Domain Model for Geospatial Metadata Application Profile

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INTRODUCTION

The Samvera Geo Predicates working group was established in 2017:

- Objective: To develop a core set of recommended RDF predicates sufficient for basic description of geospatial resources in a Samvera repository when combined with default metadata.
- Need: Geospatial resources require specialized metadata elements for adequate description, but there is a lack of consensus around what individual predicates should be used for these elements in a linked data/RDF environment like Samvera.

We elected to adopt the general steps outlined in the Me4MAP method for developing a metadata application profile (Malta 2017), which is based on the Singapore Framework for Dublin Core Application Profiles (DCMI 2008).

We identified several tasks within the method as key steps for our working group:

- S2 Developing the Domain Model
- A3 Environmental Scan
- S3 Developing the description set
- S3.1 Vocabulary Alignment

This poster describes work to develop a domain model to serve as a basis for a partial metadata application profile for geospatial resources.

DEVELOPING THE MODEL

Quoting Baker & Coyle (2009), Malta defines a domain model as *"a description of what things your metadata will describe, and the relationships between those things. The domain model is the basic blueprint for the construction of the application profile*," and further specifies that "*it identifies the entities and their relationships, and the entities attributes (e.g., datatypes and other attributes with literal values)*" (Malta 2017).

Geospatial resources can encompass a breadth of resource types and formats, and it can be tricky to categorize them. We took a multi-step approach to developing a set of domain entities for the model, starting with a list of concrete resource types, then determining applicable target attributes, and finally developing a generalized set of domain entity classes from them. This approach allows conceptualization to emerge from the results of a concrete scope-setting step, rather than be imposed prematurely. It also represented a movement from conceptualizing repository objects to conceptualizing metadata objects.

RESOURCE TYPES

We enumerated a set of in-scope and included geospatial resource types, loosely construed as 'types of geospatial resources that might be shared in a library repository.' This was an intuitive process, based on the collective experience of the working group members with collections of geospatial resources.

This set of resource types was refined so that each type was distinct and did not overlap with any other. Some resource types were excluded through this process, because they were deemed to be included in another type, or out of scope. Sets and single instances of the types were defined separately.

The final set of included resource types is given in the table below. Almost all resource types were defined in matching pairs of single and collection instances to more closely reflect the range of real world repository objects.

ID	Resource Type Name
RT1	scanned map
RT2	scanned map set
RT3	scanned geological cross-section
RT4	scanned geological cross-section set
RT5	aerial photograph
RT6	aerial photograph set
RT7	georeferenced scanned map
RT8	georeferenced scanned map set
RT9	georeferenced aerial photograph
RT10	georeferenced aerial photograph set
RT11	remote sensing data object
RT12	remote sensing data set
RT13	vector GIS data object
RT14	vector GIS data set
RT15	raster GIS data object
RT16	raster GIS data set
RT17	mixed GIS data set

TARGET ATTRIBUTES

Each resource type was characterized in terms of applicable geospatial metadata attributes, from a list of target attributes that we defined ahead of time, based on the group's collective domain knowledge.

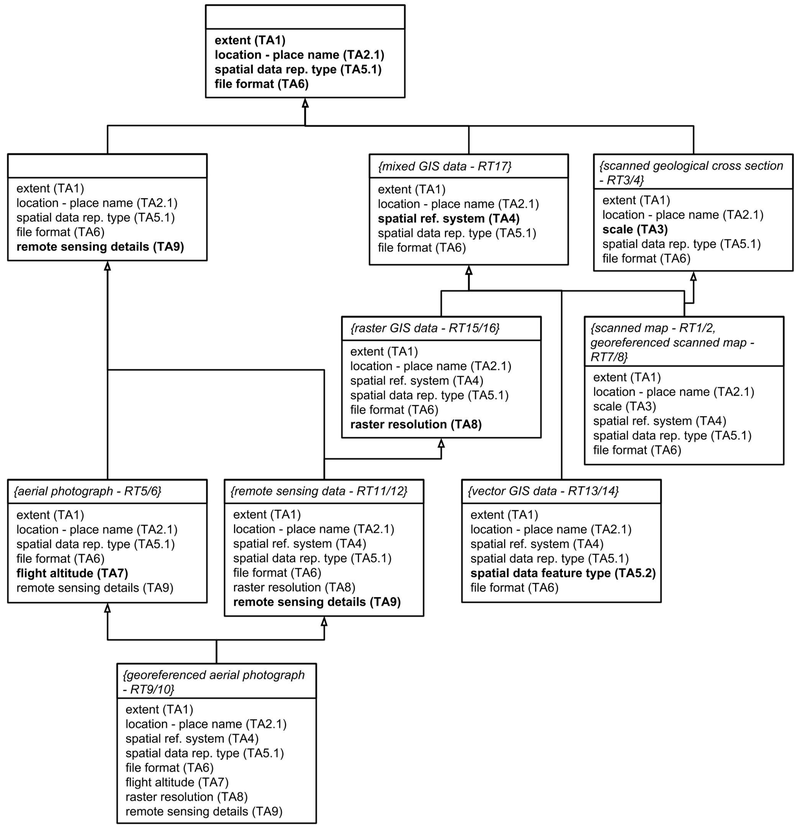
What we called a "target attribute" represents a piece of geospatial metadata for which we seek a linked data predicate capable of expressing that information. General attributes, such as title or creator, are not part of the set of target attributes, because a founding assumption of the working group objective is that these attributes are already provided for in a standard metadata vocabulary, such as Dublin Core Terms.

Through this process, we identified one target attribute that was not essential (Geographic Location - Description); added one (Remote Sensing Details); and chose to expand the scope of another (Spatial Data Representation Type) so that it could serve to express the type characteristic for all the resource types we identified.

ID	Target Attribute Name
TA1.1	Geographic Extent - Bounding box (rectangle)
TA1.2	Geographic Extent - Polygon (Footprint)
TA1.3	Geographic Extent - Path
TA1.4	Geographic Extent - Point
TA2.1	Geographic Location - Place name
TA3.1	Scale - Representative Fraction Denominator
TA3.2	Scale - Text
TA3.3	Scale - Qualifier
TA4	Spatial Reference System
TA5.1	Spatial Data Representation Type (vector, raster)
TA5.2	Spatial Data Feature Type (point, line, polygon)
TA6	File Format for Geospatial Objects
TA7	Flight Altitude
TA8	Raster Resolution (dimension of raster pixel)
TA9	Remote Sensing Details

DOMAIN MODEL ENTITIES

Domain model entities were abstracted from the resource types, using the applicability of different target attributes as distinguishing criteria. We found that there was a set of base target attributes universally applicable, which established a base class for a general geospatial resource within the model. Other classes represent specializations. The distinction between single objects and sets was not retained for the DM entities.



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