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

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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
BRGM on the rocks © cocktail

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

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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
- Tool installation
- Database modelling
- Performance and scalability
- Update and maintainability
WFS App Schema > Tools used in BRGM

constellation

GeoServer

degree
## 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, POC</td>
</tr>
<tr>
<td>Mineral resources</td>
<td>EarthResourceML</td>
<td>Minerals4EU</td>
<td>x, POC</td>
</tr>
</tbody>
</table>
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 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

<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</td>
<td>Under discussion</td>
<td>EnergicOD</td>
<td>Under discussion</td>
</tr>
<tr>
<td>(CitizenScience)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SOS > Focus on Groundwater RawData Levels

> 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 obs. from #EntiteHydroGeol/107AK01
#Piezometre/00634X0147/PZ1.2
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 controlled 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
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 28\textsuperscript{th} 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

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