GML implementations

Luc Donéa – ERDAS APOLLO Product Manager
Philippe Duchesne – ERDAS APOLLO Architect

erdas
The Earth to Business Company

INTERGRAPH®

GML in RedSpider and APOLLO products

GML is first implemented as output data format for the WFS service

Ionic Software RedSpider Products

• Implementation of GML 3.2.0 & 3.2.1

1999

2001

August 2007

August 2011

• GML1 (co-author), GML2 (co-author), GML3 (RWG), WFS (co-author)

Ionic Software creation

• Implementation/support of
  - GML 2.1.2, 3.0.0, 3.0.1, 3.1.0, 3.1.1
  - GMLsf 1.0.0
  - EO GML (HMA)
  - GMLJP2

APOLLO Products

erdas
The Earth to Business Company

INTERGRAPH

First and main product usage – WFS output format

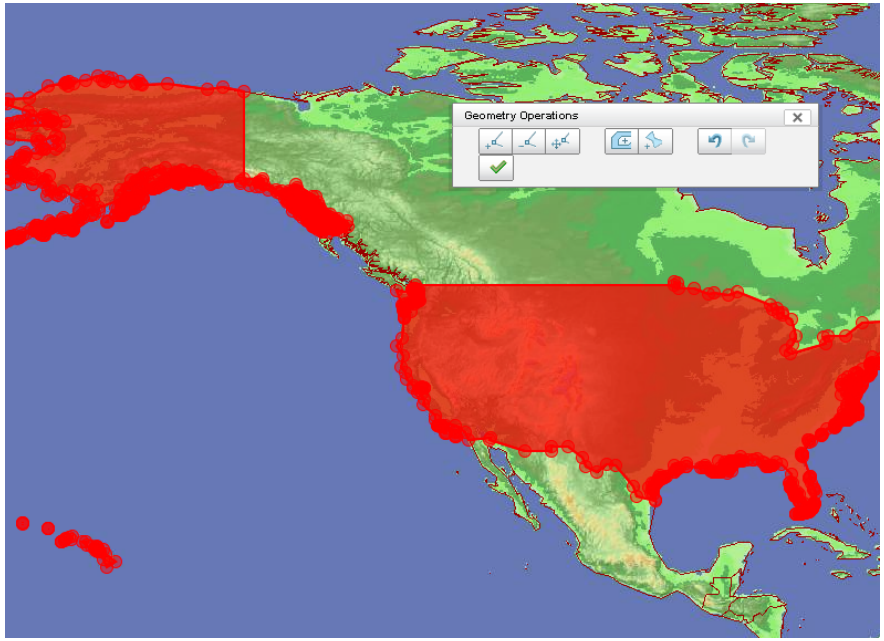
- GML allows to describe features and feature collections

- Client applications needs to perform WFS requests to provide vector data styling and editing

- Issue: GML is really **verbose**

- It takes a lot of time to encode/transport/parse GML data

- **Performance bottleneck** : Makes client applications slow when lots of big geometries are involved



- Possible solution: GML compression, but does not help on encoding and parsing + adds compression/decompression time

- better idea: provide **vector data streaming protocol**, offer views with generalized geometries. But GML doesn't lend itself to that solution.

Project implementations - 2004 – AIXM inclusion

- **Eurocontrol**: European Organization for the Safety of Air Navigation

- Use GML for the Aeronautical Information Exchange Model (AIXM), designed to enable the management and distribution of Aeronautical Information Services (AIS) data in digital format.

- Design of **custom GML Application schema** matching their needs
    - Compliant with the **GML3.1** specification
    - GML compliant software should be able to read/display the AIXM information as part of the GML data
    - Can be served through compliant WFS
    - include AIXM attributes related to the GML geometry
- GML schema flexibility came in handy

Project implementations - 2006 – OS GML schema

- **Ordnance Survey** - project Magnesium phase II

- Automatic system delivering Change Only Updates data to their clients using OS Master Map data (GML schema designed in Phase I)

- Automatic updates via an OpenGIS compliant WFS-T
    - Update is done by requesting the Master WFS with BBOX, result GML is then pushed to the client WFS-T to automatically update its content

- The OS Master Map GML schema was very complex

- Again, GML schema allowed the expression of a complex model, but this time with a drawback :
    - Some constructs (in particular xlinks) are difficult to map to database schemas
    - As a result, some application schemas can turn out to be a nightmare at the time of implementation

Project implementations - 2006 – OS GML schema (cont'd)

• Second issue: the **need for versioning**. It was difficult to implement a versioning system for GML data

→ Versioning facilities should be included in GML specification

Project implementations - 2007 - GMLJP2

- **EUSC** Reference Facilities Project

- Partner with Luratech (JP2 compression)

- implementation of a **GMLJP2** coder/decoder (GML embedded in JP2 headers)

- read and serve GMLJP2 data through the **WCS** OGC web interface

- Goal: provide all info in one file:
    - aerial imagery
    - imagery metadata
    - annotations
    - related vector data

- WCS GMLJP2 results automatically comes with metadata + annotations!

- GML is a good fit for Imagery metadata and related information, but having it **embedded into the JP2** file can be an issue for metadata updates

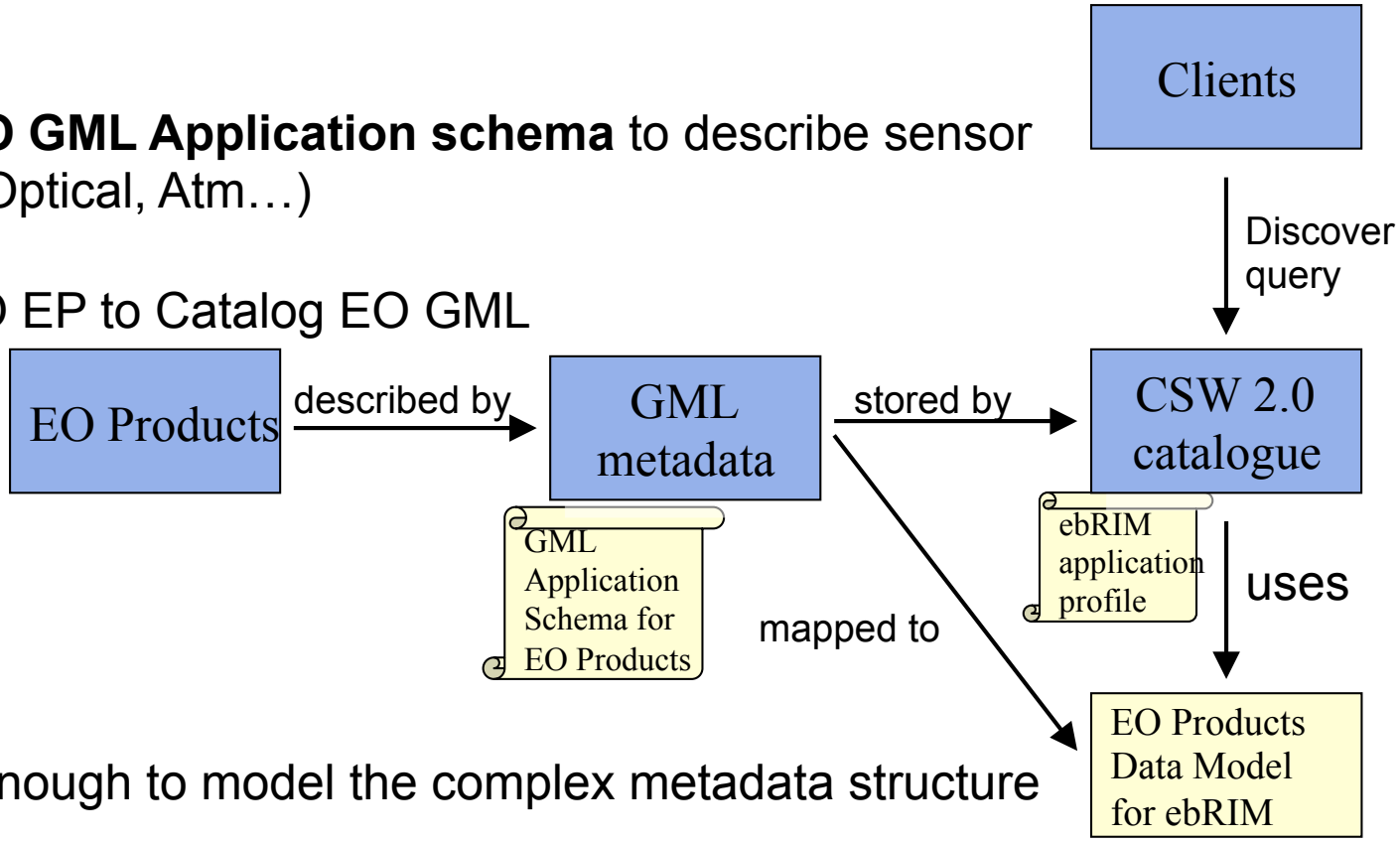
Project implementations – Earth Observation

- **ESA HMA** Projects

- Goal: provide standards to implement a European data management system. That system should aggregate and connect services allowing to find and access Satellite Imagery available in each country

→ definition of **EO GML Application schema** to describe sensor products (Radar, Optical, Atm…)

- CS-W ebRIM EO EP to Catalog EO GML



- GML is flexible enough to model the complex metadata structure

Project implementations – Earth Observation (cont'd)

- Initially EO GML was based on gml:observation

- As gml:observation was likely to be deprecated in GML4, had to move to O&M to keep a model of observation (using GML3.2)

→ Watch out for backward compatibility issues from one version to another

Project implementations – Semantics related

- used GML in several projects involving **semantic annotations**
    - Past Swing european research project
    - Current SMAAD ESA project

- No specific construct is available to express semantic annotations at the feature type, feature instance or feature property levels
    - URIs can be expressed using xlinks or anyURI types, but no strongly typed construct

→OGC **DP 08-167** : suggests new constructs for various levels of semantic annotations in several OGC standards, incl. GML

(an updated version of that document is to be released soon)

Summary of issues/recommandations

- Standard for **Vector Data Streaming** Protocol

- Provide **versioning** facilities in GML specification

- Watch out for **backward compatibility** issues

- Need for a strongly typed **semantic reference** construct

- GML schema flexibility and expressivity, a **double edged sword** :
    - really complex models can be mapped into GML
    - but resulting application schemas can be tricky to map into databases, if possible at all

Thank You!