

Paper for Consideration by S-100WG

Representation of DataCoverage Geometries in S-100 Part 17

Submitted by:	IIC Technologies
Executive Summary:	Simplification of the number of ways to describe coverage is required
Related Documents:	S-100 Part 17
Related Projects:	

Introduction / Background

In order to reduce the processing required by S-100 implementers NIPWG7 approved the simplification of the number of different ways in which GML objects can be used for the representation of DataCoverage in S-100 CATALOG.XML.

It was required that no S-100 schema changes are made, however, and that the GML remains as generic GML, and not S-100 specific elements. This should be done by restricting the number of ways allowed in S-100 Part 17 and therefore requires clarification in S-100 Part 17.

Analysis/Discussion

GML is used as an integral part of S-100 Part 17, specifically in the XML elements defined by the Exchange Catalogue Schema. The core GML schemas are included by the Part 17 schemas and are the same schemas included by the Part 10b GML schemas. Product specifications then build their own GML schemas by including the S-100 GML profile schemas. Thus there is a common ancestry between CATALOG.XML coverage GML objects and GML objects used by GML encoded datasets conformant with Part 10b.

GML is a comprehensive language for encoding a rich and diverse array of geometric objects. For the purpose of representing coverage objects in CATALOG.XML, however only a very small number of possibilities are required. Implementers would benefit from a tighter standardization through a reduction of the CATALOG.XML coverage polygons.

Coverage polygons use GML in the S-100 boundingPolygon elements. There are many hundreds of ways to represent Polygons in GML¹ e.g.

- Curve
- MultiGeometry
- Surface
- Point
- Polygon

NIPWG considered whether an S-100 “specific” implementation of a Polygon or a profiling of the existing GML possibilities would be most appropriate and came to the conclusion that the profiling is the more favoured option as it allows for greater interoperability with other GML implementations and does not restrict S-100.

Conclusions

In order to simplify the job of S-100 implementers for CATALOG.XML the only requirement is for a representation which encodes a simple, connected polygon with a single exterior and 0 or more holes.

¹ <http://erouault.blogspot.com/2014/04/gml-madness.html> contains many good examples for reference.

The following example is proposed as the simplest way to represent such polygons using the GML vocabulary implemented in the included S-100 schemas.

```
<S100XC:boundingPolygon>
  <gex:polygon>
    <gml:Polygon gml:id="DC1">
      <gml:exterior>
        <gml:LinearRing>
          <gml:posList srsName="EPSG:4326">
            0.0 0.0 1.0 0.0 1.1 1.1 0.0 1.0 0.0 0.0
          </gml:posList>
        </gml:LinearRing>
      </gml:exterior>
      <gml:interior>
        <gml:LinearRing>
          <gml:posList srsName="EPSG:4326">
            0.25 0.25 0.75 0.25 0.75 0.75 0.25 0.75 0.25 0.25
          </gml:posList>
        </gml:LinearRing>
      </gml:interior>
    </gml:Polygon>
  </gex:polygon>
</S100XC:boundingPolygon>
```

This implements bounding Polygons restricted to a single GML Polygon (with a gml:id with an SRS defined in each of the posList coordinates of EPSG:4326) with a single exterior element and optional (i.e. 0 or more) interior elements. Each exterior or optional interior is a Linear Ring with ≥ 4 coordinate pairs, with the first and last coordinate pair being identical, i.e. the Linear Ring is closed. Coordinate order is as per EPSG:4326, latitude/longitude.

No further stipulations are required as geometry must also conform to the S-100 geometry model and be conformant with the XML Schema for exchange catalogues..

Recommendations

It is recommended that GML polygons used for CATALOG.XML DataCoverage (bonding Polygon) elements are restricted to the form shown above and appropriate language added to S-100 Part 17 to this effect. Validation tests should also be added at the S-100 level to ensure conformance with this form of GML polygon.

Action Required of S-100WG

S-100WG is asked to:

1. Consider the background and content raised in this paper
2. Clarify the form of DataCoverage Polygons allowable in S-100 Part 17 CATALOG.XML exchange catalogues using the form and description defined in this paper.

This would be achieved through a restriction in the Part 17 schema documentastion, and a note within S_98 Annex C. It will be further backed up through S-100 level validation tests on CATALOG.XML. In time the Part 17 schems itself may be changed to restrict the coerage polyogngs via XML Schema.