by UML tools:
  - MagicDraw Community Edition 12.1 (UML 2.0, XMI 2.0)
  - Modelio 3.0 (UML ..., XMI ...)
  - Altova Umodel

What VO-DML is (and is not)

- Is
  - Formal modelling language for all our data models

- Is Not
  - A description of how to serialize instances of a data model in a VO Table.

Why is everyone so excited about VO-DML?

- Formal modelling language for all our data models
  - UML inspired, but simpler
  - Notable features:
    - Model sharing
    - Semantic concepts
- Machine readable data models
  - Validation
  - Documentation generation
  - Code generation
- With a formal way to describe data models, we can define a way to serialize data objects in VO Tables
- Supports interoperability at model level

Interoperability enabled by the language

- Data models can be shared, reused and extended
- vodml-id/vodml-ref mechanism
  - Model A can use elements from model B by
    1. Importing model B
    2. Referring to types inside model B using vodml-ref
- That + machine readability enables automated validation of new models that import others
- Standardized, cross-linked documentation generation

Decisions on Open Issues

- Meeting Baltimore Jan 2016 (MC-D, TD, OL, AR (remote), GL)
- Enumeration Literals:
  - Decision: No separate "human readable" label/title
    - Instead use description for this
    - Simplifies mapping of literals in VOTable serializations
  - http://mail.ivoa.net/pipermail/dm/2016-February/005335.html
- Attribute multiplicity
  - Decision: Allow "*", but warn against its usage
  - Why allowed?
    - Sometimes difficult to design alternative
    - We could not prove it wouldn't be needed, and changing it later has a high cost
  - Why warn against usage?
    - Hard to map to RDB (hence TAP). Arguably most important/interesting use case for DMs
    - Often indicates bad modelling
  - Be suspicious of models requiring this (I'm watching you STC-2 !!!)
    - Warning in validator
    - Warnings should be considered by WG when approving a model
  - http://mail.ivoa.net/pipermail/dm/2016-February/005336.html

Models expressed in VO-DML/XML

- (links are to folders with UML, VO-DML, HTML)
- SAMPLE, TOY Source DM
  - https://volute.g-vo.org/svn/trunk/projects/dm/vo-dml/models/source
  - Used as motivation in new Source DM effort (JS, MD, etal)
- SimDM (GL)
  - https://volute.g-vo.org/svn/trunk/projects/dm/vo-dml/models/simdm
  - The original mapped from VO-URP to VO-DML
  - Used in SimDAL (at some time)
- Photometry (JS)
  - https://volute.g-vo.org/svn/trunk/projects/dm/vo-dml/models/photdm-alt
- Dataset (MC-D)
  - https://volute.g-vo.org/svn/trunk/projects/dm/DatasetMetadata-1.0/vo-dml
- STC-2 (AR)
  - https://volute.g-vo.org/svn/trunk/projects/dm/vo-dml/models/STC2/2016-02-19
- ObsCore 2 (LM + ML to do before Trieste)
- IVOA
  - https://volute.g-vo.org/svn/trunk/projects/dm/vo-dml/models/ivoa
  - base model with value types
  - to be reused by all other models for primitive types such as string, integer, real etc

Scripts: VO-DML/XML → …

- Scripts on volute@g-vo
  - https://volute.g-vo.org/svn/trunk/projects/dm/vo-dml/xslt
- Validation scripts based on XML schema and Schematron
  - schematron rules need completing
- Generation of (semi-)normative HTML documentation
  - Example: http://volute.g-vo.org/svn/trunk/projects/dm/vo-dml/models/source/SourceDM.html#
- Generation of POJO Java classes for instantiation
  - Example use case
  - Could do XSD, C#, RDF, …
- TODO write *Note* how to use generation pipeline

Scripts: UML/XMI → VO-DML/XML

- Scripts for generation of VO-DML/XML from UML/XMI generated by UML tools:
  - MagicDraw Community Edition 12.1 (UML 2.0, XMI 2.0)
  - Modelio 3.0 (UML …, XMI …)
  - Altova Umodel
- Set of template models for same tools
  - SAMPLE/TOY Source DM: https://volute.g-vo.org/svn/trunk/projects/dm/vo-dml/models/source
  - Empty starter models: https://volute.g-vo.org/svn/trunk/projects/dm/vo-dml/models/templates
- TODO write *Note* how to use UML tools for creating VO-DML/XML

The specification: products

- MS Word/PDF document
  - https://volute.g-vo.org/svn/trunk/projects/dm/vo-dml/doc/VO-DML-WD-v1.0.docx
  - https://volute.g-vo.org/svn/trunk/projects/dm/vo-dml/doc/VO-DML-WD-v1.0.pdf
  - to be moved to wiki
- XML schema+Schematron
  - https://volute.g-vo.org/svn/trunk/projects/dm/vo-dml/xsd/vo-dml-v1.0.xsd
  - https://volute.g-vo.org/svn/trunk/projects/dm/vo-dml/xsd/vo-dml.sch.xml
  - to be moved to wiki
- Basic IVOA model with standard types etc:
  - existence of basic, primitive types essential for interoperability
  - ivoa.vo-ml.xml etc : https://volute.g-vo.org/svn/trunk/projects/dm/vo-dml/models/ivoa

Tasks

- Review document
- Review schema+schematron
- Review IVOA data model
  - part of spec?
- Write Note on "how to create an IVOA data model"
  - with generation description
  - UML tool templates

Mapping VO-DML to VOTable - Status

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What Is the Goal?

- VODML formally describes data models
- Data objects in those models can be instantiated

- GOAL: Communicate those instances via VO Table
  - Requires an update to the VO Table standard

Why is this difficult?

- Object models can be arbitrarily nested and complex

- VO Tables are flattened representations of the atomic elements of the model.

Where are we?

- Mapping document exists to define how to describe instances in VO Table
  - Document is thorough, but not up-to-date with recent decisions
- Still need concrete examples and implementations
- Not much progress since Sesto
  - Resource limitations
  - Project dependencies
- Items on the roadmap remain largely the same
  - Urgency for progress is greater
  - Some resources will be more available before Trieste
    - I am committing to 1 month of work during that time.

Roadmap/Tasks

- (GL, OL) Update Mapping Document
  - https://volute.g-vo.org/svn/trunk/projects/dm/vo-dml/doc/MappingDMtoVOTable-v1.0-201506xx.docx
- (All) Homework:
  - Read mapping doc and raise questions or concerns.
  - Continue discussion on DM list
- (GL, OL) Update VO Table schema to match document
  - https://volute.g-vo.org/svn/trunk/projects/dm/vo-dml/mapping
- (GL, OL) Create sample VO Tables, particularly with instances of a Source DM
  - SDSS, 2MASS, Hubble Source Catalog
- (TD, GL, OL) Implementations
  - (TD) Implement parser and client that can do something useful with source instances
    - Experiment with alternative syntax
  - (TD, GL) Implement data provider side, so that real query results can contain source instances.
- (GL) Augment mapping document as needed (ongoing)
- (TD, OL, GL) Report on implementation lessons learned and propose VO Table updates