



The consumption of INSPIRE harmonised data made easy with the QGIS GML Application Schema Toolbox

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► To cite this version:

Francois Prunayre, Sylvain Grellet, Paul Hasenohr, Christian Ansong. The consumption of INSPIRE harmonised data made easy with the QGIS GML Application Schema Toolbox. grès INSPIRE Conference 2016, Sep 2016, Barcelone, Spain. hal-01381221

HAL Id: hal-01381221

<https://brgm.hal.science/hal-01381221>

Submitted on 14 Oct 2016

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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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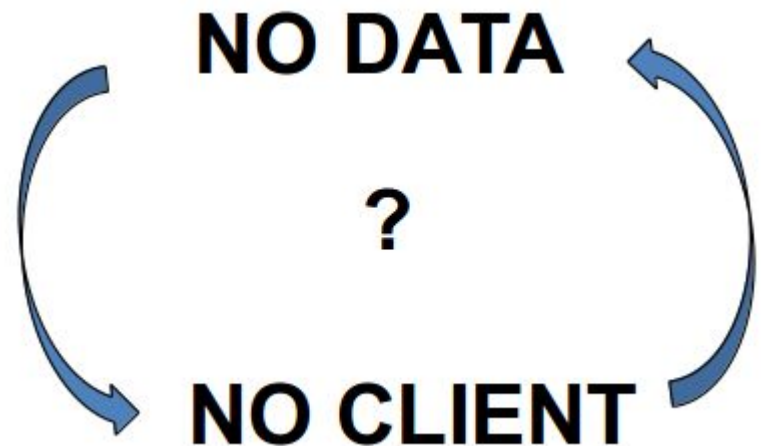
Christian Ansorge

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

2015

INSPIRE Data Specification
Working groups

2016

[Study](#) on how to improve
GML support in QGIS ?

Scenario 1
Read GML

Scenario 2
Convert to
DB



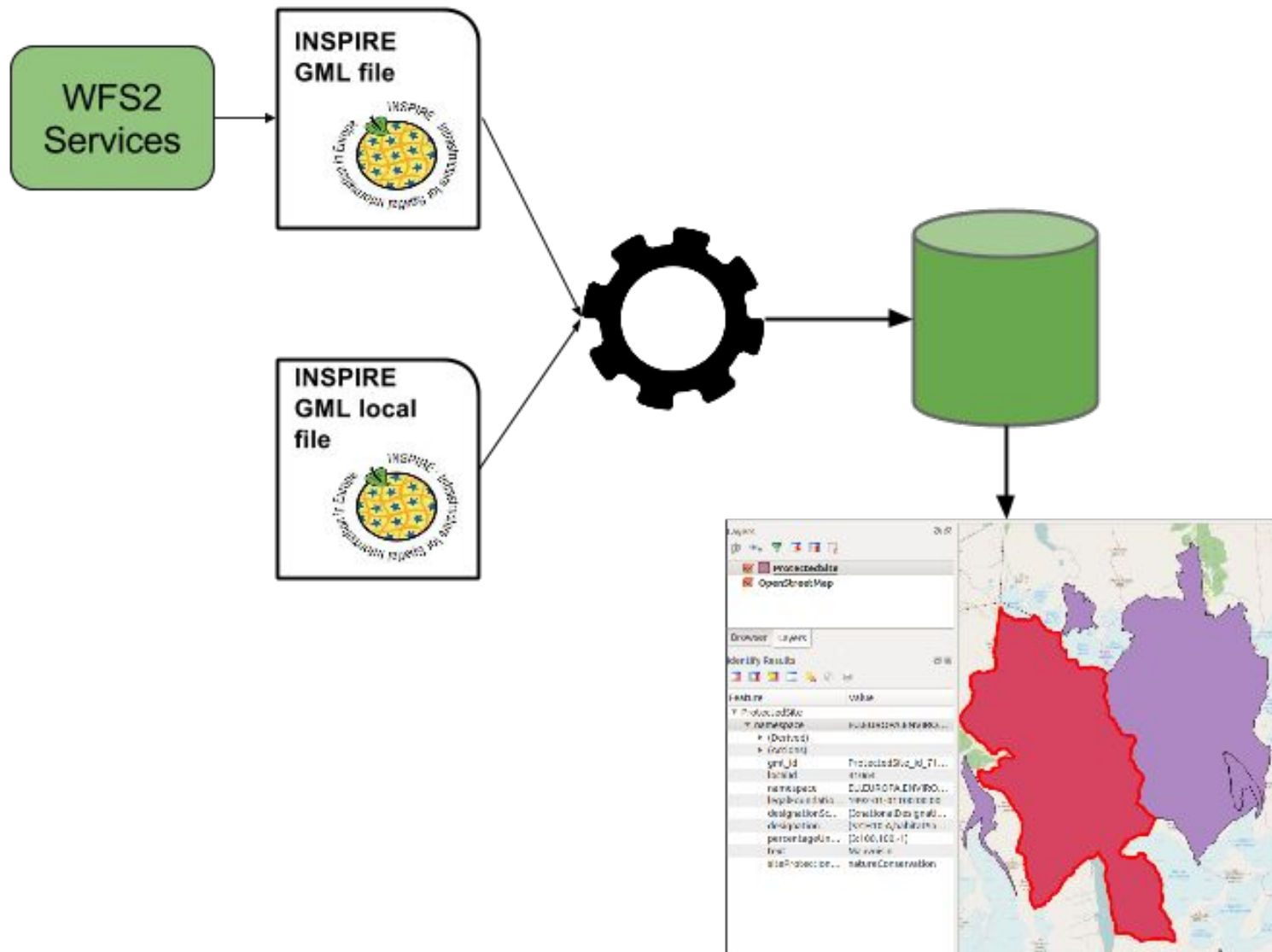
2017

POC QGIS Plugin

GML App Schema OGR
Driver and QGIS integration



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**

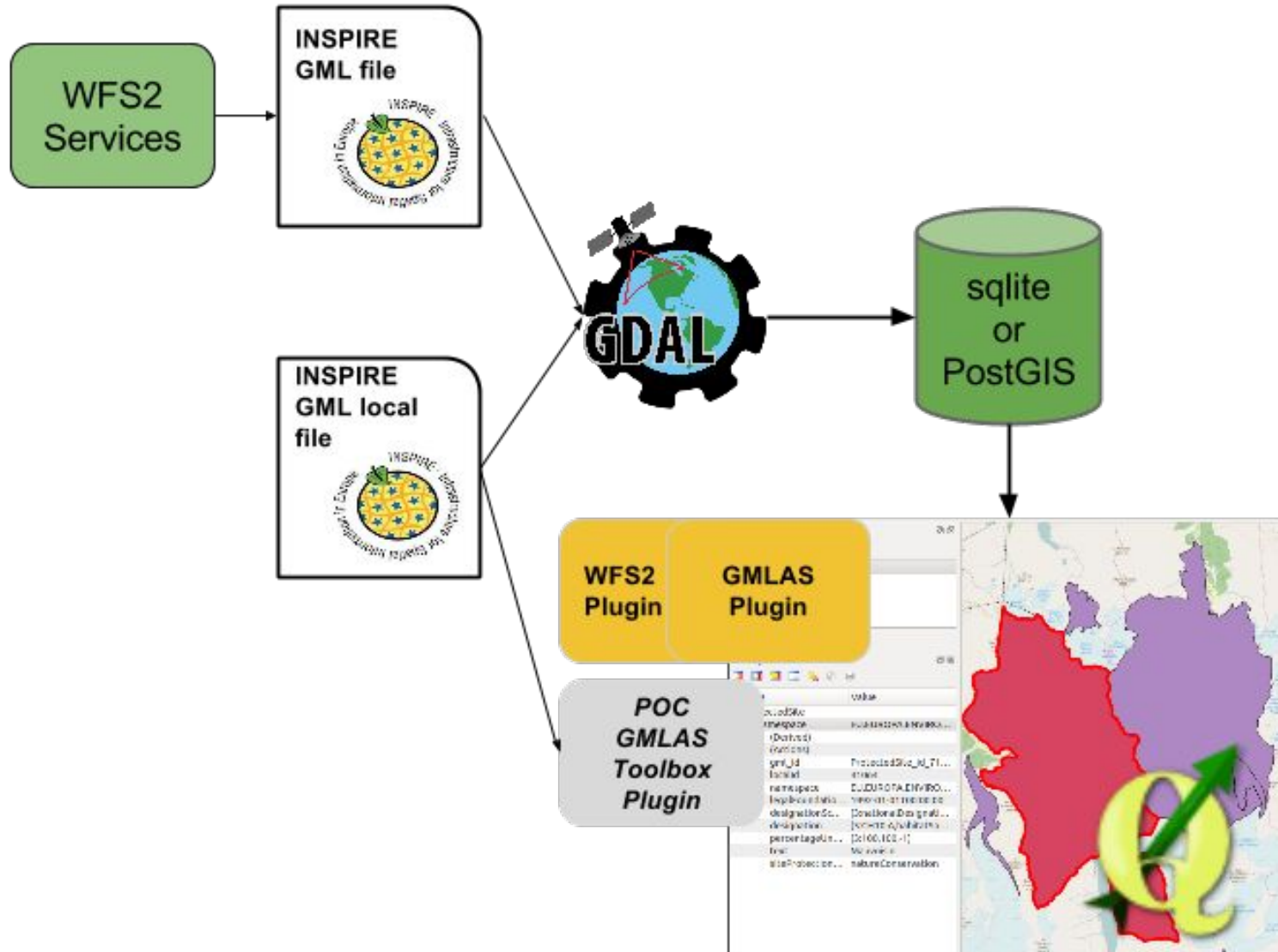


Use the GML App Schema driver in a desktop GIS: **QGIS**

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)

XLink support

Reading GML

Configuration ...

All applications using
GDAL can benefit
from this.

```
<Configuration xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:noNamespaceSchemaLocation="gmlasconf.xsd">

  <AllowRemoteSchemaDownload>true</AllowRemoteSchemaDownload>
  <SchemaCache enabled="true">
    <Directory/> <!-- empty: use $HOME/.gdal/gmlas_xsd_cache by default -->
  </SchemaCache>
  <Validation enabled="false">
    <FailIfError>>false</FailIfError>
  </Validation>
  <ExposeMetadataLayers>>false</ExposeMetadataLayers>
  <LayerBuildingRules>
    <UseArrays>true</UseArrays>
    <GML>
      <IncludeGeometryXML>true</IncludeGeometryXML>
      <InstantiateGMLFeaturesOnly>true</InstantiateGMLFeaturesOnly>
    </GML>
  </LayerBuildingRules>

  <IgnoredXPath>
    <WarnIfIgnoredXPathFoundInDocInstance>true</WarnIfIgnoredXPathFoundInDocInstance>
    <Namespaces>
      <Namespace prefix="gml" uri="http://www.opengis.net/gml"/>
      <Namespace prefix="gml32" uri="http://www.opengis.net/gml/3.2"/>
    </Namespaces>
    <XPath warnIfIgnoredXPathFoundInDocInstance="false">gml:boundedBy</XPath>
    <XPath warnIfIgnoredXPathFoundInDocInstance="false">gml32:boundedBy</XPath>
    <XPath>gml:priorityLocation</XPath>
    <XPath>gml32:priorityLocation</XPath>
    <XPath>gml32:descriptionReference/@owns</XPath>
    <XPath>@xlink:show</XPath>
    <XPath>@xlink:type</XPath>
    <XPath>@xlink:role</XPath>
    <XPath>@xlink:arcrole</XPath>
    <XPath>@xlink:actuate</XPath>
    <XPath>@gml:remoteSchema</XPath>
  </IgnoredXPath>
</Configuration>
```

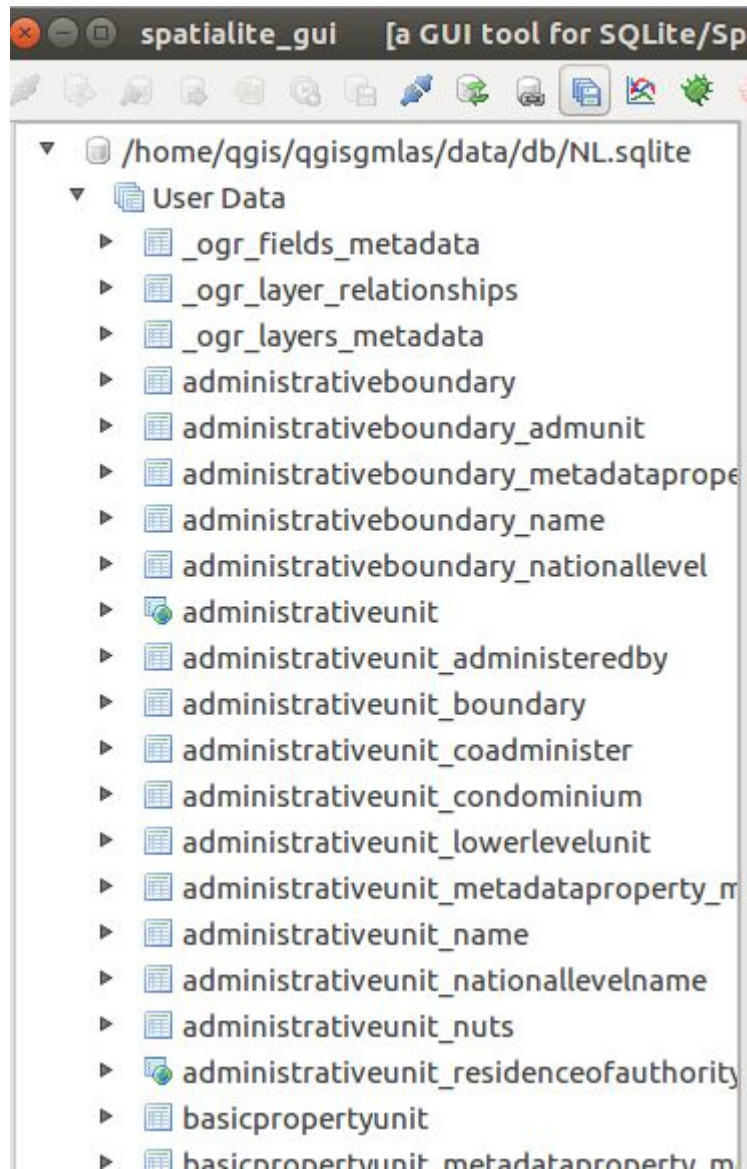
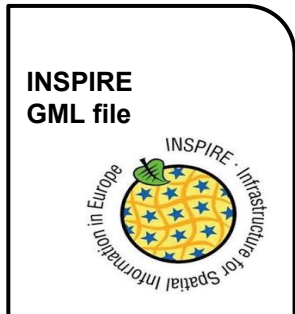
A new driver (GMLAS) in **GDAL**



INSPIREd database



Database



A new driver (GMLAS) in **GDAL**



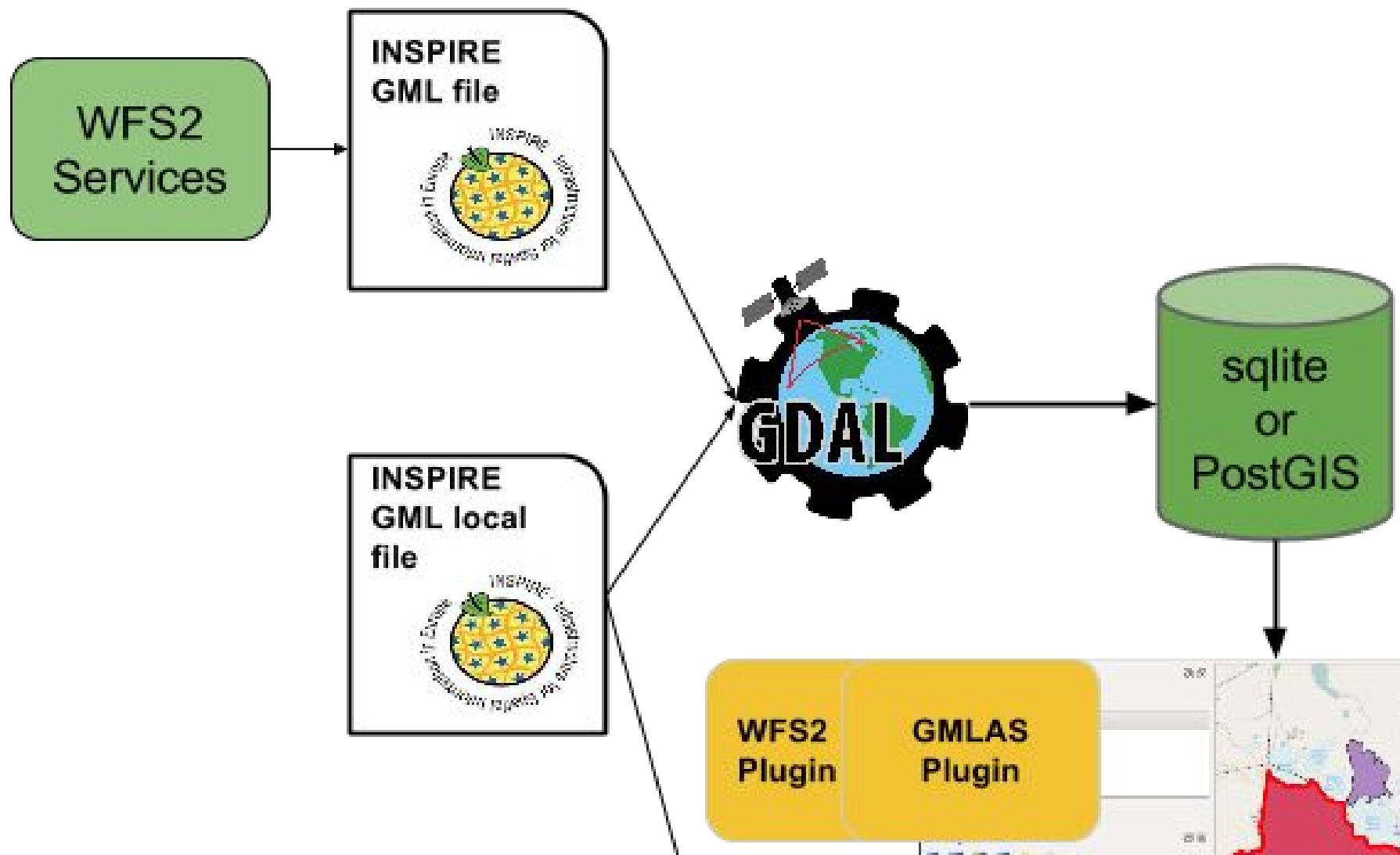
INSPIREd database



Used in



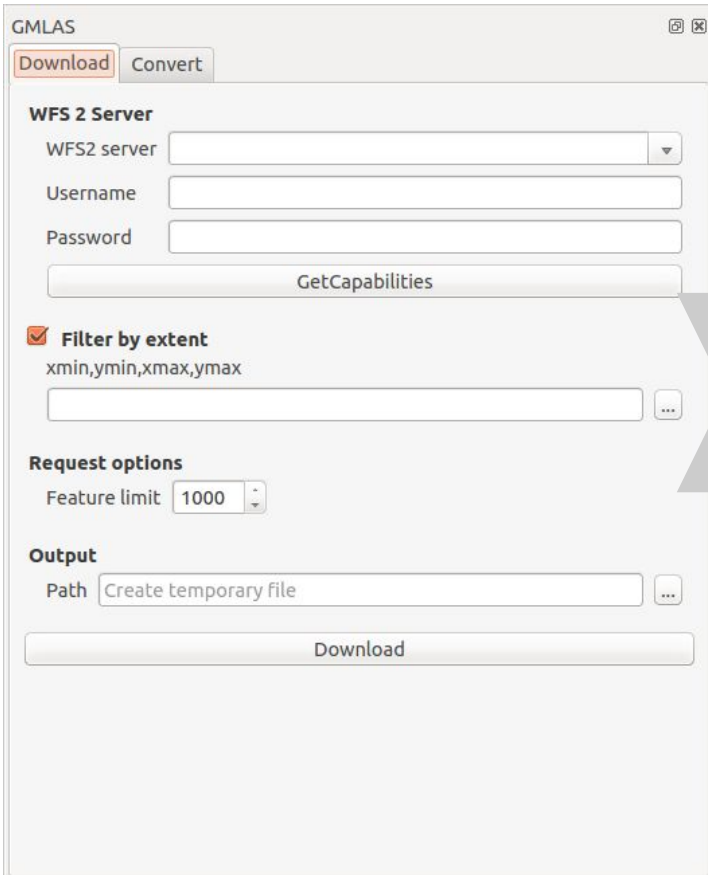
Usage in QGIS



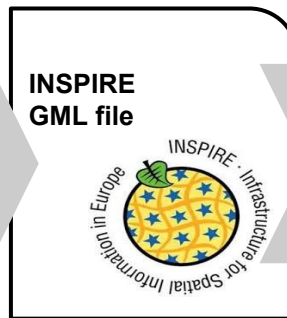
Usage in QGIS / Download and convert

(optional) Download from WFS

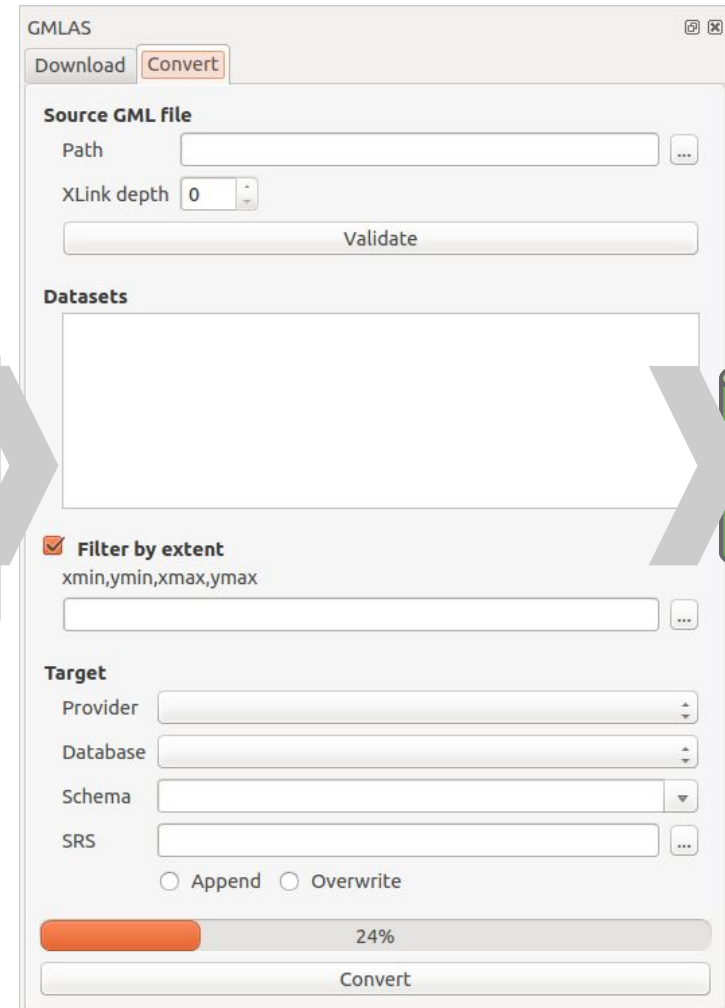
(based on [WFS2 plugin](#) made by Juergen Weichand)



The GMLAS dialog box has two tabs: 'Download' (selected) and 'Convert'. Under 'WFS 2 Server', there are fields for 'WFS2 server', 'Username', and 'Password', followed by a 'GetCapabilities' button. The 'Filter by extent' section is checked, with a text box for 'xmin,ymin,xmax,ymax'. The 'Request options' section has a 'Feature limit' dropdown set to '1000'. The 'Output' section has a 'Path' field with a button to 'Create temporary file' and a 'Download' button at the bottom.



Convert to database



The GMLAS dialog box has two tabs: 'Download' and 'Convert' (selected). Under 'Source GML file', there is a 'Path' field with a browse button, an 'XLink depth' dropdown set to '0', and a 'Validate' button. The 'Datasets' section is empty. The 'Filter by extent' section is checked, with a text box for 'xmin,ymin,xmax,ymax'. The 'Target' section has dropdowns for 'Provider', 'Database', and 'Schema', and a text box for 'SRS'. There are radio buttons for 'Append' and 'Overwrite'. A progress bar shows '24%' completion. A 'Convert' button is at the bottom.



Browser Panel

PostGIS

- inspire
 - BR
 - GE
 - LC
 - PS
 - _ogr_layer_relationships
 - _ogr_layers_metadata
 - ci_citation
 - ci_citation_alternatetitle
 - ci_citation_date
 - designatedarea_metadata
 - designatedarea_name
 - designatedarea_sitedesignation
 - designatedarea_sitename
 - designatedarea_siteprotection
 - designatedarea.geometry
 - designatedarea.representation
 - md_identifier
- public

SpatiaLite

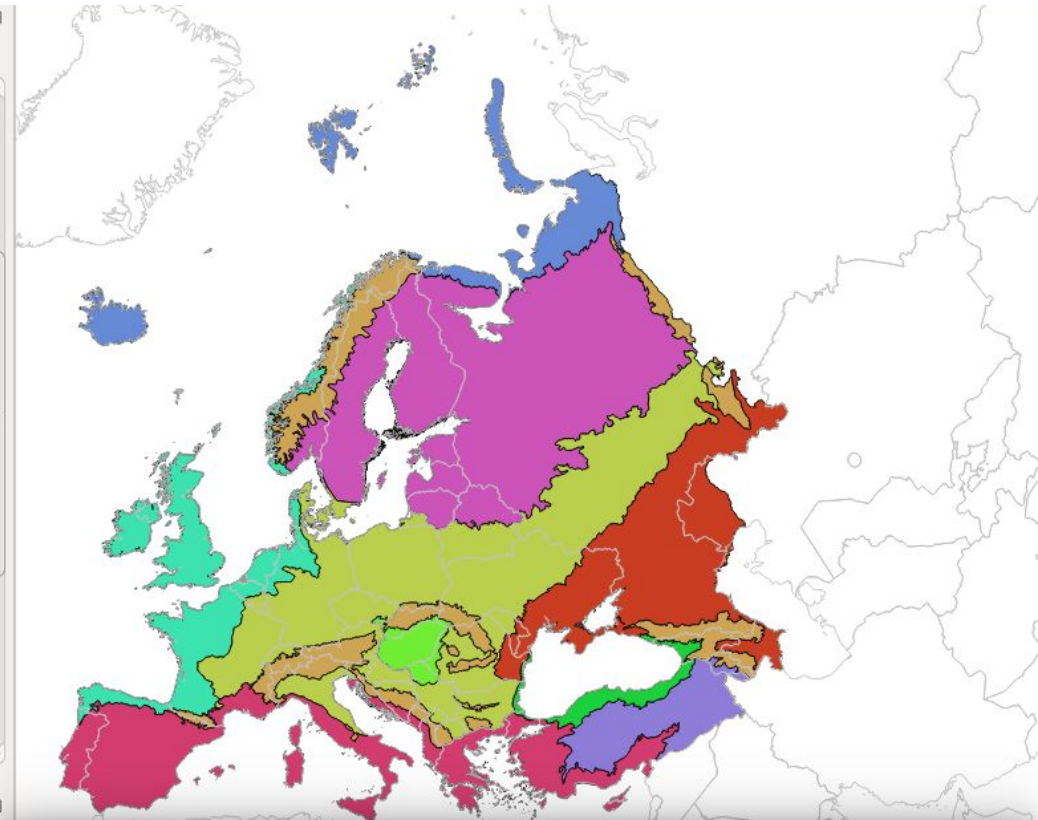
- array_type_test.sqlite
- BR.sqlite
- GE.sqlite
- LC.sqlite
- NL.sqlite
 - administrativeunit

Layers Panel

☒ ne_10m_admin_0_countries

☒ bio_geographicalregion

- ☒ alpine
- ☒ anatolian
- ☒ arctic
- ☒ atlantic
- ☒ black
- ☒ boreal
- ☒ continental
- ☒ macaronesia
- ☒ mediterranean
- ☒ pannonian
- ☒ steppic
- ☒



bio_geographicalregion :: Features total: 11, filtered: 11, selected: 0

Expression

1

2

3

4

5

6

7

8

9

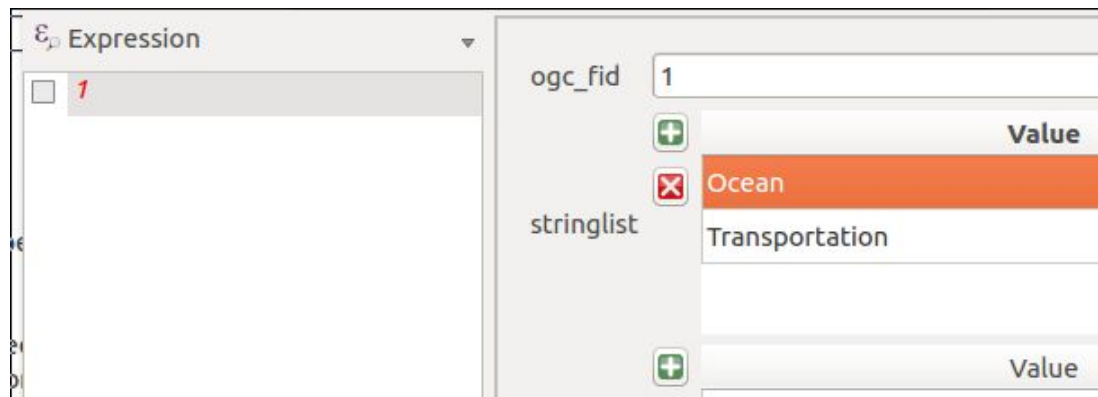
10

11

ogc_fid	1
id	N_368552f1-c9ce-4b1e-b9cb-
description_href	NULL
description_title	NULL
description_nilreason	NULL
description	NULL
descriptionreference_href	NULL
descriptionreference_title	NULL
descriptionreference_nilreason	NULL
identifier_codespace	http://inspire.ec.europa.eu/ic
identifier	aps/data/biogeographical-reg

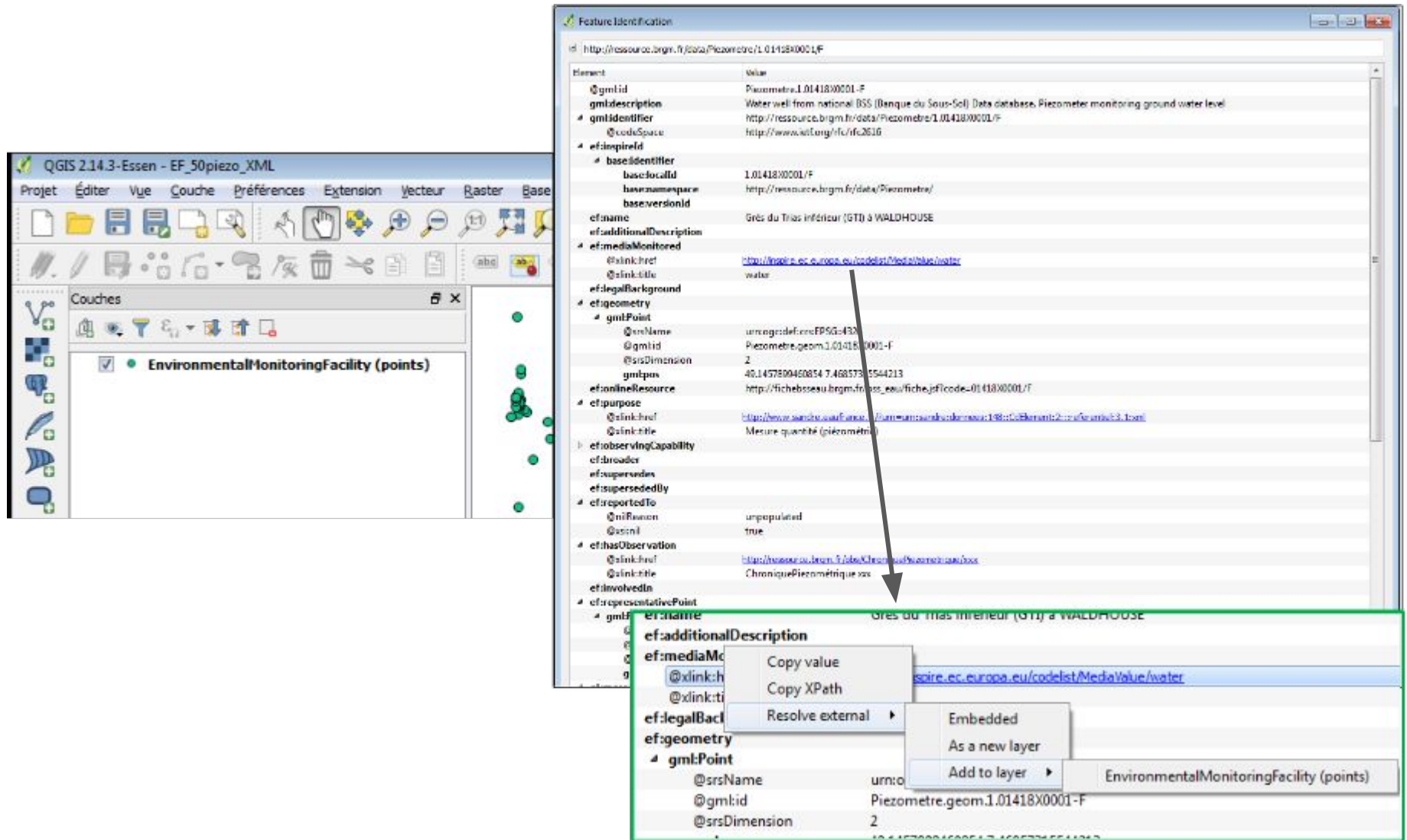
Usage in QGIS / coming work

- 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

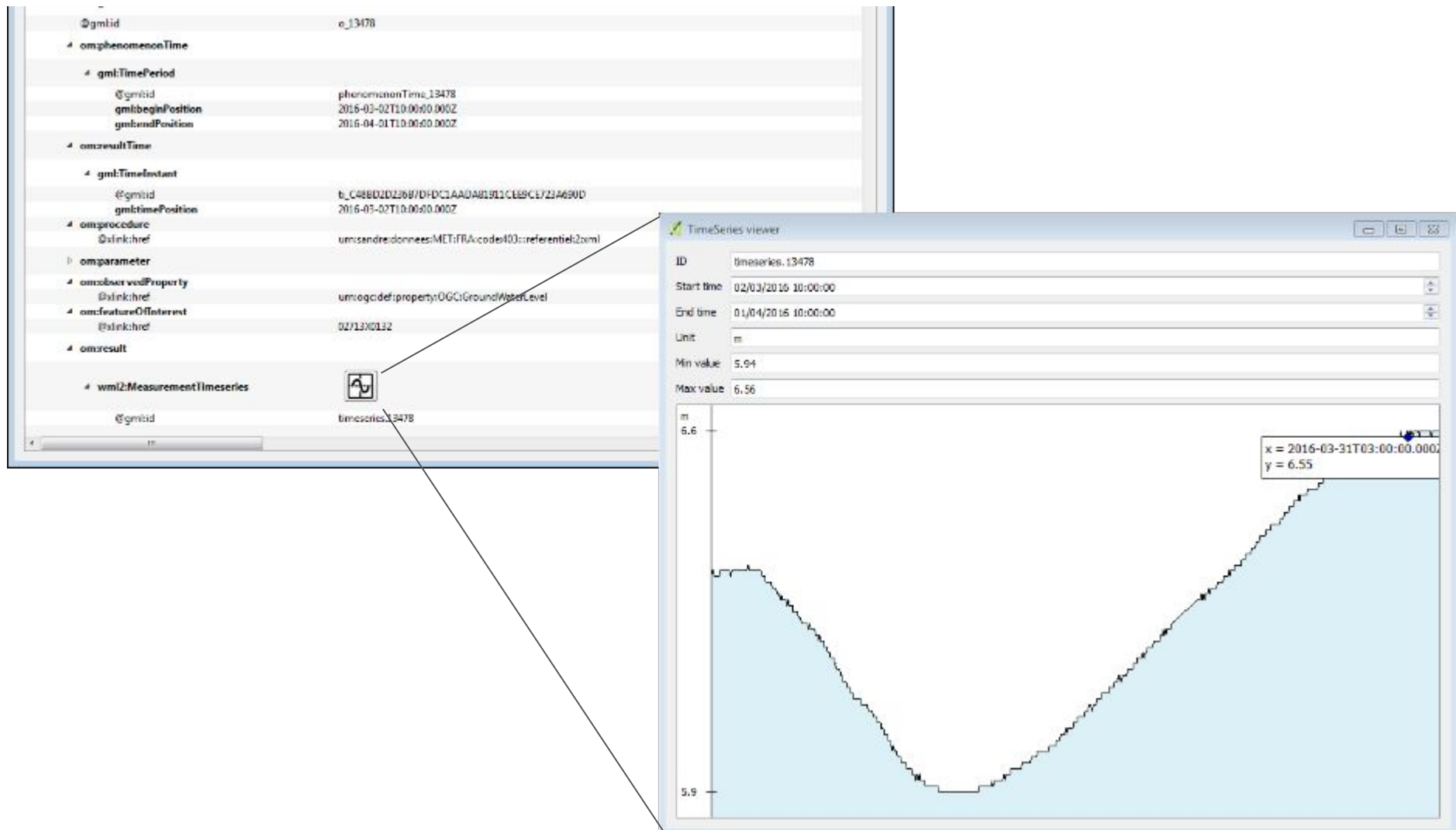


Additional features
made in BRGM POC

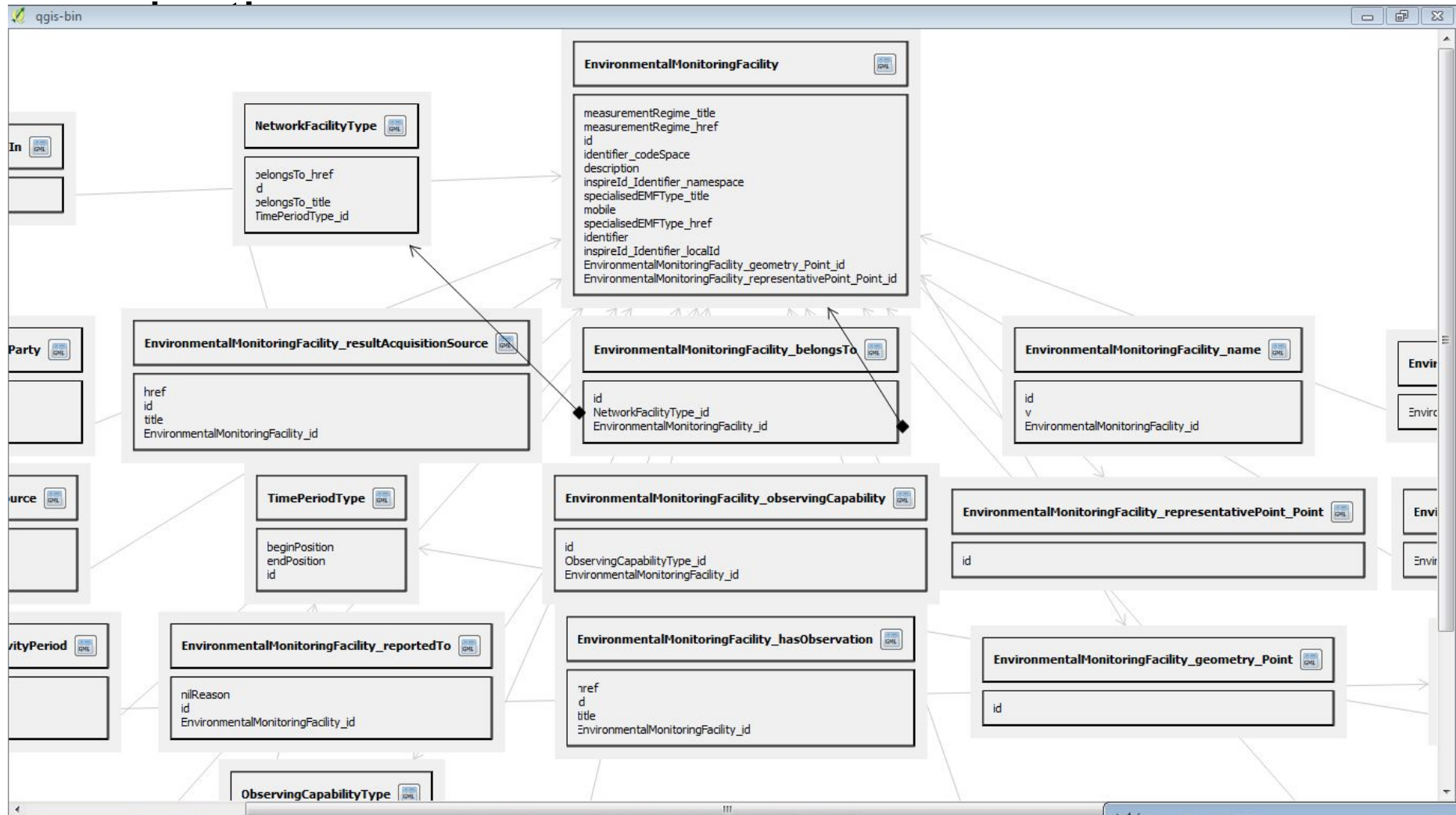
XML mode > WFS Flow



XML Mode > SOS Flow



Schema representation with QGIS to ease



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



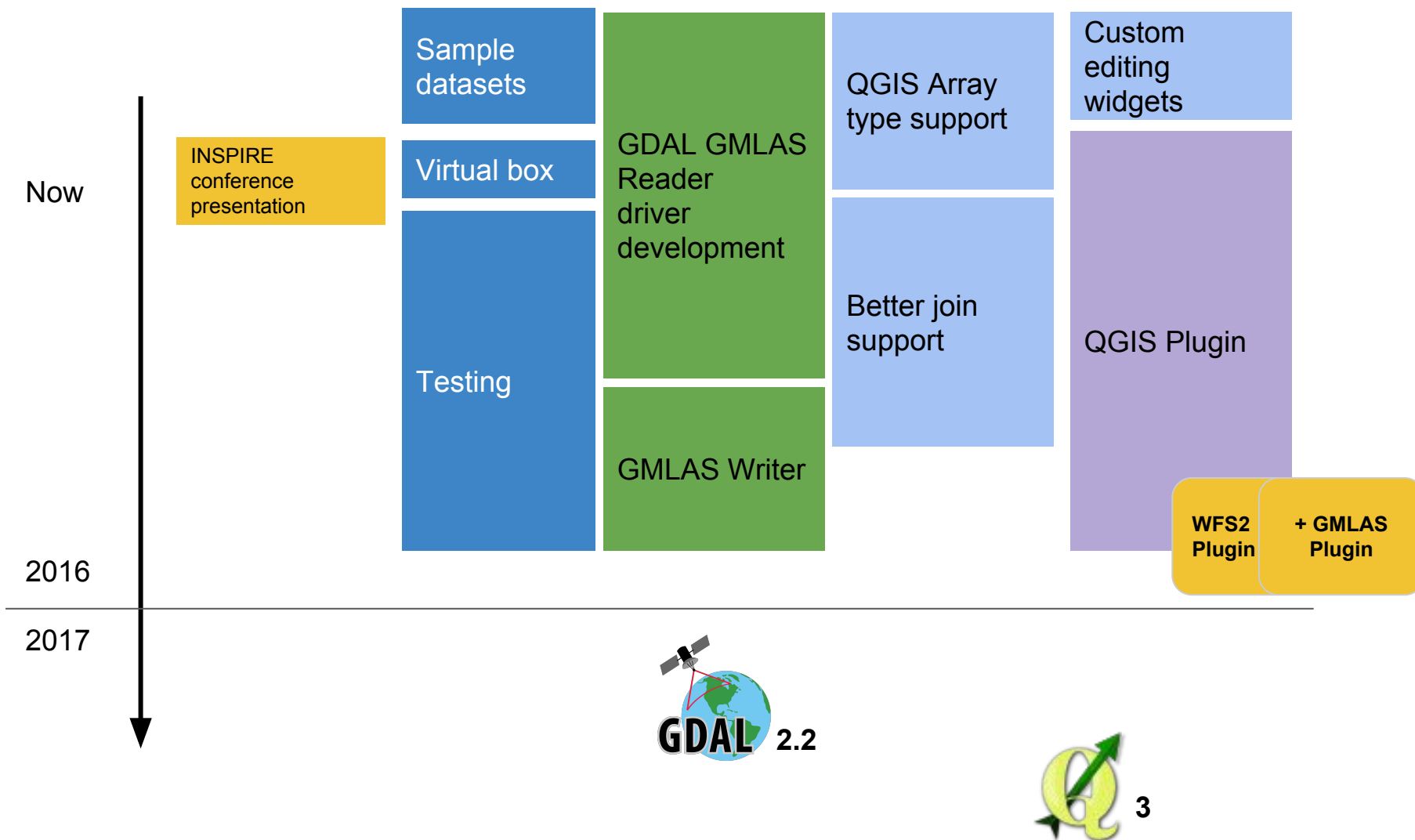
QGIS 3 - 2017

- 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

*POC
GMLAS
Toolbox
Plugin*



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