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

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

Mickaël Beaufils, Sylvain Grellet & François Tertre

INSPIRE Conference 2016 Workshop, Barcelona

Monday, September 26, 2016
BRGM on the rocks © cocktail

1. WFS App Schema
2. SOS
3. Identifier & resolver
4. User interface

© Cheryloz
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
- Tool installation
- Database modelling
- Performance and scalability
- Update and maintainability
WFS App Schema > Tools used in BRGM
## WFS App Schema > Current uses cases

<table>
<thead>
<tr>
<th>Data type</th>
<th>Model</th>
<th>BRGM associated project</th>
<th>Implementations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geologic units, faults and boreholes</td>
<td>INSPIRE Geology + GeoSciML v4</td>
<td>EPOS / EGDI</td>
<td>x</td>
</tr>
<tr>
<td>Water level piezometers</td>
<td>INSPIRE Environmental Monitoring Facility &amp; Network</td>
<td>Pôle INSIDE</td>
<td>x</td>
</tr>
<tr>
<td>Shoreline</td>
<td>INSPIRE Sea Region</td>
<td>EnergicOD</td>
<td>x</td>
</tr>
<tr>
<td>Aquifer units</td>
<td>GroundWaterML v2</td>
<td>Pôle INSIDE</td>
<td>x</td>
</tr>
<tr>
<td>Mineral resources</td>
<td>EarthResourceML</td>
<td>Minerals4EU</td>
<td>x</td>
</tr>
</tbody>
</table>

Notes:
- x: Available
- POC: Project Owner Contact
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 > 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 raw observation 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

<table>
<thead>
<tr>
<th>Data type</th>
<th>Profile</th>
<th>BRGM associated project</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groundwater levels (raw observations)</td>
<td>INSPIRE PointTimeSeriesObs°</td>
<td>Pôle INSIDE</td>
<td>X</td>
</tr>
<tr>
<td>Groundwater levels (validated data)</td>
<td>INSPIRE PointTimeSeriesObs°</td>
<td>Pôle INSIDE</td>
<td>WIP</td>
</tr>
<tr>
<td>Groundwater quality (validated data)</td>
<td>Under discussion</td>
<td>Pôle INSIDE</td>
<td>Specified</td>
</tr>
<tr>
<td>Borehole logs</td>
<td>GWML2 (GeologyLogCoverage)</td>
<td>EPOS</td>
<td>Specified</td>
</tr>
<tr>
<td>Geothermy properties</td>
<td>INSPIRE PointTimeSeriesObs°</td>
<td>BRGM ADEME platform</td>
<td>WIP</td>
</tr>
<tr>
<td>Coastline erosion observation (CitizenScience)</td>
<td>Under discussion</td>
<td>EnergicOD</td>
<td>Under discussion</td>
</tr>
</tbody>
</table>
Some examples:

- Latest GroundWaterLevel observation from one piezometer:
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 have a lot of #GroundWater Levels observations regarding #EntiteHydroGeol/107AK01
URIs > Groundwater Levels use case: model view

Legend:
- Feature(s)
- Observation(s)
URIs > Groundwater Levels use case: service view

Legend:
- **Feature(s)**
- **Observation(s)**
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

  - ./data for data objects (e.g. geologic units, piezometers, …)
  - ./obs for observations (e.g. groundwater levels, …)
  - ./vocabs 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

> 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 +
Teaser to Wednesday 28th presentation

XML Mode (WFS)
Teaser to Wednesday 28th presentation

> XML Mode (SOS)
Teaser to Wednesday 28th presentation

> Relational mode
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!
m.beaufils@brgm.fr