



Implementing INSPIRE WFS and SOS for geoscience data: the technological cocktail to quench the user's thirst for data

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BRGM on the rocks © cocktail



4. User interface

3. Identifier & resolver

2. SOS

1. WFS App Schema

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WFS Application Schema

WFS App Schema > Stairway to ... interoperability



User side

Advanced usage
(e.g. filtering)

Basic usage
(e.g. GetFeatureById)

Administrator side

**Tool configuration
for App Schema**

**Performance
and scalability**

Tool installation




**Update
and maintainability**

Database modelling

WFS App Schema > Tools used in BRGM



WFS App Schema > Current uses cases

			Implementations		
Data type	Model	BRGM associated project			
Geologic units, faults and boreholes	INSPIRE Geology + GeoSciML v4	EPOS / EGD I			X
Water level piezometers	INSPIRE Environmental Monitoring Facility & Network	Pôle INSIDE			X
Shoreline	INSPIRE Sea Region	EnergicOD			X
Aquifer units	GroundWaterML v2	Pôle INSIDE	X		POC
Mineral resources	EarthResourceML	Minerals4EU		X	POC

WFS App Schema > Subjective feedback

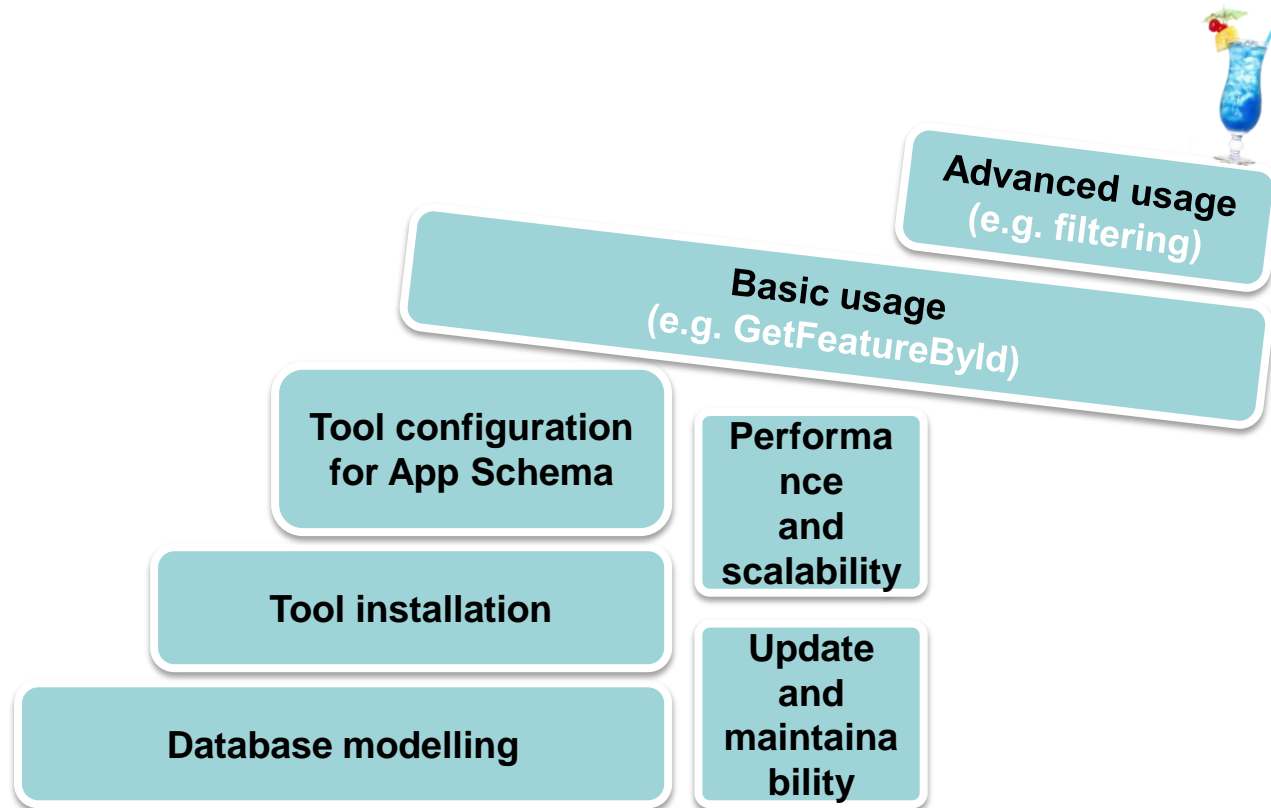
> No totally satisfying implementation

- Constellation
 - Difficult to configure and to update
- Deegree
 - Database structure must be close to diffusion schema
 - Filtering issues emphasized in 2015 (see Deegree Github)
- GeoServer
 - Still some bugs (e.g. ERML: IsMultipleIsTrue > data duplication)
 - Configuration of App Schema is tricky
 - Performances issues on complex features (all data are loaded by JAVA)

> Positive aspect

- GetFeatureById works
- Should we define stored queries and forbid other filter combinations?

WFS App Schema > Main conclusion & perspectives



Can we team up to finance necessary evolution?

SOS

SOS > Feedback from SOS implementation

> **Topics of discussion during the implementation**

- Which SOS solution to deploy?
- How to map to preexisting (non O&M compliant) databases?
- How to design the rawobservation database?
- How to link features to observations (at service level)?

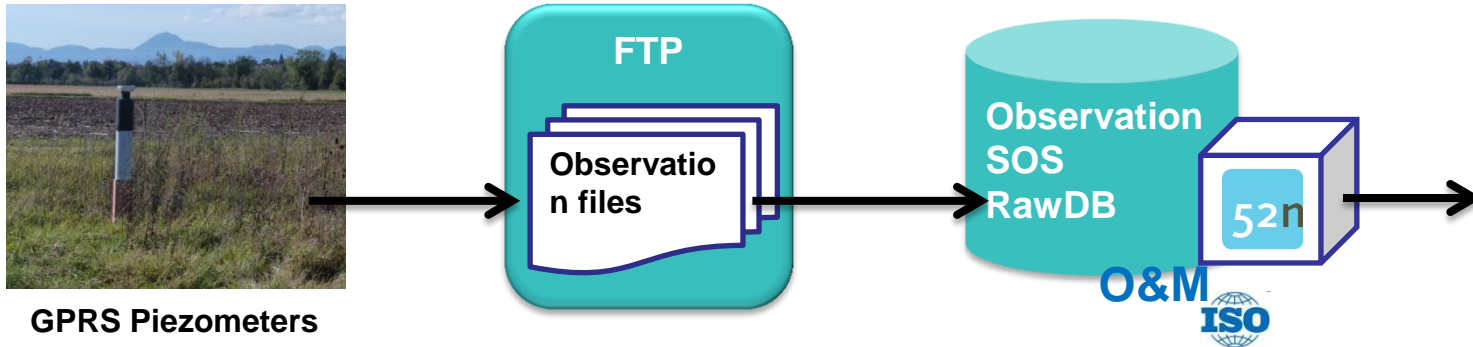
> **Choices:**

- 52 North solution
- Raw observation schema database very close to O&M schema
 - Use of materialized views to bridge to raw database
- One webapp is set up per use case

SOS > Current use cases

Data type	Profile	BRGM associated project	Status
Groundwater levels (raw observations)	INSPIRE PointTimeSeriesObs°	Pôle INSIDE	X
Groundwater levels (validated data)	INSPIRE PointTimeSeriesObs°	Pôle INSIDE	WIP
Groundwater quality (validated data)	Under discussion	Pôle INSIDE	Specified
Borehole logs	GWML2 (GeologyLogCoverage)	EPOS	Specified
Geothermy properties	INSPIRE PointTimeSeriesObs°	BRGM ADEME platform	WIP
Coastline erosion observation (CitizenScience)	Under discussion	EnergicOD	Under discussion

SOS > Focus on Groundwater RawData Levels



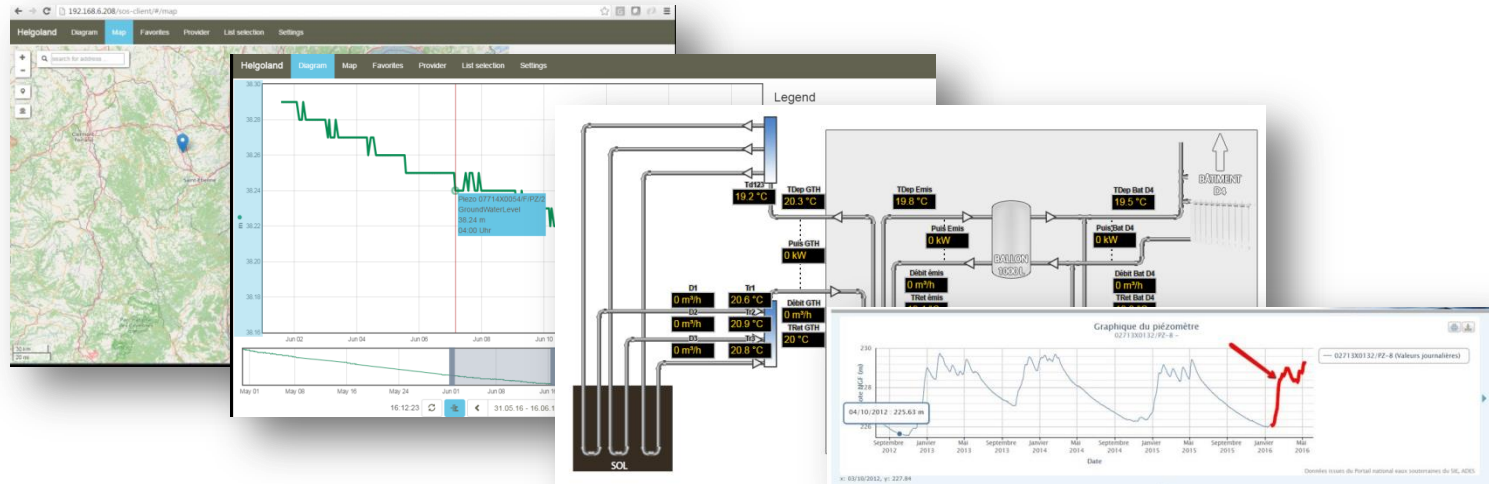
> Some examples:

- Latest GroundWaterLevel observation from one piezometer:
 - WaterML 2.0 format: <http://ressource.brgm-rec.fr/obs/RawOfferingPiezo/00463X0036/H1.2&responseFormat=http://www.opengis.net/waterml/2.0&temporalFilter=om%3AphenomenonTime%2Clatest>
 - JSON format: <http://ressource.brgm-rec.fr/obs/RawOfferingPiezo/00463X0036/H1.2&responseFormat=application/json&temporalFilter=om%3AphenomenonTime%2Clatest>

SOS > Positive feedback

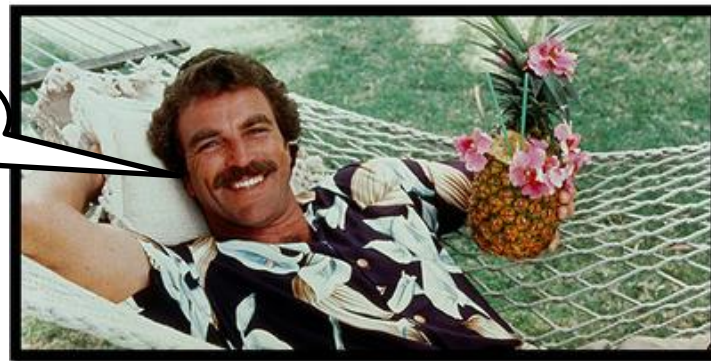
> It's worth the effort!

- Lot of reuse (websites, QGIS client plugin)



- Our domain colleagues are happy!

Now I have a
taste of INSPIRE!



Identifiers and resolvers

URIs to link data

> Objectives

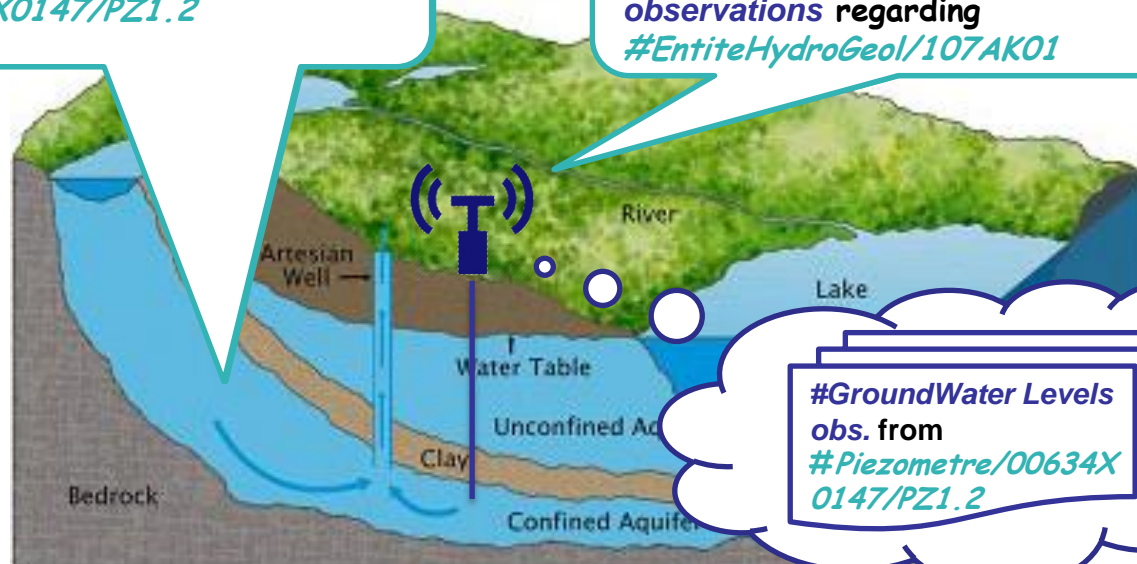
- To provide stable and resolvable links to resources
- To allow reference / data citation
- Independant from underlying technologies used to provide data

I am [#EntiteHydroGeol/107AK01](#)

I am monitored by
[#Piezometre/00634X0147/PZ1.2](#)

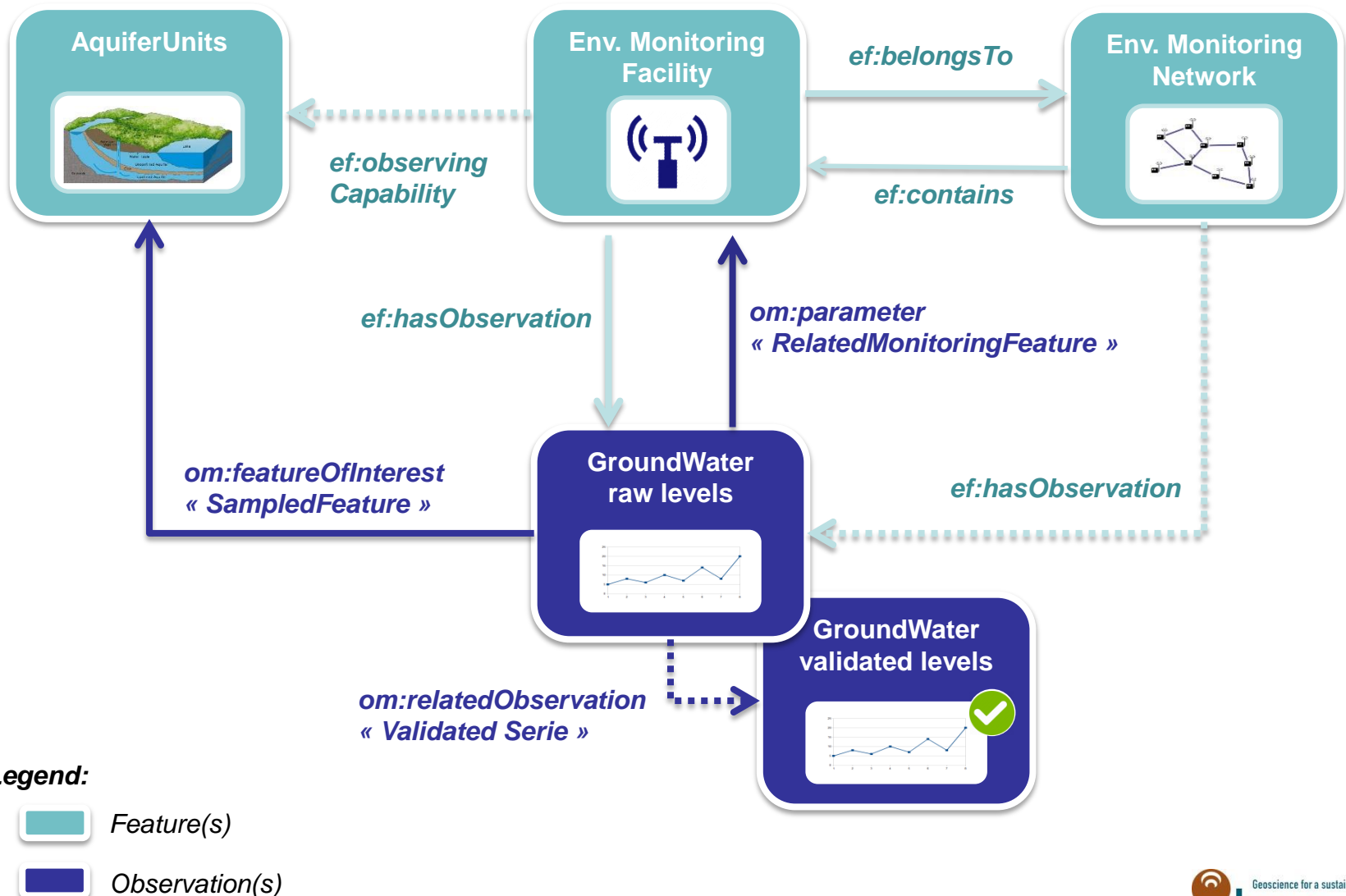
I am [#Piezometre/00634X0147/PZ1.2](#)

I have a lot of [#GroundWater Levels](#)
[observations](#) regarding
[#EntiteHydroGeol/107AK01](#)

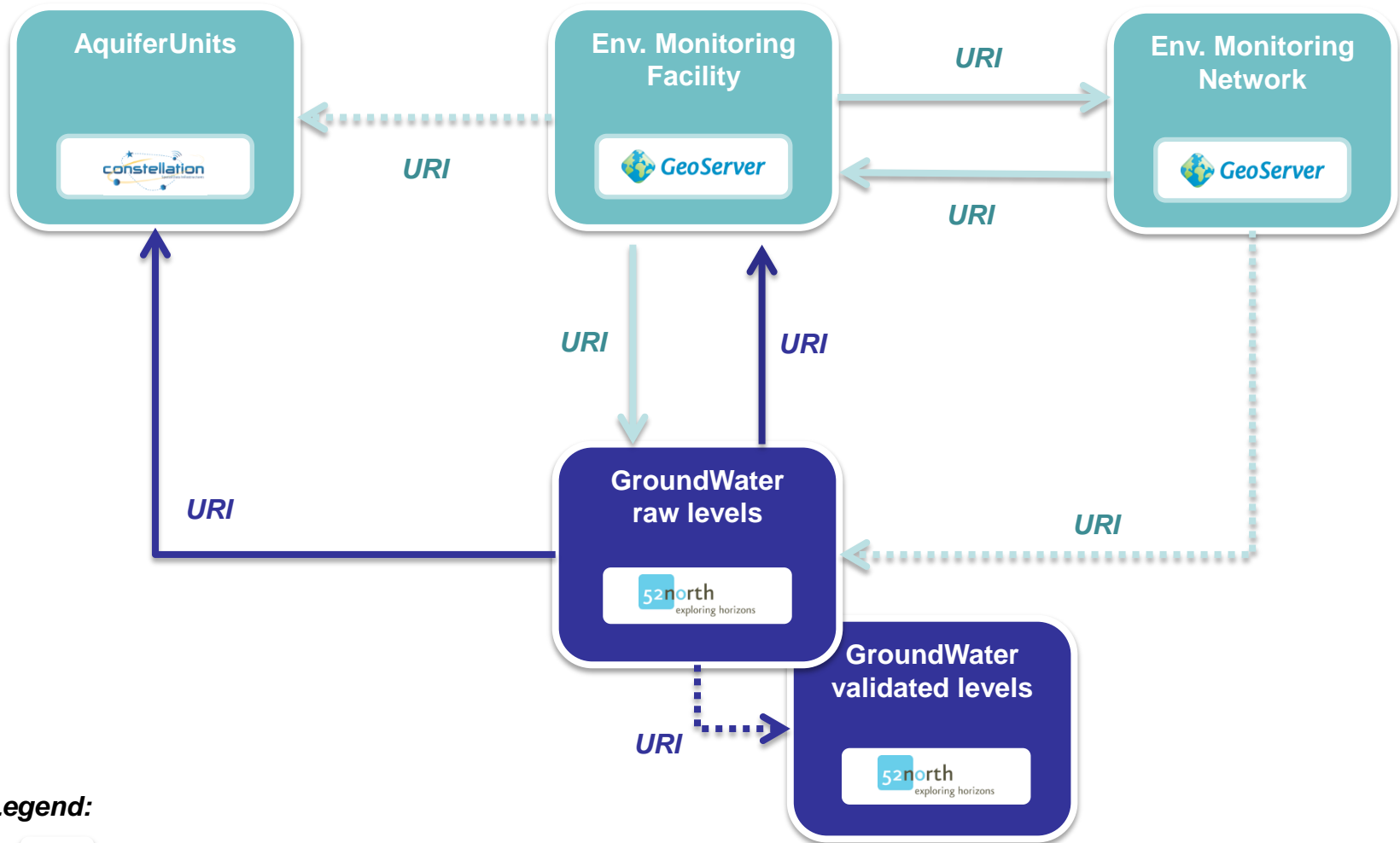


[#GroundWater Levels](#)
obs. from
[#Piezometre/00634X](#)
[0147/PZ1.2](#)

URIs > Groundwater Levels use case: model view



URIs > Groundwater Levels use case: service view



URIs > Implementation

> Topics of discussion

- Identifier nomenclature (language, pluralism, separators)
- When should we define specific identifiers ?
 - Different representations of the same resource
 - Data versions
 - Data granularity

> Choice

- <http://ressource.brgm-rec.fr/> to centralize BRGM data resources
 - **./data** for data objects (e.g. geologic units, piezometers, ...)
 - **./obs** for observations (e.g. groundwater levels, ...)
 - **./vocab**s for controled vocabularies (e.g. groundwater sampling for quality analysis, ...)
 - **./services** for web services endpoint
- POC Apache rewriting rules

URIs > Some examples of identifiers and resolvers

<http://ressource.brgm-rec.fr/data/EntiteHydroGeol/107AK01>

Rewrite in proxy mode

http://gwml2poc.brgm-rec.fr/WS/wfs/BRGM:GWML2?service=WFS&version=2.0.0&request=GetFeature&typeName=gwml-main:GW_Aquifer&storedQuery_Id=urn:ogc:def:query:OGC-WFS::GetFeatureById&id=EntiteHydroGeol.107AK01

> Other examples:

- One piezometer: <http://ressource.brgm-rec.fr/data/Piezometre/00634X0147/PZ1.2>
- One GroundWaterLevel offering: <http://ressource.brgm-rec.fr/obs/RawOfferingPiezo/00463X0036/H1.2&responseFormat=http://www.opengis.net/waterml/2.0>

User interfaces

User interface

> Objectives

- Enhance INSPIRE services readability
- Emphasizes data connectivity
- Break the No client <-> No data loop

> QGIS GML Application Schema Toolbox



- Funded by BRGM and developed by Oslandia
- Available for download on QGIS plugin store
- Developed for QGIS v2.14 +

> XML Mode (W)



The screenshot shows the 'Resolve external' context menu in QGIS. The menu is open, displaying the following options:

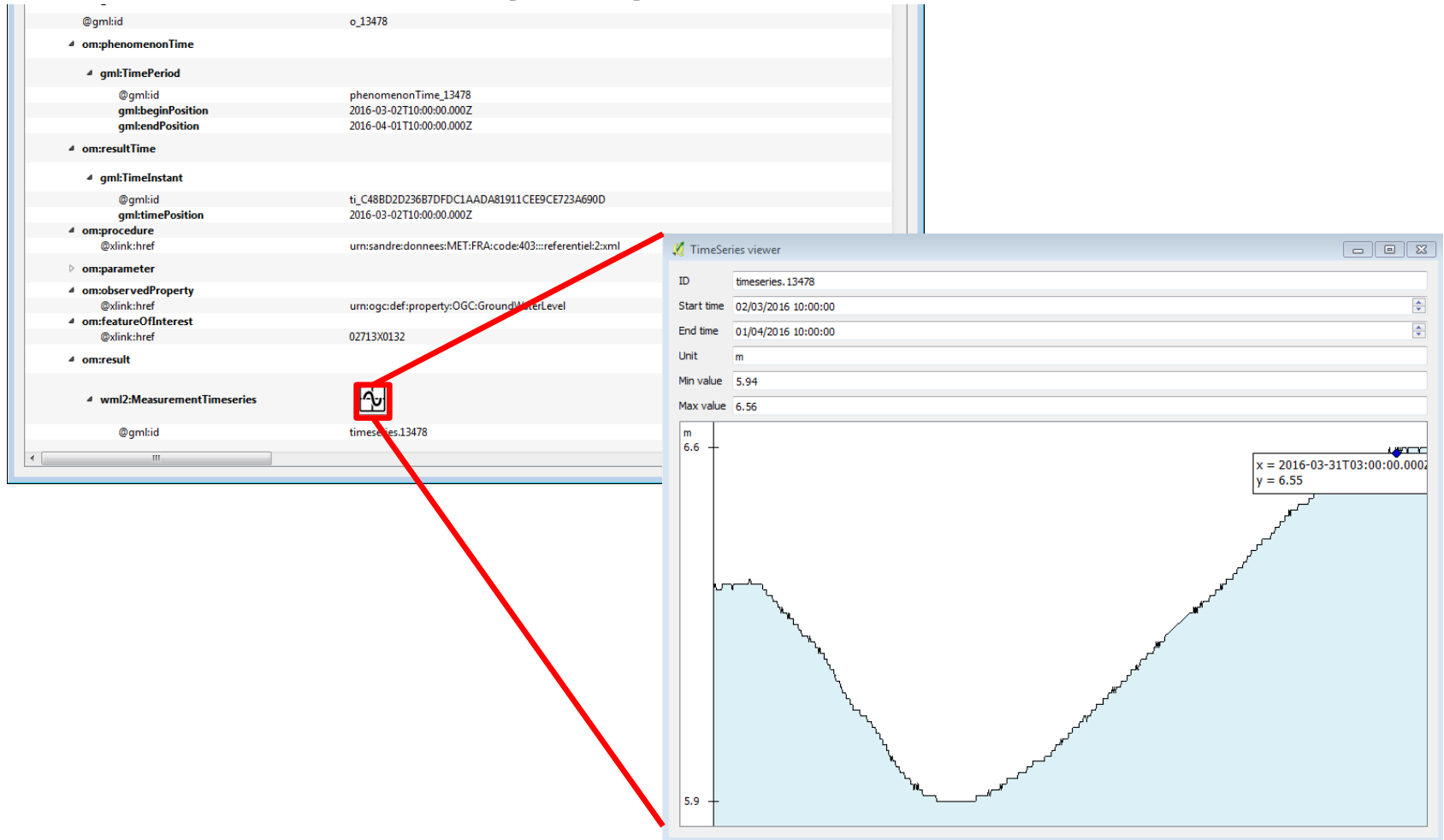
- Copy value
- Copy XPath
- Resolve external (selected)
- Embedded
- As a new layer
- Add to layer (expanded)

The 'Add to layer' sub-menu is open, showing a list of layers:

- EnvironmentalMonitoring (selected)
- Piezometre.geom.1.01418X0001-F
- 2

Teaser to Wednesday 28th presentation

> XML Mode (SOS)



Teaser to Wednesday 28th presentation

> Relational mode

The screenshot displays the QGIS Attribute Editor in 'Relational mode'. The interface is divided into several sections:

- Left Sidebar:** Contains icons and labels for 'General', 'Style', 'Labels', 'Fields', 'Rendering', 'Display', 'Actions', 'Joins', 'Diagrams', 'Metadata', 'Variables', and 'Legend'.
- Attribute editor layout:** Set to 'Drag and drop designer'.
- Python Init function:** A dropdown menu.
- Fields Table:** A table with columns: Id, Name, Edit widget, Alias, and Type. It lists fields like 'mobile', 'specialisedEMFType_href', 'identifier', 'inspireId_Identifier_localId', 'geometry_Point_id', and 'representativePoint_Point_id'.
- Relations Table:** A table with columns: Name, Layer, and Field. It lists relationships such as 'EnvironmentalMonitoringFacility_belongsTo', 'EnvironmentalMonitoringFacility_hasObservation', 'EnvironmentalMonitoringFacility_involvedIn', 'EnvironmentalMonitoringFacility_legalBackground', 'EnvironmentalMonitoringFacility_mediaMonitored', and 'EnvironmentalMonitoringFacility_name'.
- Right Panel:** A pane for 'Label' and 'Columns'. It lists various attributes and relationships, including 'measurementRegime_title', 'measurementRegime_href', 'id', 'identifier_codeSpace', 'description', 'inspireId_Identifier_namespace', 'specialisedEMFType_title', 'mobile', 'specialisedEMFType_href', 'identifier', 'inspireId_Identifier_localId', 'geometry_Point_id', 'representativePoint_Point_id', and a list of 1:N Links.
- Buttons:** 'Help', 'Style', 'Apply', 'Cancel', and 'OK' are located at the bottom.

Conclusion

In a (coco)nutshell

> **Very encouraging points:**

- WFS & SOS enable to provide data for basic usage
- Identifiers and resolvers enable to link data
- QGIS plugin increase data consumption pleasure
- Domain colleagues can now taste INSPIRE (SOS)!

> **Challenges to overcome:**

- Configuration of WFS App Schema is not really accessible
- SOS implementation need one instance per use case
- Scalability and performances must be enhanced to reach production mode

> **Can we can team up to finance it?**



Cheers!

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