The consumption of INSPIRE harmonised data made easy with the QGIS GML Application Schema Toolbox
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Supporting GML application compliant complex features in QGIS and beyond

Developments needed to break the circle “no data / no software to use the data”
Presenters

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Break the circle “no data / no software to use the data”

« another approach to demonstrate the usefulness of interoperable standards »

or

« having something to show to those who consider XML is not sexy »
Quick history

INSPIRE Data Specification Working groups

2015

Study on how to improve GML support in QGIS?

Scenario 1
Read

Scenario 2
Convert to DB

2016

POC QGIS Plugin

GML App Schema OGR Driver and QGIS integration

2017
Workflow
Technological challenges

Create database structure based on specification (XSD) … keeping in mind to have something usable

Reusable work (eg. avoid hardcoded configurations, identify core functionalities)
Technological choices

Based on open source projects

Create reader and writer for GML App Schema in a well-known and used library: **GDAL**

Use the GML App Schema driver in a desktop GIS: **QGIS**

Identify generic GIS/DB concepts which could be reused: Improve table join support, Add array types, Add custom editing widgets

Create a plugin dedicated to specialized tasks: Convert INSPIRE GML to DB
Technological choices
A new driver (GMLAS) in GDAL
Reading GML App Schema

A new driver added to GDAL OGR: **GMLAS driver**

- **How-to list GML file feature types?**

```
ogrinfo -ro GMLAS:cddaDesignatedArea.gml
INFO: Open of `GMLAS:cddaDesignatedArea.gml'
    using driver `GMLAS' successful.
1: DesignatedArea (Unknown (any), Point)
2: DesignatedArea_metaDataProperty (None)
3: DesignatedArea_name (None)
4: DesignatedArea_legalFoundationDocument_CI_Citation_alternateTitle (None)
```

- **How-to convert from GML to spatialite?**

```
ogr2ogr cdda.sqlite GMLAS:cddaDesignatedArea.gml \
   -f sqlite -dsco spatialite=yes -oo EXPOSE_METADATA_LAYERS=YES
```
Reading GML App Schema

XSD > Object model conversion based on Xerces

Respect application schema type

Model simplification eg. use Array db types

Exclude unused elements eg. xlink:role

XSD caching

XML validation : well-formed and/or XSD

GML geometry parsing (OGR)

XML Link support
Reading GML

Configuration ...

All applications using GDAL can benefit from this.
A new driver (GMLAS) in INSPIREd database
Database

INSPIRE GML file

INspired by EU Community

.spatialite_gui [a GUI tool for SQLite/Sp

/home/qgis/qgisgmlas/data/db/NL.sqlite

User Data
  _ogr_fields_metadata
  _ogr_layer_relationships
  _ogr_layers_metadata
  administrativeboundary
  administrativeboundary_admunit
  administrativeboundary_metadataproperty
  administrativeboundary_name
  administrativeboundary_nationallevel
  administrativeunit
  administrativeunit_administeredBy
  administrativeunit_boundary
  administrativeunit_coadminister
  administrativeunit_condominium
  administrativeunit_lowerlevelunit
  administrativeunit_metadataproperty
  administrativeunit_name
  administrativeunit_nationallevelname
  administrativeunit_nuts
  administrativeunit_residenceofauthority
  basicpropertyunit
  basicpropertyunit_metadataproperty
A new driver (GMLAS) in INSPIREd database Used in
Usage in QGIS

WFS2 Services

INSPiRE GML file

GDAL

sqlite or PostGIS

INSPiRE GML local file

WFS2 Plugin

GMLAS Plugin

Map with regions
Usage in QGIS / Download and convert

(optional) Download from WFS

(based on WFS2 plugin made by Juergen Weichand)

Convert to database

GMLAS

<table>
<thead>
<tr>
<th>WFS 2 Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>Username</td>
</tr>
<tr>
<td>Password</td>
</tr>
<tr>
<td>GetCapabilities</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Filter by extent</th>
</tr>
</thead>
<tbody>
<tr>
<td>xmin, ymin, xmax, ymax</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Request options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feature limit</td>
</tr>
<tr>
<td>1000</td>
</tr>
</tbody>
</table>

Output

<table>
<thead>
<tr>
<th>Path</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create temporary file</td>
</tr>
</tbody>
</table>

Download

GMLAS

Source GML file

Path

XLink depth

Datasets

Filter by extent

xmin, ymin, xmax, ymax

Target

Provider

Database

Schema

SRS

Append

Overwrite

24%

Convert

sqlite or PostGIS
Usage in QGIS / coming work

- **Plugin**
  - Download and conversion processing
  - Predefined SQL views by INSPIRE themes to simplify database use
- **QGIS Core**
  - Autodiscover join between tables in db model
  - Navigation between related tables in attribute table mode
Additional features made in BRGM POC
XML mode > WFS Flow
XML Mode > SOS Flow
Schema representation with QGIS to ease navigation.
What’s next ?
Testing

INSPIRE datasets, GeoSciML, ...

A virtual box is available with GDAL+GMLAS driver + QGIS3 + samples
Open source projects version used and roadmap

GDAL 2.2 April 2017

QGIS 3 - 2017
- 2.x series is now a maintenance release (ie. no major changes).
- QGIS 3 was announced in February 2016
- Development will be supported on the long term
- No resources to duplicate the work in 2.x and 3.x series (major changes for Python and QT).
- Contributions to 3.x by adding core functionalities, testing it, migrating plugin (eg. WFS2), which will benefit for the QGIS community
Planning

- Sample datasets
- Virtual box
- GDAL GMLAS Reader development
- Testing
- GMLAS Writer
- QGIS Array type support
- Better join support
- Custom editing widgets
- QGIS Plugin

- POC GMLAS Toolbox Plugin
- WFS2 Plugin + GMLAS Plugin

Now

2016

2017
Next steps

Finalize the work (2016)

Support publication of GDAL2.2 and QGIS3 + QGIS plugins in QGIS official repository (BRGM POC is already available and work with QGIS2)

Develop a user and developer community

● Have people use it & report usage …

Enhance the work

● Combine work made in the POC and the current implementation
● Add domain useful widget (Hydrogeologists, …)
● This work is not INSPIRE specific so it can be useful to the overall OGC community
Links

https://github.com/rouault/gdal2/tree/gmlas

https://github.com/pvalsecc/QGIS/tree/gmlas

https://plugins.qgis.org/plugins/gml_application_schema_toolbox/
(BRGM POC)

https://github.com/INSPIRE-MIF/qgis-ogr-gmlas

http://files.titellus.net/vbox/ for testing