QGIS / GDAL GML application schema support update: use case on French Groundwater Information Network (GIN)

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QGIS / GDAL GML application schema support update: use case on French Groundwater Information Network (GIN)
French GIN – linked data use case

> Objectives

• To provide stable and resolvable links to resources
• To allow reference / data citation
• Independent from underlying technologies used to provide data

I am #EntiteHydroGeol/107AK01

I am monitored by #Piezometre/00634X0147/PZ1.2

I have a lot of #GroundWater Levels observations regarding #EntiteHydroGeol/107AK01

I am #Piezometre/00634X0147/PZ1.2 attached to #Borehole/00634X0147/PZ1.2

#GroundWater Levels obs. from #Piezometre/00634X0147/PZ1.2
French GIN – linked data use case

> Flows based on OGC and INSPIRE defined featureTypes

Legend:
- Feature(s)
- Observation(s)
French GIN – linked data use case

Object instances are associated by their URI

Legend:
- Feature(s)
- Observation(s)
French GIN – linked data use case

> URI allowing to dereference content exposed by OGC services
GML application schema toolbox - overall context

> Initial idea
• Reuse information available in XML compliant to xsd(s) to handle this content with no hardcoded configuration -> enriched XML and database generation on the fly.

> Retrieve objects of interest described according to a standard
• = semantic and geographical representation
• interacts with the content (XML and Database). Database -> plug other tools

> Resolve XLinks to add more content
• vocabulary registry definitions (multilingualism is handled)
• linked domain features / observation
GML application schema toolbox - overall context

> **Trigger custom widgets based on standards**
  - working: Waterml 2 timeseries, Inspire PointTimeSeries
  - drafty: GW_GeologyLogCoverage
  - on-going EU AirqualityDirective timeseries

> **Writes content (file not WFS-T)**

> **Standalone OGR/GDAL driver -> reuse**

> **Previously presented during last year workshop**
  - Koblenz 2016 Hydro DWG Workshop [presentation](#) of the Proof Of Concept QGIS plugin
GML application schema toolbox use – QGIS 3
GML application schema toolbox use – XML
GML application schema toolbox use – XML

Env. Monitoring Facility

GroundWater raw levels

om:resultTime

gml:TimeInstant

@gml:id ti_A58905235028277DAC699731065C3585E0F1

gml:timePosition 2016-12-15T14:40:00:000Z

om:procedure

@xlink:href http://id.eaufrance.fr/met/403.xml

@xlink:title Electronic piezometric probe

om:parameter

om:observedProperty

@xlink:href http://id.eaufrance.fr/par/1939.xml

@xlink:title GroundWaterLevel

om:featureOfInterest

wml2:Monitore...

@gml:id mp_4C6129829F70C1C2DE4A2FB853F56C581A

@gml:identifier http://ressource.brgm-rec.fr/data/Piezometre

@gml:name Piezo 06988C0281/F.2

@sfs:sampledFeature

@sfs:shape

om:result

wml2:Measure...
GML application schema toolbox use – XML
GML application schema toolbox use – XML

Borehole
GML application schema toolbox use – XML

Borehole

Observations/Geological logs

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GML application schema toolbox use – XML

URI

Borehole

Observations/ Geological logs

URI
Borehole

Env. Monitoring Facility

URI

URI

back to slides 9, 10
GML application schema toolbox use – Database

- WaterML2 flow (see slide 10, Timeseries viewer) but client in database mode
GML application schema toolbox use – ogrinfo

> Ex: direct driver access to GroundWaterML2 GW_Well

```
ogrinfo -q GMLAS:GW_Well_BRGM-dcl.xml gw_well
```

Layer name: gw_well
OGRFeature(gw_well):1
  id (String) = PointEau.01846X0361.P1
description_href (String) = (null)
description_title (String) = (null)
description (String) = Water well from national BSS (Banque du Sous-Sol) Data database
descriptionreference_href (String) = (null)
descriptionreference_title (String) = (null)
descriptionreference_nllreason (String) = (null)
identifier_codespace (String) = http://www.ietf.org/rfc/rfc2616
identifier (String) = http://ressource.brgm.fr/data/PointEau/01846X0361/P1
location_location_pkid (String) = (null)
type_owns (integer(Boolean)) = 0
type_href (String) = (null)
type_title (String) = (null)
type_nllreason (String) = (null)
lineage_pkid (String) = (null)
shape_href (String) = (null)
shape_title (String) = (null)
shape_nllreason (String) = (null)
gwellconstructeddepth_href (String) = (null)
gwellconstructeddepth_title (String) = (null)
gwellconstructeddepth_nllreason (String) = (null)
gwellconstructeddepth_on_observation_on_observation_pkid (String) = OW_Observation.1
gwellconstructeddepth_on_observation_gw_geologylog_pkid (String) = (null)
gwellconstruction_href (String) = (null)
gwellconstruction_title (String) = (null)
gwellconstruction_nllreason (String) = (null)
gwellconstruction_owns (Integer(Boolean)) = 0
gwellconstruction_borehole_pkid (String) = Borehole.1
gwellsite_owns (Integer(Boolean)) = 0
gwellstatus_href (String) = http://www.sandre.seaufrance.fr/?urn=urn:sandre:donnees:79::cElement:3::referentiel:3:1.xml
gwellstatus_title (String) = OpAerationnel
gwellstatus_nllreason (String) = (null)
gwelltotallength_nllreason (String) = (null)
gwelltotallength_href (String) = (null)
gwelltotallength_title (String) = (null)
```
Overall – development story

NO DATA

?  

NO CLIENT

« another approach to demonstrate the usefulness of interoperable standards »

or

« having something to show to those who consider XML is not sexy »
Overall – development story

> From the ProofOfConcept to an enhanced approach

Run n°1
QGIS 2.x GML application schema toolbox POC

Run n°2
GML App Schema OGR Driver and QGIS 3 integration

Run n°3 (now)
GML App Schema OGR Driver and QGIS 3 integration enhancements
Overall – development story

> From the ProofOfConcept to an enhanced approach

Run n° 1
QGIS 2.x GML application schema toolbox POC

Run n° 2
GML App Schema OGR Driver and QGIS 3 integration

PyXB -> specific OGR/GDAL GMLAS driver (targetting GDAL 2.2), handling both reading and writing Integration within QGIS 3

Run n° 3 (now)
GML App Schema OGR Driver and QGIS 3 integration enhancements

- GDAL GMLAS : addition handling specific SWE types based on GWML2 GW_GeologyLogCoverage and EU Air Quality Reportings (dataArray, dataRecord, …)
- QGIS 3 : enhanced widgets for timeseries, and borehole logs + some commit to the trunk
Useful links

> https://plugins.qgis.org/plugins/gml_application_schema_toolbox/

> https://github.com/BRGM/gml_application_schema_toolbox
  • Documentation, GUI presentation

> Multilingualism handling
  • on INSPIRE registry: same flow asking for English then Greek definitions
    https://www.youtube.com/watch?v=EeAyyUOykVE

> How to test under QGIS3 until its official release
  • Use OSGeo4W installer
  • Advanced install \ Desktop -> add qgis-dev
  • Then install the plugin from QGIS repository
Conclusion

> **Generic work successfully tested on**
  - OGC: GroundWaterML2, GeoSciML4, WaterML2

> **Our domain colleagues can now finally make use of standardized content 😊**

> **Next steps**
  - Address (some) SWE specificities
  - Have more domain widgets
  - Handle other content type (JSON-LD ?)
  - Workshop at Foss4G-E: [github ticket](mailto:github ticket) to gather content to play with
  - Feel free to use, test, enhance it, propose evolutions
Conclusion - whishlist

GML Application schema toolbox

Input connector → Input data reading → Data format → Data use → Output data writing

- WFS 2 client
- SOS 2 client
- File
- <XML>
- PostreGre/GIS Spatialite
- GUI-Widget WaterML2
- GUI-Widget GWML2 BoreholeLog
- GUI-Widget EU AQD TimeSeries
- More domain GUI-widgets
- More data structures
- Data processing libs
Thank you

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