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## Practicing Practical INSPIRE

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Practicing  
Practical  
INSPIRE

INSPIRE Conference 2017



# Introduction

Architectural Overview  
with examples

Implementation Issues  
what went wrong - how we made it right

Discussion / Wrap-up  
what to do about it



# Architectural Overview

with examples



# Architectural Overview with Examples

- Application to groundwater monitoring system
- Statistical Viewer
- EF - Bathing Sites Monitoring Facilities
- SYKE's experiences with GeoServer
- WFS 2.0. direct access across multiple feature types

# Architectural Overview with Examples

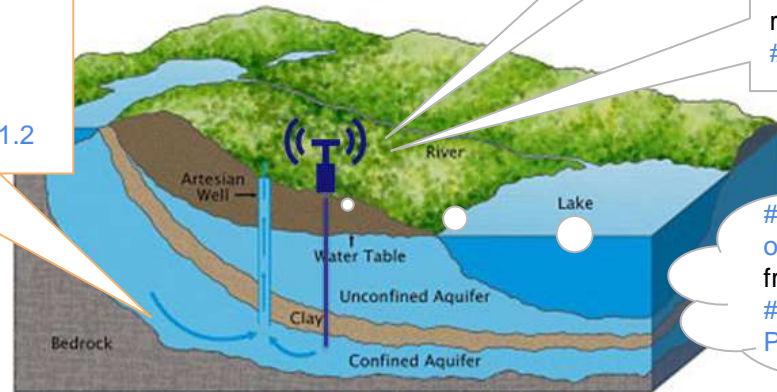
- **Application to groundwater monitoring system**
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# Application to groundwater information network

What was the plan?

- Providing groundwater levels in their context
  - Observations/measures (groundwater levels)
  - + associated features (Boreholes and facilities)
  - + links between them and other GeoScience things

I am  
[#EntiteHydroGeol/107AK01](#)  
monitored by  
[#Piezometre/00634X0147/PZ1.2](#)



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

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

[#GroundWater Levels](#)  
observations  
from  
[#Piezometre/00634X0147/PZ1.2](#)

# Application to groundwater information network

What was the technology used?

WFS AppSchema: GeoServer + Constellation + Deegree

SOS: 52°North

URIs as identifiers for features (boreholes, HydrogeologicUnits, facilities) and observations (ground water levels)

Apache resolver to manage redirections

- <http://ressource.brgm-rec.fr/obs/RawSeriePiezo/00463X0036/H1.2-622>
- > <http://192.168.6.208/52n-sos-rawdb-new/service?service=SOS&version=2.0.0&request=GetObservationById&observation=http://ressource.brgm-rec.fr/obs/RawSeriePiezo/00463X0036/H1.2-622>



# Application to groundwater information network

Where were the problems

GetFeature / GetObservations with filters

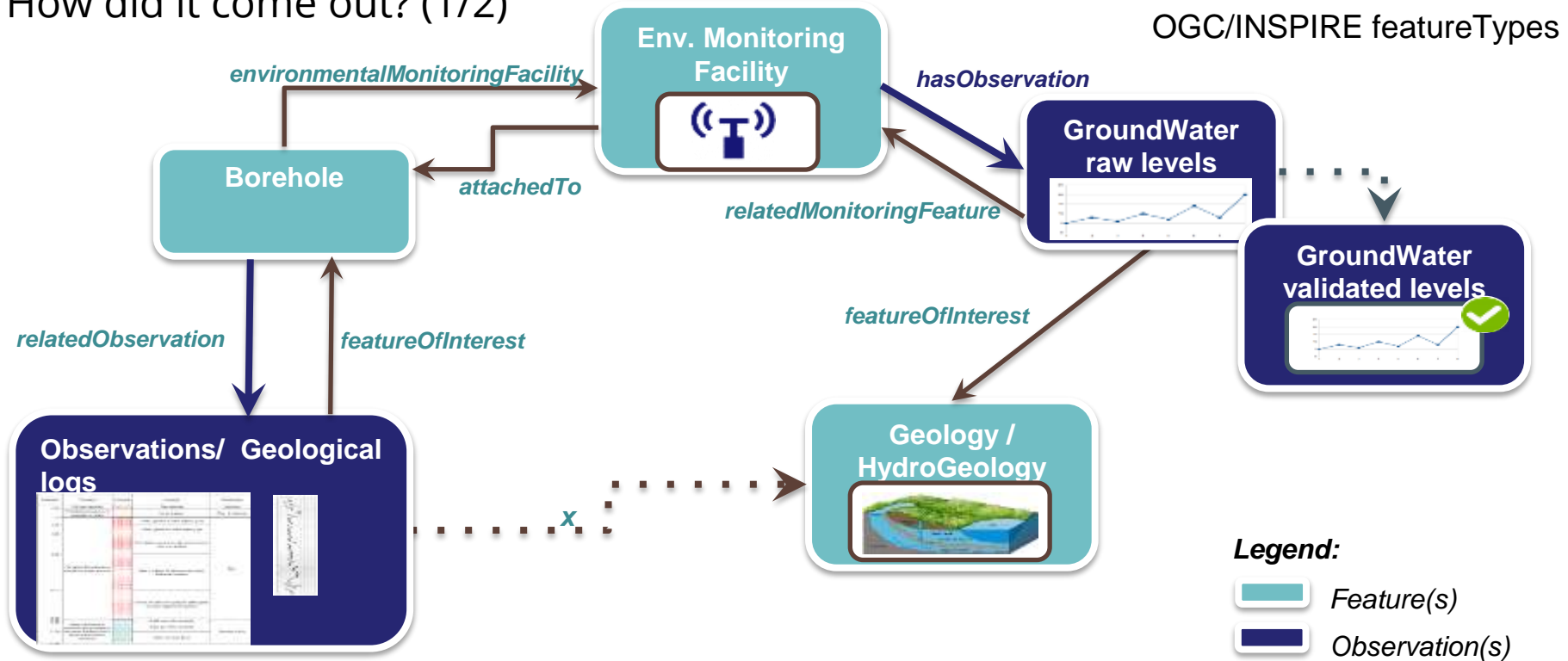
- WFS AppSchema works well with GetFeatureByID. Not so good with filters.
- Better with SOS but still have limitations (eg: not yet possible to query from result value).

Data duplication

- WFS AppSchema: CONCAT & co. are very memory consuming > you need to have database schema very close to the model to have direct mapping
- SOS: It was not possible to have mapping on the fly from raw DB to SOS > we had to build materialized views compliant with 52nSOS expected schema and tables

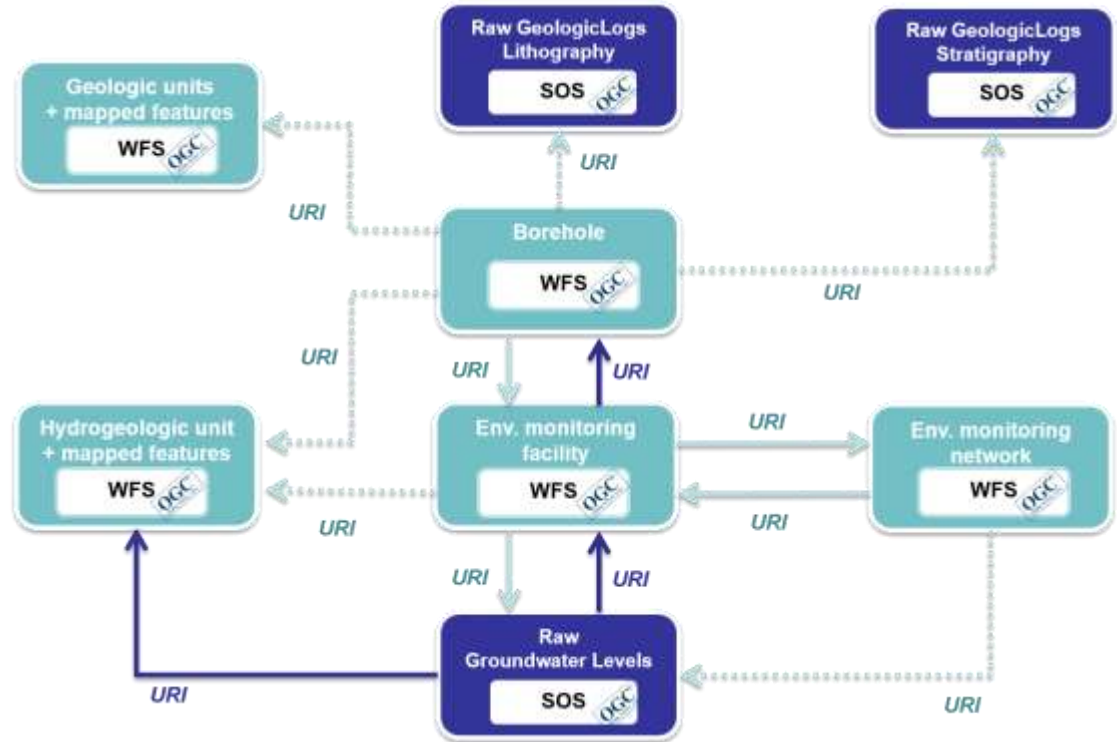
# Application to groundwater information network

How did it come out? (1/2)

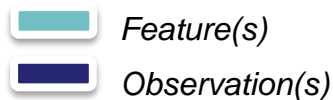


# Application to groundwater information network

How did it come out? (2/2)



**Legend:**



# Architectural Overview with Examples

- Application to groundwater monitoring system
- **Statistical Viewer**
- EF - Bathing Sites Monitoring Facilities
- SYKE's experiences with GeoServer
- WFS 2.0. direct access across multiple feature types

# Statistical Viewer

What was the plan:

Create simple viewer for statistical data:

- Statistical Units
- Population Distribution

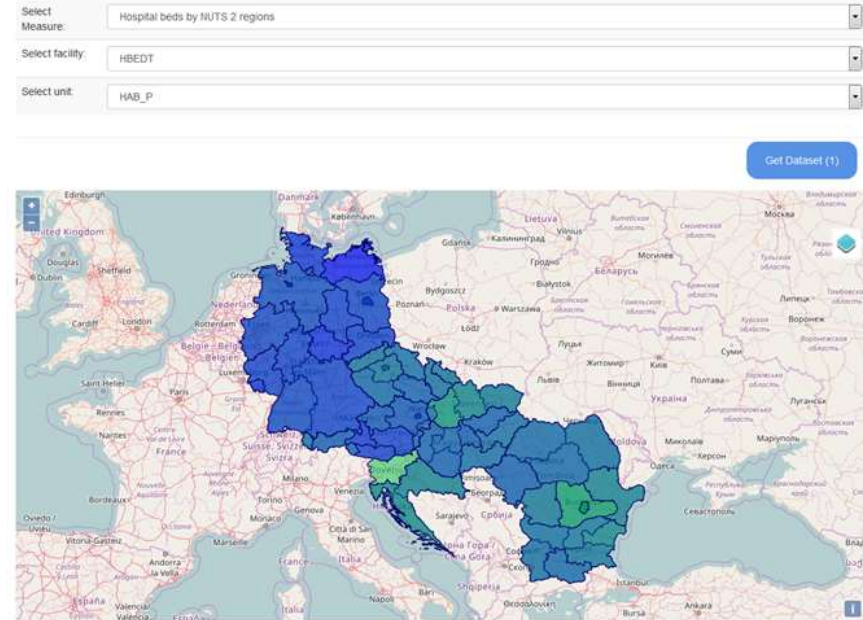
No INSPIRE compliant data services available

- Implemented utilizing open data from eurostat

What was the technology used:

- Data Transformation: Java code
- Data Provision: GeoServer AppSchema & PostGIS
- Middleware: PHP Filter module
- Web GUI: Open Layers, ajax, jquery

## Statistical Data Viewer App



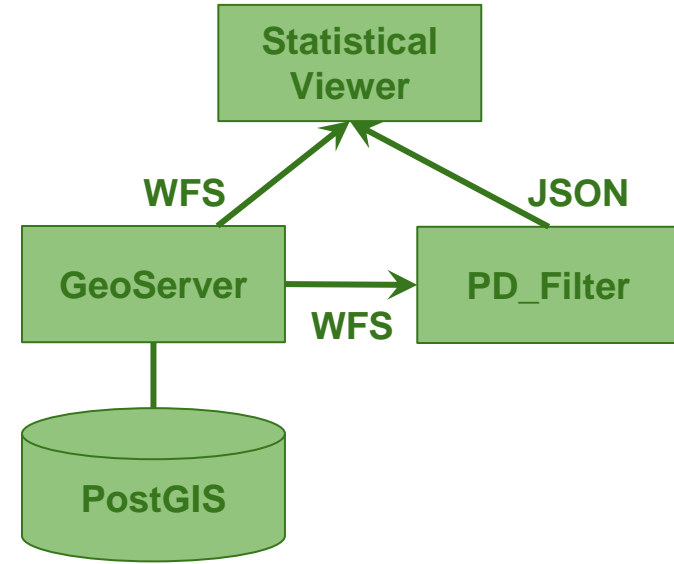
# Statistical Viewer

Where were the problems:

- Stored Queries - syntax for complex features not fully documented
- Filtering of distinct values available for specific fields not possible
- Population Distribution features massive (not geo!)
- Various GeoServer bugs (i.e. quite crash after requests for multiple complex features)

How did it come out:

- <http://bolegweb.geof.unizg.hr:2017/danubehack2/pd-viewer/>



# Architectural Overview with Examples

- Application to groundwater monitoring system
- Statistical Viewer
- **EF - Bathing Sites Monitoring Facilities**
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# EF - Bathing Sites Monitoring Facilities

## **What was the plan:**

Transform bathing sites according to INSPIRE EF meeting requirements:

- Conformity of the transformed GML dataset, served by means of WFS, to INSPIRE data model and GML Specs.
- Provide both deegree and GeoServer web services

## **What was the technology used:**

Data Transformation: hale studio

Data Provision:

- GeoServer (using hale studio *AppSchema* feature)
- deegree



# EF - Bathing Sites Monitoring Facilities

deegree:

**Issue:** Feature types `ef:ObservingCapability` and `om:OM_Observation` are not present in the feature store as “Feature types” but are present as “Feature collection type hierarchy” and not published as WFS layers.

**Cause:** in the INSPIRE *EnvironmentalMonitoringFacilities.xsd*, encoding of the elements (associations):

1. `"featureOfInterest"` with data type `"gml:FeaturePropertyType"`
2. `"procedure"` with data type `"om:OM_ProcessPropertyType"`

Solution:

The data types for the fields have been changed to `"gml:ReferenceType"` in the `EF.xsd`

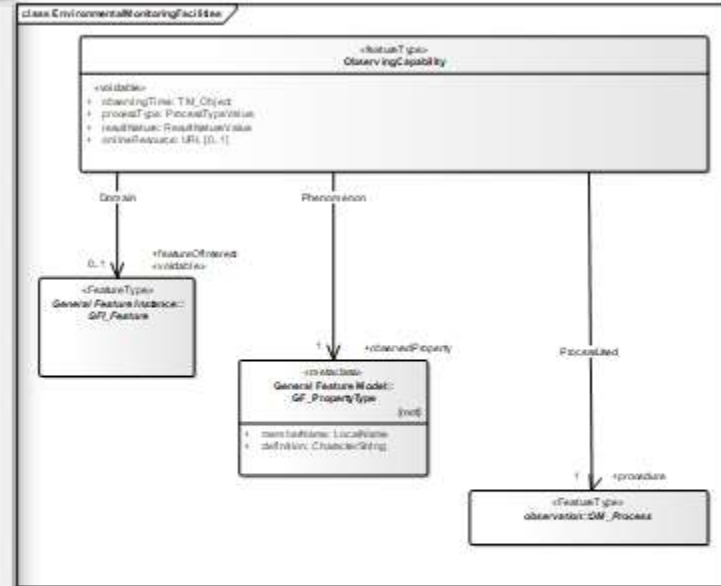
# EF - Bathing Sites Monitoring Facilities

Modified xsd

```
...
<element base="resultStatus" substitution="true" type="gml:ReferenceType"/>
<annotation/>
<documentation><!-- Definition -- State of the provided result.</documentation>
</annotation>
</element>
<element base="OK" base="gml:Resource" substitution="true"/>
<annotation/>
<documentation><!-- Definition -- & link to an external document providing further information about an ISO 18184 'Observed Property' compliant data model used to store Observations and Measurements acquired.</documentation>
</annotation>
<complexType>
<simpleContent>
<extension base="anyURI"/>
<attribute name="gml:hasUser" type="gml:URIReferenceType"/>
</extension>
</simpleContent>
</complexType>
</element>
<element base="procedure" type="gml:ReferenceType"/>
<annotation/>
<documentation><!-- Definition -- link to the Procedure used to generate the result. The OK_Procedure shall be suitable for the purpose of the observed property. As a corollary, details of the observed property shall be available in the procedure used.</documentation>
</annotation>
</element>
<element base="featureOfInterest" type="gml:ReferenceType"/>
<documentation><!-- Definition -- This feature is the real-world object whose properties are under observation, or is a sample of the real-world object.</documentation>
</annotation>
</element>
<element base="observedProperty" type="gml:ReferenceType"/>
<documentation><!-- Definition -- The property being observed or measured at this AMD.</documentation>
</annotation>
</element>
</element>
```

Original xsd

```
...
<documentation><!-- Definition -- State of the provided result.</documentation>
</annotation>
<documentation><!-- Definition -- State of the provided result.</documentation>
</annotation>
</element>
<documentation><!-- Definition -- link to an external document providing further information about an ISO 18184 'Observed Property' compliant data model used to store Observations and Measurements acquired.</documentation>
</annotation>
<documentation><!-- Definition -- link to an external document providing further information about an ISO 18184 'Observed Property' compliant data model used to store Observations and Measurements acquired.</documentation>
</annotation>
<complexType>
<simpleContent>
<extension base="anyURI"/>
<attribute name="gml:hasUser" type="gml:URIReferenceType"/>
</extension>
</simpleContent>
</complexType>
</element>
<element base="procedure" type="gml:ReferenceType"/>
<documentation><!-- Definition -- link to the Procedure used to generate the result. The OK_Procedure shall be suitable for the purpose of the observed property. As a corollary, details of the observed property shall be available in the procedure used.</documentation>
</annotation>
</element>
<element base="featureOfInterest" type="gml:ReferenceType"/>
<documentation><!-- Definition -- This feature is the real-world object whose properties are under observation, or is a sample of the real-world object.</documentation>
</annotation>
</element>
<element base="observedProperty" type="gml:ReferenceType"/>
<documentation><!-- Definition -- The property being observed or measured at this AMD.</documentation>
</annotation>
</element>
</element>
```



# EF - Bathing Sites Monitoring Facilities

How did it come out?



```
<ef:observingCapability xmlns:xlink="http://www.w3.org/1999/xlink" xlink:href="http://localhost:8080/services/BathingSites_EF_WFS2.0?SERVICE=WFS&VERSION=2.0.0&REQUEST=GetFeature&OUTPUTFORMAT=application%2Fxml%3B+version%3D3.2&STOREDQUERY_ID=urn:ogc:def:query:OGC-WFS::GetFeatureById&ID=OC_EC_MT0110116500000A01#OC_EC_MT0110116500000A01"/>
<ef:observingCapability xmlns:xlink="http://www.w3.org/1999/xlink" xlink:href="http://localhost:8080/services/BathingSites_EF_WFS2.0?SERVICE=WFS&VERSION=2.0.0&REQUEST=GetFeature&OUTPUTFORMAT=application%2Fxml%3B+version%3D3.2&STOREDQUERY_ID=urn:ogc:def:query:OGC-WFS::GetFeatureById&ID=OC_IE_MT0110116500000A01#OC_IE_MT0110116500000A01"/>
<ef:hasObservation xmlns:xlink="http://www.w3.org/1999/xlink" xlink:href="http://localhost:8080/services/BathingSites_EF_WFS2.0?SERVICE=WFS&VERSION=2.0.0&REQUEST=GetFeature&OUTPUTFORMAT=application%2Fxml%3B+version%3D3.2&STOREDQUERY_ID=urn:ogc:def:query:OGC-WFS::GetFeatureById&ID=MT0110116500000A01_ID_EC_6639#MT0110116500000A01_ID_EC_6639"/>
<ef:hasObservation xmlns:xlink="http://www.w3.org/1999/xlink" xlink:href="http://localhost:8080/services/BathingSites_EF_WFS2.0?SERVICE=WFS&VERSION=2.0.0&REQUEST=GetFeature&OUTPUTFORMAT=application%2Fxml%3B+version%3D3.2&STOREDQUERY_ID=urn:ogc:def:query:OGC-WFS::GetFeatureById&ID=MT0110116500000A01_ID_IE_6639#MT0110116500000A01_ID_IE_6639"/>
<ef:hasObservation xmlns:xlink="http://www.w3.org/1999/xlink" xlink:href="http://localhost:8080/services/BathingSites_EF_WFS2.0?SERVICE=WFS&VERSION=2.0.0&REQUEST=GetFeature&OUTPUTFORMAT=application%2Fxml%3B+version%3D3.2&STOREDQUERY_ID=urn:ogc:def:query:OGC-WFS::GetFeatureById&ID=MT0110116500000A01_ID_EC_1393#MT0110116500000A01_ID_EC_1393"/>
```

```
WFS::GetFeatureById&ID=MT0110116500000A01_ID_IE_6639#MT0110116500000A01_ID_IE_6639"/>
<ef:hasObservation xmlns:xlink="http://www.w3.org/1999/xlink" xlink:href="http://localhost:8080/services/BathingSites_EF_WFS2.0?SERVICE=WFS&VERSION=2.0.0&REQUEST=GetFeature&OUTPUTFORMAT=application%2Fxml%3B+version%3D3.2&STOREDQUERY_ID=urn:ogc:def:query:OGC-WFS::GetFeatureById&ID=MT0110116500000A01_ID_EC_1393#MT0110116500000A01_ID_EC_1393"/>
```

# EF - Bathing Sites Monitoring Facilities

GeoServer & hale studio Appschema feature:

## Issues:

- `<null>` namespaces in WFS response (`<null:OM_Observation>` even when not using virtual services)
- hale studio Appschema feature not able to correctly map multiplicity `<ef:ObservingCapability>`

## Solution:

- No solution found for first issue
- Edit the appschema file

# EF - Bathing Sites Monitoring Facilities

How did it come out?

```
localhost:8080/geoserver/wfs?service=WFS&version=1.0.0&request=GetFeature&typeName=env:EnvironmentalMonitoringFacility&maxfeatures=50&outputFormat=application%2Fxml
- <ef:FeatureCollection numberMatched="unknown" numberReturned="30" timeStamp="2017-09-01T16:01:55.335Z" xsi:schemaLocation="http://www.opengis.net/wfs/2.0 http://localhost:8080/geoserver/schemas/wfs/2.0/wfs.xsd http://inspire.ec.europa.eu/schemas/ef/4.0 http://inspire.ec.europa.eu/schemas/ef/4.0/EnvironmentalMonitoringFacilities.xsd http://www.opengis.net/gml/3.2 http://localhost:8080/geoserver/schemas/gml/3.2.1/gml.xsd">
  <ef:number>
    <ef:EnvironmentalMonitoringFacility gml:id="MT0110116500000A01">
      <ef:inspireId>
        <base:Identifier>
          <base:localId>MT0110116500000A01</base:localId>
          <base:namespace>MT_Bathing Water Report 2016</base:namespace>
        </base:Identifier>
        <ef:inspireId>
          <ef:name>XGHAIRA</ef:name>
          <ef:name>DAWRET IX NATT (TAN NISA)</ef:name>
        </ef:additionalDescription>
          BW Type: 1, Change: na, Closed N, BW Water Cat: C, Spec: Geo: Con: N, GroupID: na
        <ef:additionalDescription>
          <ef:mediaMonitored xlink:href="http://inspire.ec.europa.eu/code/list/Media/Value/water"/>
        </ef:geometry>
          <gml:Point srsDimension="2" srsName="http://www.opengis.net/gml/srs/epsg.xml#3045">
            <gml:pos>+59078.9160527285 3971754.143844437</gml:pos>
          </gml:Point>
        </ef:geometry>
        <ef:onlineResource>
          http://health.gov.ni/en/environmental/Pages/Health-Inspectorate/Environmental-Health-Risk-Management/Bathing-Water-Profiles.aspx
        </ef:onlineResource>
        <ef:observingCapability>
          <ef:ObservingCapability gml:id="OC_EC_MT0110116500000A01">
            <ef:observingTime>
              <gml:TimeInterval gml:id="OC_TI_MT0110116500000A01">
                <gml:timePosition>2016</gml:timePosition>
              </gml:TimeInterval>
            </ef:observingTime>
            <ef:processType xlink:href="http://inspire.ec.europa.eu/code/list/Process/Type/Value/process"/>
            <ef:resultNature xlink:href="http://inspire.ec.europa.eu/code/list/Result/Nature/Value/primary"/>
            <ef:procedure xlink:href="http://health.gov.ni/en/environmental/Pages/Health-Inspectorate/Environmental-Health-Risk-Management/Sampling-Procedure.aspx">
            <ef:futureOfInterest xlink:href="http://health.gov.ni/en/environmental/Pages/Health-Inspectorate/Environmental-Health-Risk-Management/Bathing-Water-Profiles/Bathing-Water-Profile-1.aspx">
            <ef:observedProperty xlink:href="http://dd.icinet.europa.eu/datasets/latest/BWQ_2006/tables/BWQD_2006_MonitoringResults/elements/Con:EC" xlink:title="Measured concentration of Escherichia coli per sample in colony forming unit- per 100 ml (cfu/100ml)"/>
            </ef:observingCapability>
          </ef:observingCapability>
          <ef:header xlink:href="MTC 106" xlink:title="IX-XGHAIRA"/>
        </ef:hasObservation>
        <null:OM_Observation gml:id="MT0110116500000A01_ID_EC_1">
          <gml:description>GroupID: 'na', Rem: 'na'</gml:description>
          <null:phenomenonTime>

```

# Architectural Overview with Examples

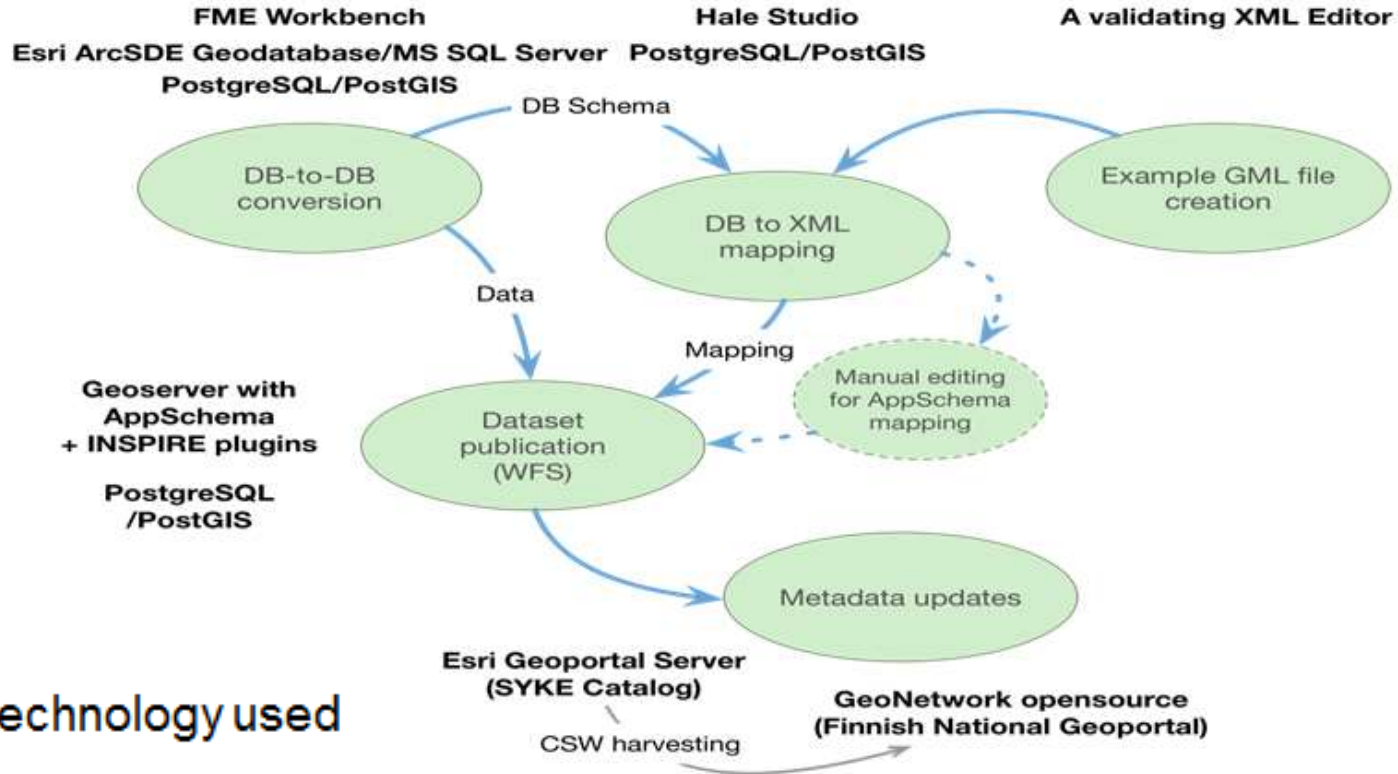
- Application to groundwater monitoring system
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- **SYKE's experiences with GeoServer**
- WFS 2.0. direct access across multiple feature types

# SYKE's experiences with GeoServer

What was the plan?

- Publish a BETA WFS service providing SYKE's annex I datasets according to the appropriate *INSPIRE schemas and feature types*:
  - [Natura 2000 sites](#) = *Protected Sites: ProtectedSite feature type*. The national dataset comprise of both polygons and lines. Some spatial objects comprise of **both polygons and lines**.
  - [Nationally designated areas](#) = *Protected Sites: ProtectedSite feature type*. The national dataset comprise of polygons.
  - [River network](#) = *Hydrography: WatercourseLink & Hydronode feature types*. The national dataset comprise of lines and points.
- Publish the reported datasets using one GeoServer instance
- Create separate stored queries for the PS datasets
- Create required dataset (3) and service metadata (1)

# SYKE's experiences with Geoserver



The technology used



# SYKE's experiences with GeoServer

How did it come out?

- INSPIRE WFS service published (BETA)

<http://geoserver.ymparisto.fi/geoserver/wfs?service=wfs&version=2.0.0&request=GetCapabilities>

- One Stored Query per PS dataset

<http://geoserver.ymparisto.fi/geoserver/wfs?service=WFS&version=2.0.0&request=getfeature&storedqueryid=http://inspire.ec.europa.eu/operation/download/getspatialdataset/&DataSetIdCode=http://paikkatiedot.fi/so/1002201/ps/ProtectedSite/> (Natura 2000)

<http://geoserver.ymparisto.fi/geoserver/wfs?service=WFS&version=2.0.0&request=getfeature&storedqueryid=http://inspire.ec.europa.eu/operation/download/getspatialdataset/&DataSetIdCode=http://paikkatiedot.fi/so/1002200/ps/ProtectedSite/> (Nationally Designated Areas)

- List of issues encountered, see later slides

# Architectural Overview with Examples

- Application to groundwater monitoring system
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- SYKE's experiences with GeoServer
- **WFS 2.0. direct access across multiple feature types**

# WFS 2.0. direct access across multiple feature types

## **The plan?**

Taking one data set, spanning many INSPIRE data themes, and transforming it for homogenized WFS download service

Going from a GIS-centric DB (topologically-correct layers organized in a single coherent GIS dataset) transposing it as INSPIRE GML datasets (4 INSPIRE data themes) & appropriate download services

Have everything validated (3\*Metadata Files, 2\*GetCapabilities Files, 4\*GML datasets): using existing public tools;

***Make everything work!***

# WFS 2.0. direct access across multiple feature types

## Technology used?

<b>Desktop GIS</b> (ArcGIS + QGIS) + <b>RDBMS</b> (Microsoft SQL Server) + <b>ArcGIS SDE</b>	Consolidating & preparing the data
<b>Proprietary:</b> Snowflake Go Publisher - Desktop <b>Open source:</b> Humboldt Alignment Editor	Transforming the data + GML predefined datasets
<b>Proprietary:</b> Snowflake Go Publisher Server <b>Open source:</b> Geoserver 2.xx + AppSchema + pgSQL	Serving the data as WFS Download Service
<b>GML validation:</b> ENVplus, OGC TeamEngine validator; MD validation: INSPIRE validator	Validating everything: MD + GML + WFS
Notepad++, Python scripting, OS-GEO bug-tracker, uncountable technical discussion forums	Misc tools





# WFS 2.0. direct access across multiple feature types

Outcome - WFS access to homogeneous data: ps:PS, gn:NP, au:AU, br:BR

The best implementation solution seems to be based around a hybrid open-source and proprietary software:

- proprietary SW usually has less bugs and better SW management features
- there is little that can be done in the way of fixing bugs and issues
- open-source solutions require more work and documentation to get going

Geoserver based solution requires quite the customization and bug-fixing, but it is 100% percent achievable

- some technical issues regarding TG implementation still exist
- has great Stored Query capabilities allowing for very interesting URL rewrites
- has come a long way since the early days of INSPIRE and is now a recommendable alternative to proprietary SW such as ArcGIS, Snowflake or others.



# Implementation Issues

what went wrong –  
how we made it right





# Implementation Issues (Overview)

- Data Provision

- from the perspective of the data provider the problems faced in creation and provision of the data to the public

- Data Access

- from the perspective of the user the problems encountered in downloading the data

- Data Usage

- from the perspective of the user the problems encountered in using the data

# Implementation Issues (Overview)

Intro to the following issues:

- Data Provision
  - Issues providing download services (GeoServer, DeeGree)
  - Simplification Options
- Data Access
  - Identifier Management and Referencing
  - Stored queries
- Data Usage
  - Available client libraries
  - Bits&Pieces

# Implementation Issues (Overview)

Intro to the following issues:

- **Data Provision**

- **Issues providing download services (GeoServer, DeeGree)**
- **Simplification Options**

- **Data Access**

- Identifier Management and Referencing
- Stored queries

- **Data Usage**

- Available client libraries
- Bits&Pieces

# Data Provision: Issues providing download services

- Various technologies being utilized for the provision of INSPIRE Services
- Most have some deficiencies pertaining to INSPIRE
- Knowing about these issues can save a great deal of effort and frustration!
- Workarounds can help to mitigate some of these issues
- Joint funding (crowd-funding among institutions) would be ideal (but politically difficult)
- Knowing who has contracted fixes would be valuable for coordination of efforts

# Main issues encountered by BRGM

- GeoServer WFS AppSchema

- One namespace is linked to one xsd (e.g. gml is associated to GML3.1.1 or GML3.2.1 for all the app schemas based data) > If you have data based on both, then you must have several GeoServer.
- AppSchemaCache is not automatically updated when XSD change > You have to (think that you will have to) do it manually.
- AppSchema is mostly reduced to one to one mapping (CONCAT cannot be used for performance reasons).

# Main issues encountered in SYKE implementation I

- Hard to meet the „one endpoint per dataset“ Download Services TG requirement 52 with GeoServer
  - Strictly speaking, if you want to publish two INSPIRE datasets you need to set up two GeoServer instances and publish them as separate endpoints
  - **You can only publish the same feature types having the same namespace once.** In order to provide our PS datasets (Natura, NDA) separately, we would need to set up and one GeoServer instance for each.
- When you publish WFS you automatically also generate WMS (workaround: have a separate GeoServer instance for publishing WFS services only.)
- Solution for these issues: workspace isolation (next page)

# Geoserver/AppSchema Improvement: Isolated Workspaces

- Allow publishing the same (complex/simple) feature types (with the same namespace) more than once using a different data source.
- Break the connection with namespaces and the workspaces:
  - Isolated workspace could have an arbitrary prefix.
  - Namespaces and feature types added to an isolated workspace would not conflict with or be visible in other workspaces or in the global services.
- Extend AppSchema to allow more than one complex feature mapping per feature type:
  - Restriction: feature types used for feature chaining can only be mapped once or must be mapped again for each using data store (OK).
- Contractor: GeoSolutions (funded by SYKE/Envibase project) -> benefit to all

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# Other issues encountered in SYKE implementation II

- AppSchema restricted the HALE mapping (workaround: editing of mapping documenting by hand, for example SWE/FI names)
- We could not create optimal GMLs with the GeoServer solution, only with Atom for PS using FME or HALE alone, as AppSchema cannot handle MultiGeometry objects (workaround: lines and polygons were split up into separate spatial objects)
- GDAL interpreted the CRS in incorrectly when providing them in an INSPIRE compliant way, that is in URI-form, not URN. This has been reported and fixed.
- Open search support in GeoNetwork is not fully working
- ESRI Geoportal Server INSPIRE metadata templates are not fully according to INSPIRE requirements
- WMS Portrayal issue: according to IR code list values should be used in WMS layer names, however if we use our national code list extensions, then we fail in the name validations...



Da

ID	Problem	Description	Workaround	ISSUE Theme Impacted	Version	Dev Reported	Reported by	In the process of negotiating funding	Comments	OSGeo Issue L
1	Unique Endpoint per Dataset	The closest solution provided by GeoServer are the namespace specific endpoints. While the namespace specific endpoints provide the correct capabilities, when providing complex features, there's a problem with the namespace encoding (formally its nice if all namespaces are declared in the header and then used, in the namespace specific encoding of complex features each namespace is defined where used, the namespaces are all set to null). Also, multiple datasets may be provided by an organization using the same ISSPRE Theme, thus namespace	Utilize Apache's rewriting functionality. For getCapabilities the namespace specific URI should be used, for getFeature the request URI should be rewritten with the namespace excluded.		2.9	1/31/2017	Kath Schwaiblmair	French Environment Institute	<p>Ikka Rönkä 16.3.2017: This should be solved by the proposed "isolated workspaces" feature currently in discussion between Finnish Environment Institute and contractor. This would introduce isolated workspaces not tied to a single namespace, and make it possible to provide data using same feature types in more than one of these isolated workspaces (more than one data source mapping for a feature type). A known limitation will be that feature type lookup for shared features is not isolated to a workspace; there could now be more than one mapping for a feature type, so the current data store is searched first, and then all others (globally). First match will be used.</p> <p>luis Maxim 21.4.2017: This discussion held two months ago: <a href="http://osgeo-org/156848/attach/1/Allowing%20multiple%20workspaces%20to%20use%20the%20same%20space%20URI%20for%2037302.html">http://osgeo-org/156848/attach/1/Allowing%20multiple%20workspaces%20to%20use%20the%20same%20space%20URI%20for%2037302.html</a> shows that isolated workspaces is just a concept not implemented, that touches some fundamentals of Geoserver. It has as well some other issues. My understanding is that currently is just a proposed development that was not done and tested in order to see if this is a solution or not and what are the limitations. If it will be done, then it should be understood that a workspace need to have a one-to-one relationship with a dataset, because according to ISSPRE each dataset should have a unique content. It should be understood as well that a dataset is composed of one or more complex feature types, and each complex feature type is defined through multiple WFS schemas. Therefore one-to-many relationships should exist between a dataset and complex feature types and one-to-many relationships should exist between a complex feature type and WFS schemas.</p>	<a href="https://trac.osgeo.org/geoserver/ticket/10022">https://trac.osgeo.org/geoserver/ticket/10022</a>
2	Stored Queries	(Some filtering of the data though) Stored queries are not possible on complex features. Correction: It is possible, but the query XPath is different than for simple features - when defining stored queries for complex features, the entire XPath excluding the base feature name must be provided (XPath). Correction2: relPath also works, if you start with / (Kath)	Set up simple features and define filters on these for the id, then request the correct feature by id		2.9	1/31/2017	Kath Schwaiblmair		<p>Ikka Rönkä 16.3.2017: Not how the getCapabilities stored query is working in FEI in Geoserver 2.9.0, see <a href="http://geoserver.org/156848/attach/1/Allowing%20multiple%20workspaces%20to%20use%20the%20same%20space%20URI%20for%2037302.html">http://geoserver.org/156848/attach/1/Allowing%20multiple%20workspaces%20to%20use%20the%20same%20space%20URI%20for%2037302.html</a> and <a href="http://geoserver.org/156848/attach/1/Allowing%20multiple%20workspaces%20to%20use%20the%20same%20space%20URI%20for%2037302.html">http://geoserver.org/156848/attach/1/Allowing%20multiple%20workspaces%20to%20use%20the%20same%20space%20URI%20for%2037302.html</a></p> <p>luis Maxim 21.4.2017: Kath is not talking only about getCapabilities stored query, but is talking about filtering the data through stored queries. This may be in relation with issue 14. I think that Kath points to the fact that she had a problem to retrieve a feature by request, thus by providing either two or three parameters: namespace, localid, versionID. We will need to better understand which is the problem, indeed is not too clear what Kath wants to indicate, but I suppose that is something related to the problem of the features that have versions, therefore is not the case of protected sites that have no versions. The example provided by Ikka works only for one dataset with only one featureType per geoserver instance. Ikka, first time try to provide two datasets, each one with only one FeatureType (i.e. ge:ProtectedSite and ge:NamePlace with the names of Protected Sites) and create a stored query request to retrieve Protected sites and another request to retrieve the geographical names of the protected sites by using the same storedqueryID. Second time try to provide a dataset that is providing access to both featureTypes, namely ge:site and ge:place and create a stored query to download that dataset containing both featureTypes without having nulls in the namespaces. This you will see that Kath has a point even if it is not described in detail. Another problem can be related to the fact that only CRS is a OGC parameter for</p>	

# Deegree excel

ID	Problem	Description	Workaround	INSPIRE Theme impacted	Version	Issue Link on the Forum
1	Support not provide dx OGC HTTP URI CRS references	the http URI encoding for CRS in GML to be large still is currently not supported by deegree. <a href="https://github.com/deegree/deegree3/issues/711">https://github.com/deegree/deegree3/issues/711</a>		*	3.3.18	claimed solved in v3.4.1: <a href="#">Enhanced CRS configuration by CRS identifier in OGC HTTP URI syntax #840</a> <a href="https://github.com/deegree/deegree3/pull/840">https://github.com/deegree/deegree3/pull/840</a>
2	omission of deeply nested fields	when creating the tables in the DB from application schema, deegree does not include 'deeply' nested field i.e. when the element structures extend a certain complexity (with nesting and recursion) deegree simply omits them	manually edit configuration files	*	3.3.18	<a href="https://sourceforge.net/p/deegree/mailman/message/32578671/">https://sourceforge.net/p/deegree/mailman/message/32578671/</a>
3	WFS response does not show those application schema properties corresponding to empty fields in the data source	WFS response does not show those application schema properties corresponding to empty fields in the data source tables (derived of course from relevant empty elements in the GML file which fed the DB). This behaviour turns into an issue when no relevant information exists in the source data (because the provider does not have or simply does not want to share) for target application schema elements which are <b>mandatory and not voidable</b> (e.g. <ps:geometry>).		*	3.3.18	
4	xlink:title is being removed on WFS (using a memory store from GML 3.2)	Using Deegree 3.3.20 server with an in memory storage (GML 3.2 file), there is a problem when a request for the feature is made using the WFS request. The response is translated correctly in the WFS format, but all the xlink:title are removed.			3.3.20	<a href="https://github.com/deegree/deegree3/issues/841">https://github.com/deegree/deegree3/issues/841</a>

# Data Provision: Issues providing download services - examples GeoServer

<b>Problem</b>	<b>Workaround</b>	<b>Funding</b>
Unique Endpoint per Dataset	Utilize Apache's rewriting functionality	SYKE
Stored Queries on Complex Features	Documentation Issue, works, not properly documented	
WMS doesn't work on gml:MultiSurface	Create simple feature	
WFS-T doesn't work with complex features		
Requests for multiple complex features crashes Geoserver	Request features individually	
...	...	...

# Data Provision: Issues providing download services

- Extend approach for other technologies:
  - Deegree (in progress)
  - GeoNetwork
  - ...
- Options for formalizing current excel sheet solution
  - Current approach quite “fragile”
  - Open to general edits
- Integrate content into existing INSPIRE platform?

# Data provision: the pushy idea (BRGM)

- Do we (really) need data servers?
- What about building and storing all possible requests results, store them and expose them?
- Hub'EAU approach with solR



# Data Provision: Simplification Options

## Problems:

- Complexity of common INSPIRE types (i.e. Geographical Names, Addresses, Related Party...) causes implementation and usage issues
- Workarounds can be dangerous; lead to unstandardized standardization (i.e. putting the entire geographical name into the GN delivery point element)

*(Currently also being discussed in MIG)*

## Options:

- Software driven flattening vs. community driven schema simplifications (GeoSciML Lite, EarthResourceML Lite,...).
- Simple Feature Representations/Mapping
  - Potential of APIs exposing simplified features as an alternative solution
- Simplification through alternative encodings (JSON, RDF)
  - Also as a way towards more INSPIRE based linked open data, Idproxy, Sensor Things

Keep it simple - nordic view

# GDI-DE Data Specification Analysis

## Results and Recommendations



# Implementation Issues (Overview)

Intro to the following issues:

- Data Provision
  - Issues providing download services (GeoServer, DeeGree)
  - Simplification Options
- **Data Access**
  - **Identifier Management and Referencing**
  - **Stored queries**
- Data Usage
  - Available client libraries
  - Bits&Pieces

# Data Access: Identifier Management and Referencing

There are no requirements/recommendations for INSPIRE identifiers of the data provided.

Identifiers are critical for feature referencing, and in reporting activities of MS.

INSPIRE data is usually reference data which belongs in European-wide registries of features.

We don't call the 8490 km-long **E40** road, by it's id:**27C59F82-5208-4C70-AEAC-6A8E172D95CD**

We also call addresses, admin. units, rivers, geographical places by their names/abbreviations

Identifiers in INSPIRE should mirror this, since it makes working with data much easier/natural

Identifiers allow users to pin-point from very a very large data-pool the exact feature they need

In short, we need intelligent identifiers, since they make sure the data is not a mess, and make it work for everyone.

# Data Access: Identifier Management and Referencing

- Identifier management loosely specified in INSPIRE, various non-aligned options available:
  - base:inspireId (which provides the local identifier inside a namespace, and versioning )
  - gml:id (default for WFS, useful for getting just the exact feature needed, restrictions++)
    - doesn't allow a number of characters, many SW generate IDs randomly
  - gml:identifier (alt. identifier in GML, freer version of gml:id, not useful in feature filtering)
- Standard WFS **GetFeatureById** stored query (SQ) references **gml:id**
  - filtering the data is based on an identifier element that has many restrictions

# Data Access: Identifier Management and Referencing

- What does INSPIRE TG mandatory **GetSpatialDataSet** SQ reference ???
  - unclear if this SQ is anything else than an alternative way of getting ALL the features from a WFS, or something more
- How to access a specific feature by the inspireId?
  - Where is **GetFeatureByInspireID** SQ? What about versioned data (dataset time series)?

# Data Access: Identifier Management and Referencing

- How to reference specific features? First try: WFS URI including query  
Problems:
  - URI changes with SW versions
  - Long and ugly URI
- Rewriter approach - provider level:
  - Configure Apache to rewrite simple URIs to current WFS
  - Simple URI used for referencing and in xlinks
- <http://ressource.brgm-rec.fr/data/Piezometre/06512X0037/STREMY.2>
- vs.
- [https://wfspoc.brgm-rec.fr/geoserver/ows?service=wfs&version=2.0.0&request=GetFeature&StoredQuery\\_ID=GetEnvironmentalMonitoringFacilityById&ID=Piezometre.06512X0037.STREMY.2](https://wfspoc.brgm-rec.fr/geoserver/ows?service=wfs&version=2.0.0&request=GetFeature&StoredQuery_ID=GetEnvironmentalMonitoringFacilityById&ID=Piezometre.06512X0037.STREMY.2)

# Data Access: Identifier Management and Referencing

- Redirect + rewrite approach - European Level (nginx):
  - URI1: RO - Ministry of Environment - Protected Areas Data Set - nat. prot. areas :  
<http://inspire.biodiversity.ro/geoserver/ows?service=wfs&version=2.0.0&request=GetFeature&typename=ps:ProtectedSite&featureid=ROSCI0135>
    - <http://gmlid.eu/RO/ENV/PADS/PS/ROSCI0135>
  - URI2: RO - National Cadaster Agency - Administrative Units Dataset - admin. units:  
[http://geoportal.ancpi.ro/arcgis/rest/services/AU/AU\\_Download/GeoDataServer/exts/InspireFeatureDownload/service?VERSION=2.0.0&SERVICE=WFS&REQUEST=GetFeature&typename=au:AdministrativeUnit&featureID=1.29.11940](http://geoportal.ancpi.ro/arcgis/rest/services/AU/AU_Download/GeoDataServer/exts/InspireFeatureDownload/service?VERSION=2.0.0&SERVICE=WFS&REQUEST=GetFeature&typename=au:AdministrativeUnit&featureID=1.29.11940)
    - <http://gmlid.eu/RO/ANCPI/UAT/AU/1.29.11940>

Where MS authority abbreviated come from INSPIRE registries, dataset abbreviations are MD namespaces for that dataset, and identifiers make human readable sense

# Data Access: Stored queries

- Syntax for stored queries on complex features slightly different from simple features, not very well documented.
  - For simple features element name in the fes:ValueReference sufficient
  - For complex features relative XPath must be provided, examples:
    - `gml:name` doesn't work
    - `./gml:name` works
    - `./ps:DesignationType/ps:designationScheme/@xlink:href`
    - `/cdda:DesignatedArea/ps:siteDesignation/ps:DesignationType/ps:designationScheme/@xlink:href`

# Data Access: Stored queries

Implementations must keep track of the following **RECs** and **REQs**:

- Req 49: Predefined SQ available for predefined datasets
- Req 50: All combinations of CRS/DataSetIdCode/  
DataSetIdNamespace/language available as Predefined SQ
- Req 51: Following parameter names must be used: CRS, DataSetIdCode,  
DataSetIdNamespace and Language
- Rec 13: Name of Predefined SQ for predefined datasets:  
<http://inspire.ec.europa.eu/operation/download/GetSpatialDataSet>
- These do not really apply for WFS-based GML features



# Data Access: Stored queries

- Standardized theme specific stored queries would be valuable for data users
  - Most systems will not allow users to specify their own stored queries, so dependent on existing ones
  - A good complement to data specifications
  - Alignment across systems essential for cross-border applications
  - Discussion of potential stored query types/options for standardization
- Deficit of WFS Filters - no select distinct!
  - Essential for GUI development, which features to select
  - Otherwise App must first access all features using GetPropertyValue, filter redundancies
- Security issue
  - It seems we can delete them while not connected (need configuration to avoid that)

# Implementation Issues (Overview)

Intro to the following issues:

- Data Provision
  - Issues providing download services (GeoServer, DeeGree)
  - Simplification Options
- Data Access
  - Identifier Management and Referencing
  - Stored queries
- **Data Usage**
  - **Available client libraries**
  - **Bits&Pieces**

# Data Usage: Available client libraries

- Various libraries are available for the implementation of client software. These will be discussed, together with their strengths and weaknesses
  - GDAL GMLAS driver ([http://www.gdal.org/drv\\_gmlas.html](http://www.gdal.org/drv_gmlas.html) )
  - QGIS GML application schema toolbox
  - QGIS V3 - will anything ever work again since V3 will make existing vital plugins unusable?
  - Resolving xlink

In January 2017 the “application/gml+xml; version=3.2” MIME Type was registered at IANA, and WFS changed text/xml into this new MIME type, making WFS response not readable in the the browser anymore.

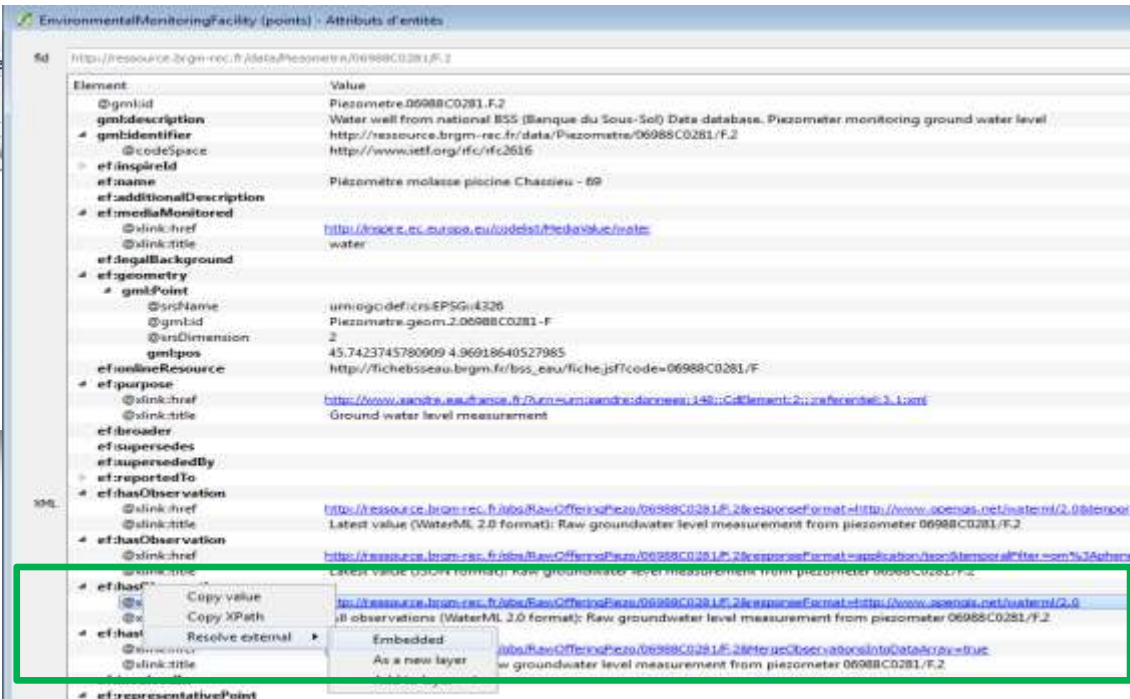
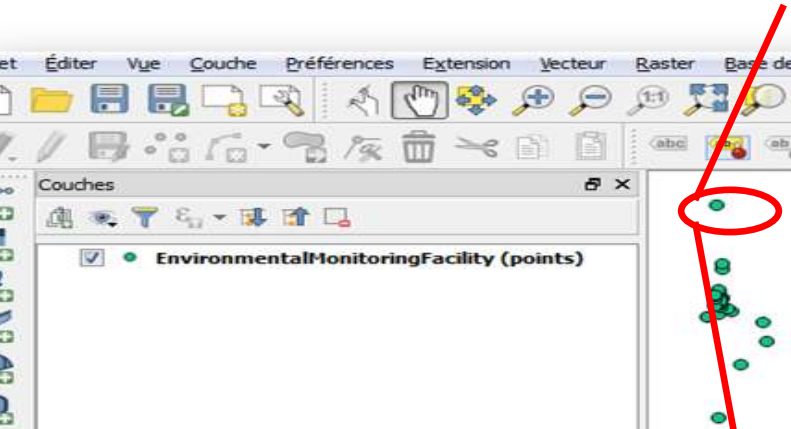
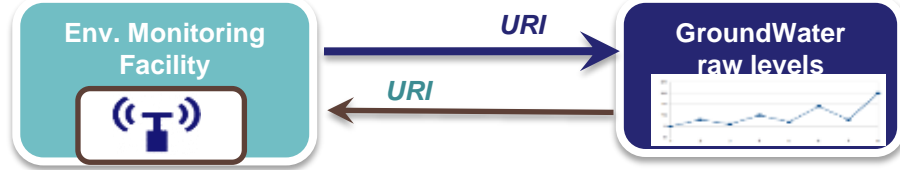
# Clients - QGIS GML Application Schema Toolbox

- QGIS Plugin for WFS with complex features
- Can download GML from WFS2 services
- Convert GML App Schema files in PostGIS and SQLite format
- Works with QGIS3+
- github : [https://github.com/BRGM/gml\\_application\\_schema\\_toolbox](https://github.com/BRGM/gml_application_schema_toolbox)

Developed by:

- BRGM - BRGM is involved for a long time in the definition of interoperability standards especially linked to OGC and the European INSPIRE directive initiatives.
- European Union's Earth observation programme Copernicus, as part of the tasks delegated to the European Environment Agency

# Clients - QGIS GML Application Schema Toolbox



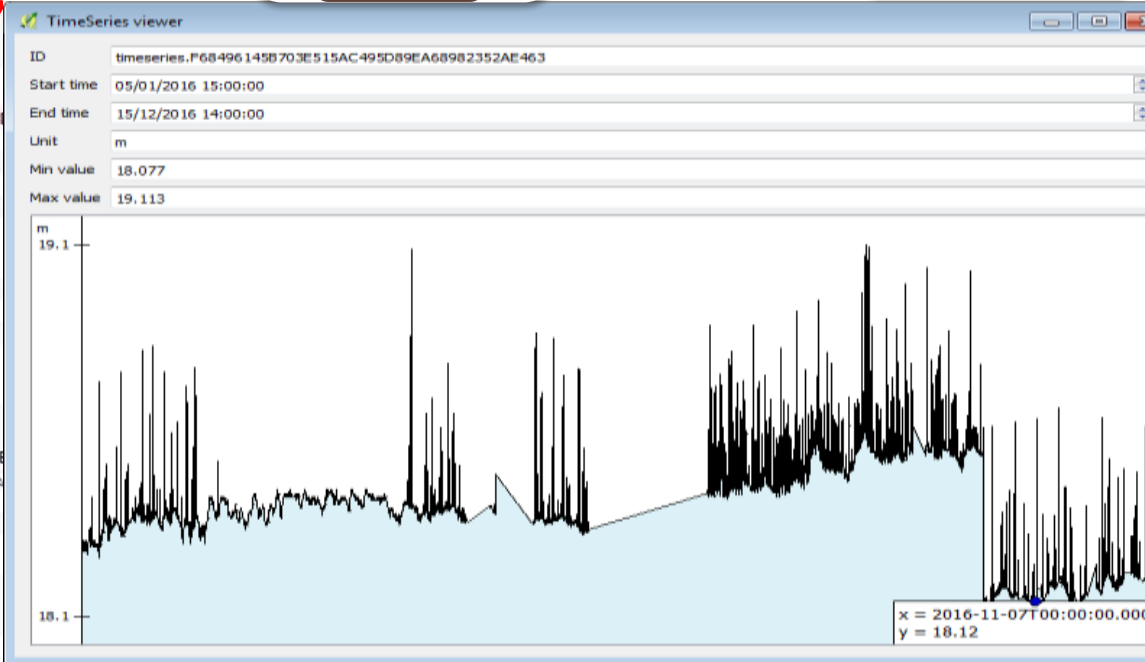
1  
2

# Clients - QGIS GML Application Schema Toolbox



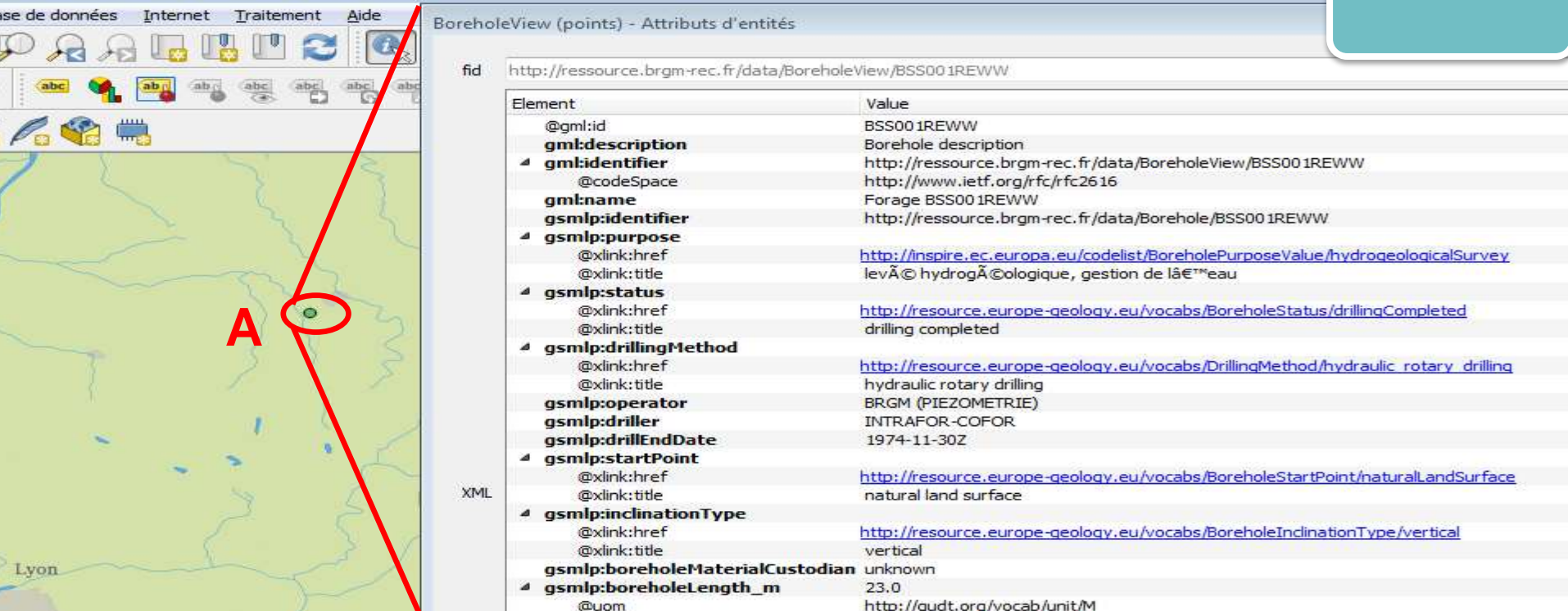
XML metadata structure:

- om:resultTime
  - gml:TimeInstant
    - @gml:id: ti\_A5B605235028277DAC699731065C3985E0F1...
    - gml:timePo...: 2016-12-15T14:00:00.000Z
  - om:procedure
    - @xlink:href: <http://fd.eaufrance.fr/met/403.xml>
    - @xlink:title: Electronic piezometric probe
  - om:parameter
  - om:observedPrope...
    - @xlink:href: <http://fd.eaufrance.fr/par/16169.xml>
    - @xlink:title: GroundWaterLevel
  - om:featureOfInter...
    - wml2:Monitori...
      - @gml:id: mp\_4C6129829FFC1C2DE4A2FB853F56C5B1A8...
      - gml:identifier: <http://ressources.brgm-rec.fr/data/Piezometre>
      - gml:name: Piezo 06988C0281/F.2
      - sf:sampledF...
      - sams:shape
  - om:result
    - wml2:Measure...  3



# Clients - QGIS GML Application Schema Toolbox

Borehole



The screenshot displays the QGIS interface. On the left, a map view shows a green area with a red circle and the letter 'A' around a small green point. A red line connects this point to the attribute table on the right. The attribute table is titled 'BoreholeView (points) - Attributs d'entités' and shows the following data:

fid	Value
http://ressource.brgm-rec.fr/data/BoreholeView/BSS001REWW	
<b>Element</b>	<b>Value</b>
@gml:id	BSS001REWW
<b>gml:description</b>	Borehole description
▲ <b>gml:identifier</b>	http://ressource.brgm-rec.fr/data/BoreholeView/BSS001REWW
@codeSpace	http://www.ietf.org/rfc/rfc2616
<b>gml:name</b>	Forage BSS001REWW
<b>gsmlp:identifier</b>	http://ressource.brgm-rec.fr/data/Borehole/BSS001REWW
▲ <b>gsmlp:purpose</b>	http://inspire.ec.europa.eu/codelist/BoreholePurposeValue/hydrogeologicalSurvey
@xlink:href	levÃ© hydrogÃ©ologique, gestion de lâ€™eau
@xlink:title	
▲ <b>gsmlp:status</b>	http://resource.europe-geology.eu/vocabs/BoreholeStatus/drillingCompleted
@xlink:href	drilling completed
@xlink:title	
▲ <b>gsmlp:drillingMethod</b>	http://resource.europe-geology.eu/vocabs/DrillingMethod/hydraulic_rotary_drilling
@xlink:href	hydraulic rotary drilling
@xlink:title	
<b>gsmlp:operator</b>	BRGM (PIEZOMETRIE)
<b>gsmlp:driller</b>	INTRAFOR-COFOR
<b>gsmlp:drillEndDate</b>	1974-11-30Z
▲ <b>gsmlp:startPoint</b>	http://resource.europe-geology.eu/vocabs/BoreholeStartPoint/naturalLandSurface
@xlink:href	natural land surface
@xlink:title	
▲ <b>gsmlp:inclinationType</b>	http://resource.europe-geology.eu/vocabs/BoreholeInclinationType/vertical
@xlink:href	vertical
@xlink:title	
<b>gsmlp:boreholeMaterialCustodian</b>	unknown
▲ <b>gsmlp:boreholeLength_m</b>	23.0
@uom	http://qudt.org/vocab/unit/M

# Clients - QGIS GML Application Schema Toolbox

Borehole

http://ressource.brgm-rec.fr/data/BoreholeView/BSS001REWW

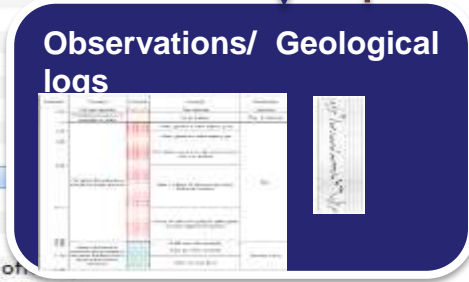
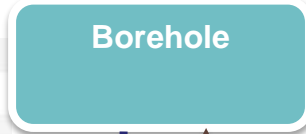
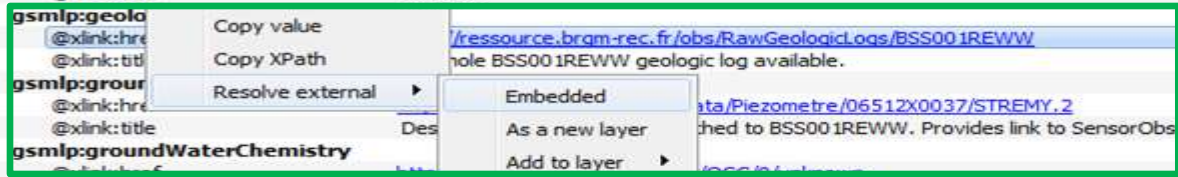
Element	Value
<b>gsmlp:drillEndDate</b>	1974-11-30Z
<b>gsmlp:startPoint</b>	
@xlink:href	<a href="http://resource.europe-geology.eu/vocabs/BoreholeStartPoint/naturalLandSurface">http://resource.europe-geology.eu/vocabs/BoreholeStartPoint/naturalLandSurface</a>
@xlink:title	natural land surface
<b>gsmlp:inclinationType</b>	
@xlink:href	<a href="http://resource.europe-geology.eu/vocabs/BoreholeInclinationType/vertical">http://resource.europe-geology.eu/vocabs/BoreholeInclinationType/vertical</a>
@xlink:title	vertical
<b>gsmlp:boreholeMaterialCustodian</b>	unknown
<b>gsmlp:boreholeLength_m</b>	23.0
@uom	<a href="http://qudt.org/vocab/unit/M">http://qudt.org/vocab/unit/M</a>
<b>gsmlp:elevation_m</b>	223.87
@uom	<a href="http://qudt.org/vocab/unit/M">http://qudt.org/vocab/unit/M</a>
<b>gsmlp:elevation_srs</b>	<a href="http://www.opengis.net/def/crs/EPSSG/0/5720">http://www.opengis.net/def/crs/EPSSG/0/5720</a>
<b>gsmlp:source</b>	<a href="http://ficheinfoterre.brgm.fr/InfoterreFiche/ficheBss.action?id=06512X0037/STREMY">http://ficheinfoterre.brgm.fr/InfoterreFiche/ficheBss.action?id=06512X0037/STREMY</a>
<b>gsmlp:metadata_uri</b>	<a href="http://www.geocatalogue.fr/Detail.do?fileIdentifier=BR_BSS_BAA">http://www.geocatalogue.fr/Detail.do?fileIdentifier=BR_BSS_BAA</a>
<b>gsmlp:genericSymbolizer</b>	Not provided
<b>gsmlp:shape</b>	
<b>gml:Point</b>	
@srsDimension	2
@srsName	urn:ogc:def:crs:EPSG::4326
@gml:id	gsmlp.shape.BSS001REWW
<b>gml:pos</b>	46.1909541655103 5.18713262971692
<b>gsmlp:cored</b>	false
<b>gsmlp:accessToPhysicalDrillCore</b>	false
<b>gsmlp:boreholeUse</b>	
@xlink:href	<a href="http://inspire.ec.europa.eu/codelist/BoreholePurposeValue/groundwaterLevelMonitoring">http://inspire.ec.europa.eu/codelist/BoreholePurposeValue/groundwaterLevelMonitoring</a>
@xlink:title	surveillance du niveau de la nappe phrÃ©atique
<b>gsmlp:detailedDescription</b>	
@xlink:href	<a href="http://www.opengis.net/def/nil/OGC/0/template">http://www.opengis.net/def/nil/OGC/0/template</a>
@xlink:title	template
<b>gsmlp:geophysicalLogs</b>	
@xlink:href	<a href="http://www.opengis.net/def/nil/OGC/0/unknown">http://www.opengis.net/def/nil/OGC/0/unknown</a>
@xlink:title	unknown
<b>gsmlp:geologicalDescription</b>	
@xlink:href	<a href="http://ressource.brgm-rec.fr/obs/RawGeologicLogs/BSS001REWW">http://ressource.brgm-rec.fr/obs/RawGeologicLogs/BSS001REWW</a>
@xlink:title	Borehole BSS001REWW geologic log available.
<b>gsmlp:groundWaterLevel</b>	
@xlink:href	<a href="http://ressource.brgm-rec.fr/data/Piezometre/06512X0037/STREMY.2">http://ressource.brgm-rec.fr/data/Piezometre/06512X0037/STREMY.2</a>
@xlink:title	Description of Piezometer attached to BSS001REWW. Provides link to SensorObservationService offering



# Clients - QGIS GML Application Schema Toolbox

▲	gsmlp:shape		
▲	gml:Point		
	@srsDimension		2
	@srsName		urn:ogc:def:crs:EPSG::4326
	@gml:id		gsmlp.shape.BSS001REWW
	gml:pos		46.1909541655103 5.18713262971692
	gsmlp:cored		false
	gsmlp:accessToPhysicalDrillCore		false
▲	gsmlp:boreholeUse		
	@xlink:href		<a href="http://inspire.ec.europa.eu/codelist/BoreholePurposeValue/groundwaterLevelMonitoring">http://inspire.ec.europa.eu/codelist/BoreholePurposeValue/groundwaterLevelMonitoring</a>
	@xlink:title		surveillance du niveau de la nappe phrÃ©atique
▲	gsmlp:detailedDescription		
	@xlink:href		<a href="http://www.openqgis.net/def/nil/OGC/0/template">http://www.openqgis.net/def/nil/OGC/0/template</a>
	@xlink:title		template
▲	gsmlp:geophysicalLogs		
	@xlink:href		<a href="http://www.openqgis.net/def/nil/OGC/0/unknown">http://www.openqgis.net/def/nil/OGC/0/unknown</a>
	@xlink:title		unknown
▲	gsmlp:geolo		
	@xlink:href	Copy value	<a href="/ressource.brgm-rec.fr/obs/RawGeologicLogs/BSS001REWW">/ressource.brgm-rec.fr/obs/RawGeologicLogs/BSS001REWW</a>
	@xlink:title	Copy XPath	borehole BSS001REWW geologic log available.
▲	gsmlp:grou		
	@xlink:href	Resolve external	<a href="data/Piezometre/06512X0037/STREMY.2">data/Piezometre/06512X0037/STREMY.2</a>
	@xlink:title	Des	ished to BSS001REWW. Provides link to SensorObservationService on
▲	gsmlp:groundWaterChemistry		
	@xlink:href		<a href="http://www.openqgis.net/def/nil/OGC/0/unknown">http://www.openqgis.net/def/nil/OGC/0/unknown</a>
	@xlink:title		unknown
▲	gsmlp:rockGeochemistry		
	@xlink:href		<a href="http://www.openqgis.net/def/nil/OGC/0/unknown">http://www.openqgis.net/def/nil/OGC/0/unknown</a>
	@xlink:title		unknown
▲	gsmlp:poreGasChemistry		
	@xlink:href		<a href="http://www.openqgis.net/def/nil/OGC/0/inapplicable">http://www.openqgis.net/def/nil/OGC/0/inapplicable</a>
	@xlink:title		inapplicable
▲	gsmlp:geoTechnicalInfo		
	@xlink:href		<a href="http://www.openqgis.net/def/nil/OGC/0/unknown">http://www.openqgis.net/def/nil/OGC/0/unknown</a>
	@xlink:title		unknown

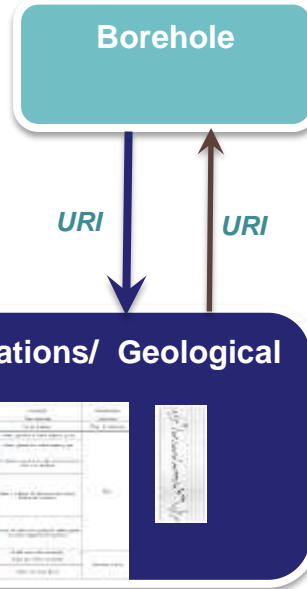
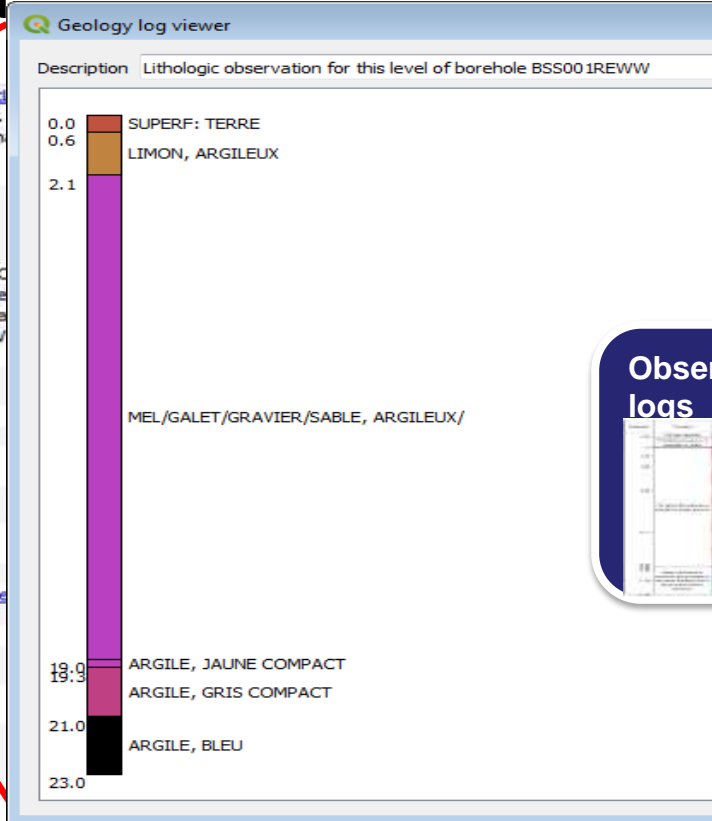
B



# Clients - QGIS GML Application Schema Toolbox

XML Schema view for `sos:GetObservationResponse`. A red box highlights the `om:OM_Observation` element, with a red arrow pointing to the 'Geology log viewer' window.

```
<?xml version="1.0" encoding="UTF-8" ?>
<sos:GetObservationResponse xmlns:sos="http://www.opengis.net/sos/2.0" xmlns:gml="http://www.opengis.net/gml/2.0" xmlns:om="http://www.opengis.net/def/observable/2.0" xmlns:gswl="http://www.opengis.net/def/gswl/2.0" >
  <sos:observationData>
    <om:OM_Observation gml:id="o_B8A570CD13F439A702FBAD713F09AA17FC" gml:description="Lithologic observation for this level of borehole BSS001REWW" gml:identifier="http://ressource.brgm-rec.fr/obs/RawEarthMaterialLogObservation BSS001REWW" om:type="RawEarthMaterialLogObservation BSS001REWW" om:phenomenonTime="2007-07-10T10:00:00" om:resultTime="2007-07-10T10:00:00" om:procedure="Lithologic observation" om:parameter="Lithologic observation" om:parameter="Lithologic observation" om:parameter="Lithologic observation" om:observedProperty="Earth Material" om:featureOfInterest="Earth Material" om:result="Lithologic observation for this level of borehole BSS001REWW" />
  </sos:observationData>
  <sos:observationData>
    <om:OM_Observation gml:id="o_1" gml:description="Piezometer attached to BSS001REWW. Provides link to SensorObservationService offering" gml:identifier="http://ressource.brgm-rec.fr/data/Piezometre/06512X0037/STREMY.2" om:type="Piezometer" om:phenomenonTime="2007-07-10T10:00:00" om:resultTime="2007-07-10T10:00:00" om:procedure="Piezometer" om:parameter="Piezometer" om:parameter="Piezometer" om:parameter="Piezometer" om:observedProperty="Piezometer" om:featureOfInterest="Piezometer" om:result="Piezometer" />
  </sos:observationData>
  <gswl:groundWaterLevel gml:id="l_1" gml:description="Piezometer attached to BSS001REWW. Provides link to SensorObservationService offering" gml:identifier="http://ressource.brgm-rec.fr/data/Piezometre/06512X0037/STREMY.2" om:type="Piezometer" om:phenomenonTime="2007-07-10T10:00:00" om:resultTime="2007-07-10T10:00:00" om:procedure="Piezometer" om:parameter="Piezometer" om:parameter="Piezometer" om:parameter="Piezometer" om:observedProperty="Piezometer" om:featureOfInterest="Piezometer" om:result="Piezometer" />
</sos:GetObservationResponse>
```



# Data Usage: Codelist Registry & Content Negotiation

Background: codelist contents provided in various formats:

- HTML (Human readable)
- Re3gistry XML
- ISO 19135 XML
- RDF/XML
- JSON
- Atom

Within data, agnostic URI is provided, resolves to human readable HTML page. Example:

<http://inspire.ec.europa.eu/codelist/AdministrativeHierarchyLevel/1stOrder>

Two options for retrieving specific formats & languages:

- INSPIRE Specific URI extensions, Example:  
<http://inspire.ec.europa.eu/codelist/AdministrativeHierarchyLevel/1stOrder/1stOrder.en.iso19135.xml>
- Content Negotiation

# Data Usage: Codelist Registry & Content Negotiation

State of the Art in Informatics is Content Negotiation via Mime Types

<b>Format</b>	<b>URI Suffix</b>	<b>Mime Type</b>	<b>Response</b>
HTML		text/html	HTML Page
Re3gistry XML	en.xml	application/xml	Re3gistry Encoding
ISO 19135 XML	en.iso19135xml	application/x-iso19135+xml	ISO 19135 XML Encoding
RDF/XML	en.rdf	application/rdf+xml	RDF Encoding
JSON	en.json	application/json	JSON Encoding
Atom	en.atom	application/atom+xml	Atom Encoding

# Data Usage: Content Negotiation - New Gotcha!

A further bit to Content Negotiation:

A new Content Type has been defined for gml (2017-01-09):

- application/gml+xml

Effect: Browsers no longer display the GML provided, instead make it available as a downloaded file, eg: **requesteddata.application** file.

No problem if you're aware of this, but good to know!

# Data Usage: Portrayal

Portrayal rules lead to ugly WMS data services, not really usable

- The least amount of effort went into designing the portrayals of layers
- Some portrayals are just not usable: AU is just a yellow patch
- Labels and scale-dependent styling?

WMS allows for so much more styling to be done, and have really nice **maps**

There are suggestions on thematic cluster, but not according to INSPIRE Reqs

# Data Usage: Bits&Pieces

Many tasks required in implementation of INSPIRE server and client solutions are being duplicated across Europe. Examples:

- Generic - Codelist Resolution: at the end of the day, the developer requires a human readable label for the concept URI
- Specific - Filtering Middleware: a PD feature provides many values for each spatial object; only one can be displayed. For the creation of a viewer for this data, filtering down to the relevant data via middleware can greatly improve viewer performance
- ...? (brainstorming)

# Data Usage: Bits&Pieces

Ideas of what can be done:

- “Map of the state of the INSPIRE implementation puzzle”
  - List existing projects: finished/on the run, technology inside.
  - List people involved in the projects (thus contact points).
  - List past/current issues, tips, workarounds faced and found in the projects.
    - To build a cross-project vision of common objectives, tools, issues
    - To organize action to overcome them

How to make available:

- GitHub: hard to see the forest for all the trees!
- INSPIRE-in-Practice: currently only complete tools, not bits&pieces of helper code
- Could we merge this?

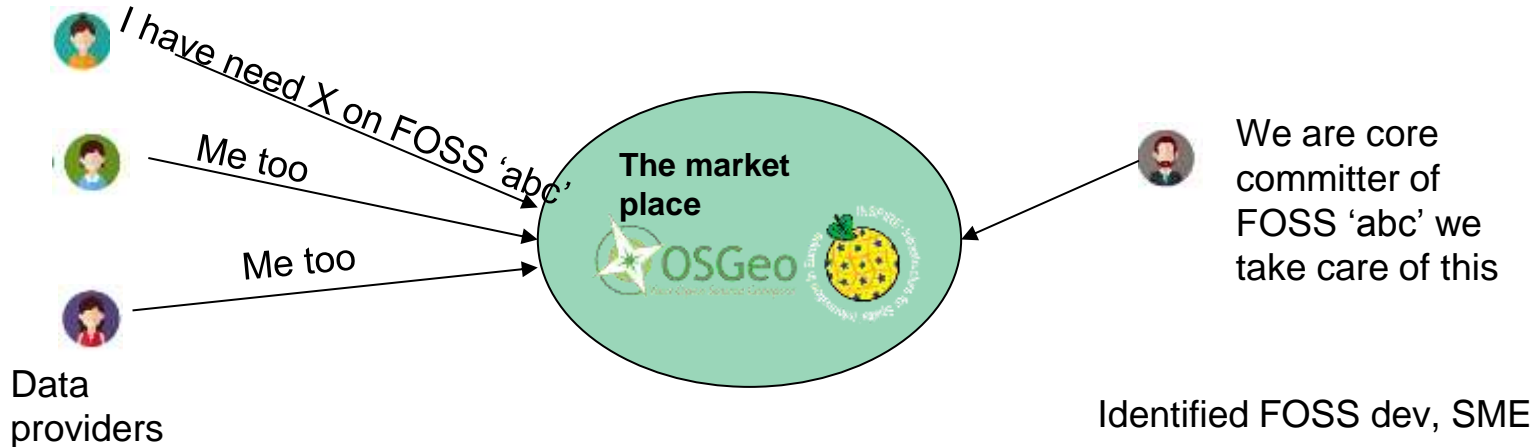
Also see: "Designing a new functionality to help to fill the INSPIRE technical gaps"  
Wednesday 14:15h, Room: Amsterdam



# Data Usage: Bits&Pieces

Ideas of what can be done:

- We need a way to liaise/link
  - people expressing their IT need (bug-fix, enhancement, ...)
  - and people having the knowledge to solve it (often being paid)
- Some sort of 'marketplace' like



# Data Usage: Bits&Pieces

Ideas of what can be done:

- The pieces of the puzzle are here, no need for more advanced extra-layer
- Facilitator could be via OsGeo and/or INSPIRE cluster
  - List of know issues already shared (see previous slides)
- The 'market place' itself
  - could be another an INSPIRE cluster (tool oriented) and/or the 'INSPIRE in Practice platform'
  - that should point to FOSS OsGeo mailing list / GitHubs / OGC Europe forum list / ...

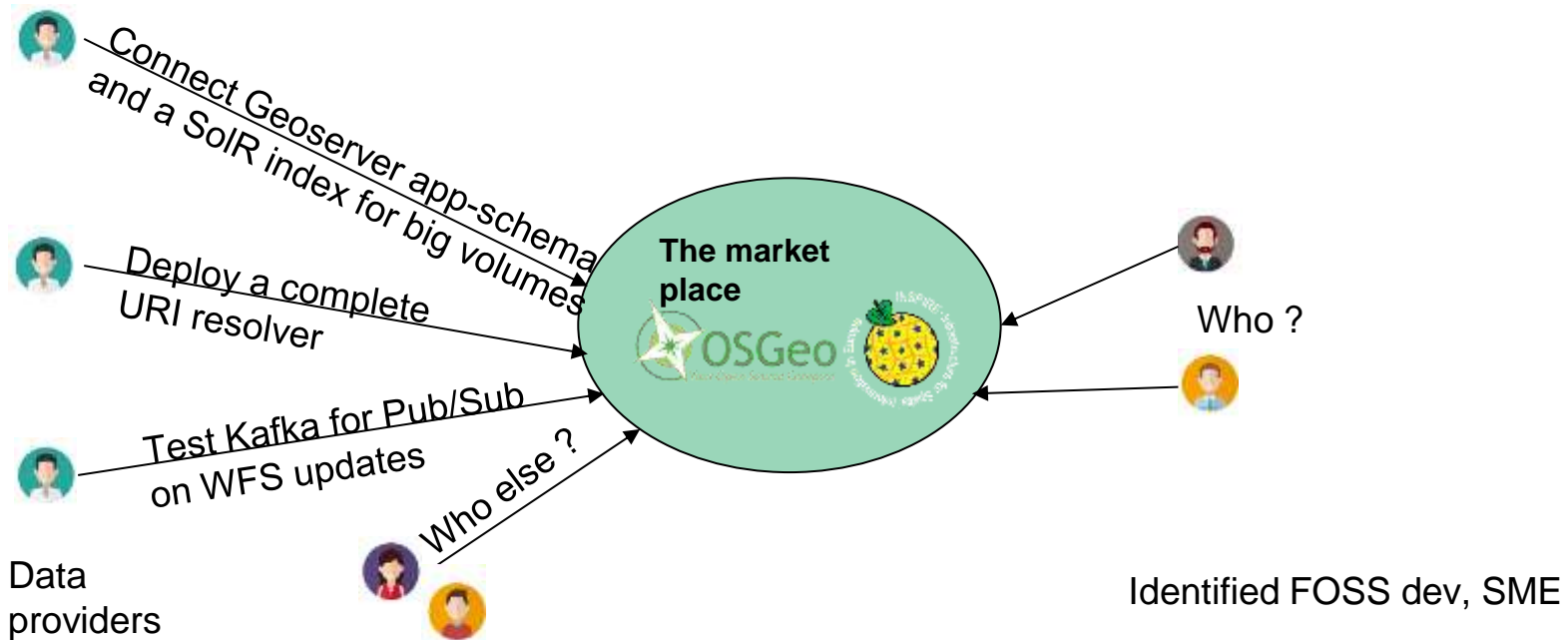
⇒ Data providers IT needs solved

⇒ FOSS companies will be more visible and have more contracts

# Data Usage: Bits&Pieces

Ideas of what can be done:

- BRGM issues for the MarketPlace from the French Groundwater Information Network





# Discussion / Wrap-up

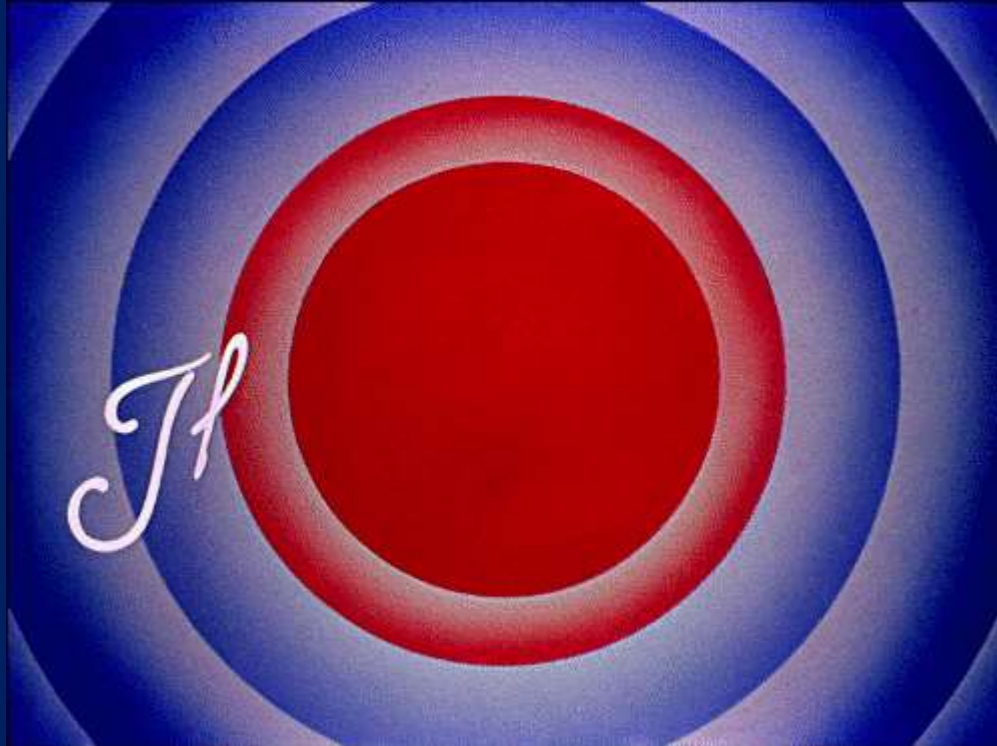
what to do about it



Discussion...



# Thanks for your attention



© Disney

# Providing INSPIRE measurement data

Thanks for your attention!



Nordic INSPIRE Network