



STRATEGIES FOR PUBLISHING DOMAIN ONTOLOGIES AS LINKED DATA FROM OGC DOMAIN STANDARDS

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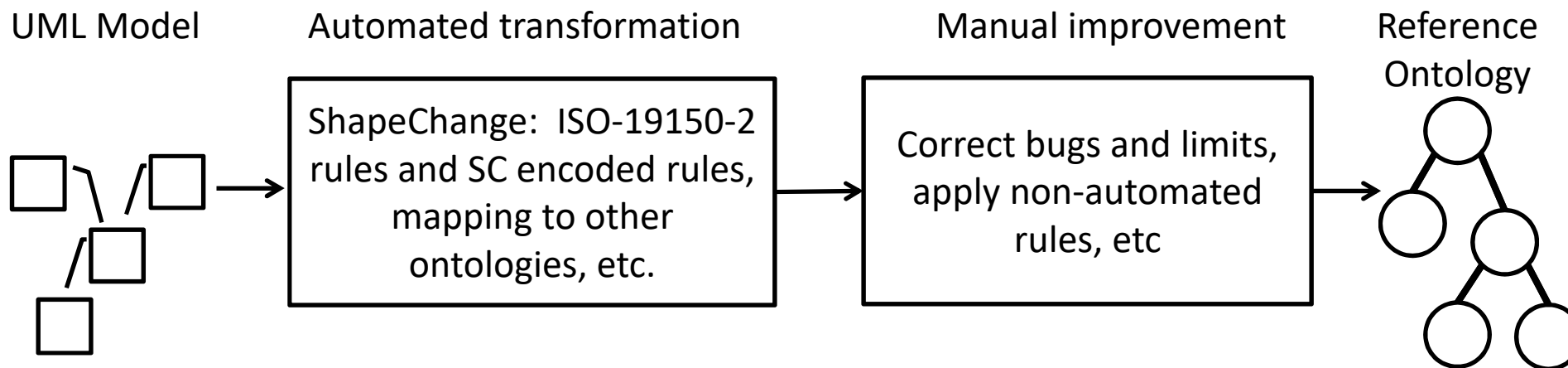
Geoscience for a sustainable Earth

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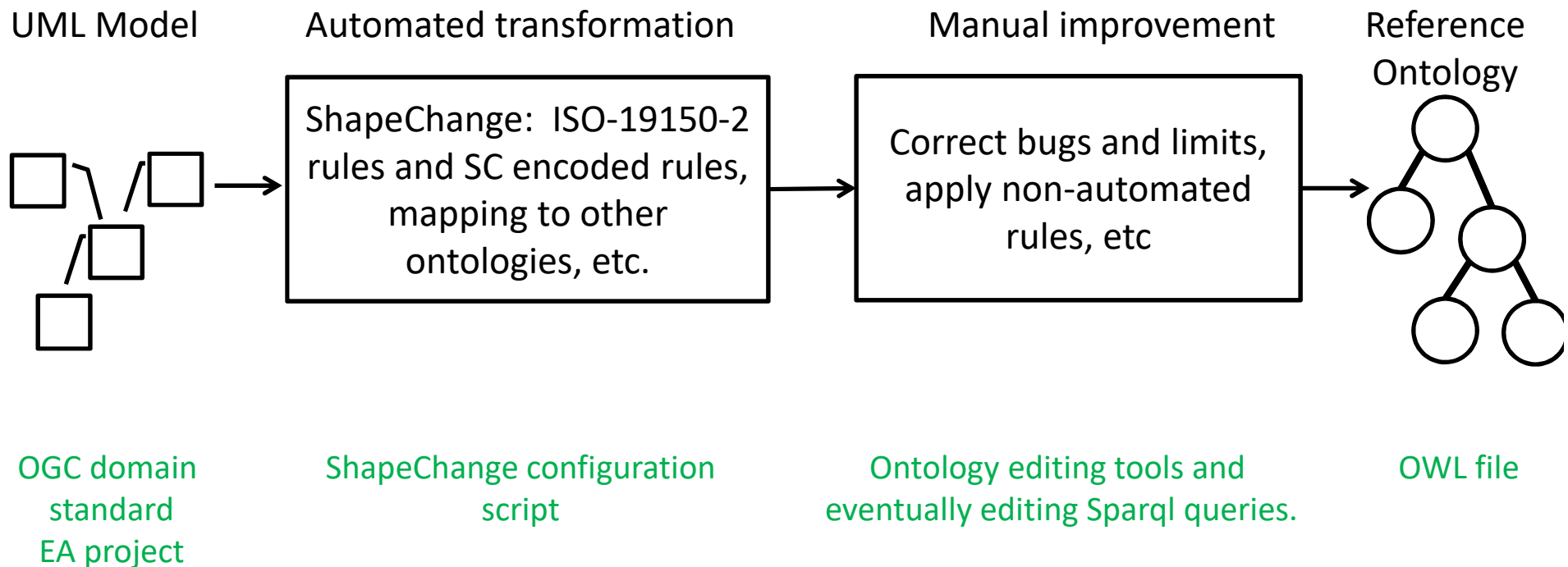
THE NEED

- Maintaining the standardization and interoperability effort initiated by domains (Geoscience, Hydro, ...)
- Providing a reference for publishing content as Linked Data
- Exploring a more formal and expressive way to represent knowledge

THE STRATEGY



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Cf. [Strategies for Publishing Domain Ontologies as Linked Data.docx](#)

URI NAMING CONVENTION

Options for naming policy

- Option 1: `http(s)://www.opengis.net/def/{ontology}/<authority>/<schemaAcronym>`
ex: [http\(s\)://www.opengis.net/def/ontology/GeoSciMLSWG/gsmlb](http(s)://www.opengis.net/def/ontology/GeoSciMLSWG/gsmlb)
- Option 2: `http(s)://www.opengis.net/def/<authority>/{ontology}/<schemaAcronym>`
ex: [http\(s\)://www.opengis.net/def/GeoSciMLSWG/ontology/gsmlb](http(s)://www.opengis.net/def/GeoSciMLSWG/ontology/gsmlb)
- Option 3: `http(s)://www.opengis.net/def/{ontology}/<schemaAcronym>`
ex: [http\(s\)://www.opengis.net/def/ontology/gsmlb](http(s)://www.opengis.net/def/ontology/gsmlb) ,
[http\(s\)://www.opengis.net/def/ontology/gsmlb/GeologicUnit](http(s)://www.opengis.net/def/ontology/gsmlb/GeologicUnit) will be the identifier of the class in the ontology
- Option 4: `http(s)://www.opengis.net/def/<schemaAcronym>`
ex: [http\(s\)://www.opengis.net/def/gsmlb/GeologicUnit](http(s)://www.opengis.net/def/gsmlb/GeologicUnit) will be the identifier of the class in the ontology

⇒ The forth option is currently used in the ontologies we generated.

Needs to coordinate with OGC-NA

ISO 19150-2

A wide set of rules for transforming UML models to OWL ontologies but

- We can't always automatically exploit the full expressiveness of OWL
 - ⇒ the resulting ontologies seem to be restricted to the UML way of modelling
- Some artefacts seems handled in a way that don't seem to respect UML (ex: association classes) / OGC (ex: union) semantics

IDENTIFIED ISSUES

Meta-model issues between UML and OWL

- Replace the “character string” data properties by object properties when possible and needed.
- Revisit/delete OWL classes issued from abstract UML classes.
- Enrich the semantics with more axioms and relations regarding classes and properties (equivalence, disjointness, transitivity, symmetry, functionality, etc.)

IDENTIFIED ISSUES

Meta-model issues between UML and OWL

- Use owl:disjointUnionOf for class union (instead of owl:unionOf as in ISO 19150-2)
- The placeholder attribute “any” (in GeoSciML Lite) is useless in owl: delete it
- When possible, encode model constraints (features def, OCL) as OWL restrictions and axioms

IDENTIFIED ISSUES

Meta-model issues between UML and OWL

- If no confusion, properties naming should be scoped to the ontology name space. Else, the naming should be scoped to the classes (cf. ISO-19150-2 §6.2.6)
- To favor reuse, leave the domains and ranges of properties empty. A restriction on the values of the properties should be defined for every class.
- Reuse as much as possible the Semantic Web existing classes/properties or link the newly defined classes/properties to external ontologies.

IDENTIFIED ISSUES

SWE related issues

Reference to basic SWE types must be modified if needed by specialized classes from other ontologies or by defining new ones

- Use GSML_QuantityRange instead of swe:QuantityRange as recommended in GeoSciML definition.
- Rename swe:Category to skos:Concept or mdl:Lineage (depending on the case) and swe:Quantity to the relevant class in the context (ts:TimePosition, mdq:PositionalAccuracy, etc.).

IDENTIFIED ISSUES

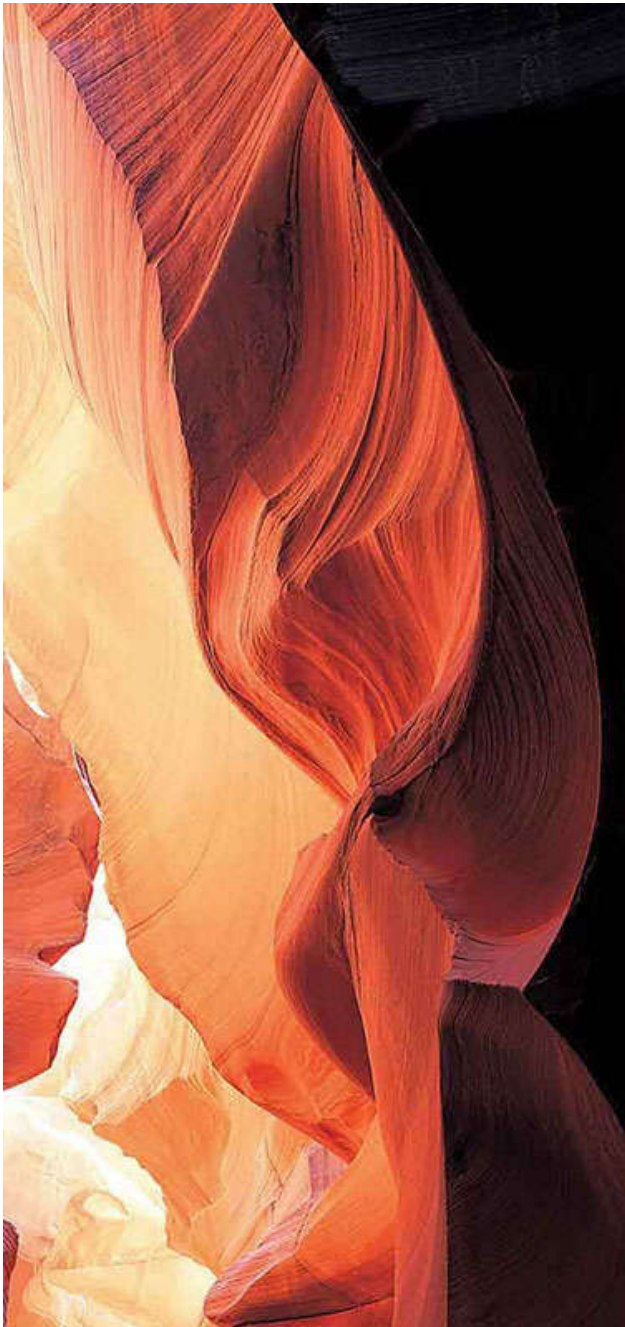
Software limits: ShapeChange

- Association classes must be handled differently than what is suggested in ShapeChange
 - ⇒ ShapeChange does the association class -> owl:Class transformation but the newly generated class is linked to no-one
 - ⇒ Need to specify properties to link it to the related classes.
- Use owl:disjointUnionOf for class union instead of the rule proposed in ShapeChange

IDENTIFIED ISSUES

Standing issues

- Usage of SKOS VS dedicated classes when transforming <<codeList>> from the UML
- Version in URI



THANK YOU

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