More Practical INSPIRE Practice

INSPIRE Conference 2018
Introduction
Introduction - Overview

- Intro [5 min]
- Known Issues pertaining to [45 min]
  - Data Provision
  - Data Access
  - Data Usage
- Discussion Panel [30 min]
  - Bring together data providers, software producers and technology integrators
  - Topics: bug remediation process, possible coordination and collaboration options (Github?)
- Discussion/Wrap-up [10 min]
  - Prioritization of issues
  - Ways to remediate
Audience interview

Who is a:

- Data provider: 15
- Systems integrator: 2
- SW developer: 2
- Data User: 2

(Whereby the audience went up to 32 participants)

Which sw is being utilized? GeoServer, deegree, FMI/ESRI (clear focus on GeoServer, but often multiple technologies are required)
Demonstrator showing the world as we’d like it

https://raw.githubusercontent.com/BRGM/gml_application_schema_toolbox/master/presentations/2018_EGU/Demo_1_2_0_rc2_EPOS_WP15_EGU_with_datagraph.mp4
Known Issues
Known Issues - Overview

- **Data Provision**
  - Issues providing download services (GeoServer, deegree)
  - Alternatives for coverage models
  - Simplification Options
  - Codelists and Registers

- **Data Access**
  - Identifier Management and Referencing
  - Stored queries

- **Data Usage**
  - Available libraries and tools (GDAL GMLAS driver and QGIS GMLAS toolbox, QGIS 3.0)
  - Reusable code for client development

*Note: if possible, please state the requirement the issue pertains to*
Data Provision - Issues with 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
**Data Provision - Issues with download services**

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- Knowing about these issues can save a great deal of effort and frustration!
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**Geoserver known issues**

<table>
<thead>
<tr>
<th>ID</th>
<th>Problem</th>
<th>Description</th>
<th>Workaround</th>
<th>INSPIRE Themes Impacted</th>
<th>Version</th>
<th>Date Reported</th>
<th>Reported by</th>
<th>In the process of negotiating funding</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Unique Endpoint per Dataset</td>
<td>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 it's nicer 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 INSPIRE Theme, thus namespace.</td>
<td>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.</td>
<td>2.9</td>
<td>1/31/2017</td>
<td>Kathi Schiedt</td>
<td>Finnish Environment Institute</td>
<td>Ilkka Rime</td>
<td>workspace tied to a single same feature but more than one data should be that feature workspace the so the current First match will be from the same name workspaces is fundamentals My understanding was not done a what are the limits if it will be done have more-to-one INSPIRE each understood as feature types, or XSD schema a dataset and should exist be worked in FES.</td>
</tr>
<tr>
<td>2</td>
<td>Stored Queries</td>
<td>(Some filtering of the data trough) Stored queries are not possible on complex features.</td>
<td>Set up simple features and define filters on these for the id, then</td>
<td>2.9</td>
<td>1/31/2017</td>
<td>Kathi Schiedt</td>
<td></td>
<td>Ilkka Rime</td>
<td>working in FES</td>
</tr>
</tbody>
</table>
Repository of software issues

Known INSPIRE issues (download and others) with Geoserver on Github: https://github.com/geosolutions-it/inspire-issues/

Source: Excel sheet with known issues and workarounds + GeoSolutions contribution
Repository of software issues
Repository of software issues

Current status of **most relevant** issues:

- **3 in progress** issues related with **multiple endpoints** *(almost done)*:

- **3 open** issues related with **stored queries**

- **3 open** issues related with **download services**
Progress since the 2017 WS

Progress in Geoserver described by GeoSolutions on GitHub. Closed issues:

<table>
<thead>
<tr>
<th>Issue Description</th>
<th>Author</th>
<th>Labels</th>
<th>Assignee</th>
<th>Milestones</th>
<th>Sort</th>
</tr>
</thead>
<tbody>
<tr>
<td>WFS Schema Location incorrect in DescribeFeatureType</td>
<td></td>
<td>bug, download services, geoserver</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>GetFeature requests to virtual services are returning null namespace prefixes,</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>therefore virtual services can't be used as endpoints to fulfill REQ. 51</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GetSpatialDataSets StoredQuery is providing null namespace prefixes while</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>retrieving a dataset with multiple featureTypes.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GetPropertyValue for an element of a featureType embedded in another featureType</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>NULL namespace prefixes used in AppSchema WFS GetFeature responses</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

Closed on Sep 7, 2018.
Progress since the 2017 WS

Explicitly define the **default geometry** attribute:

```xml
<isDenormalised>true</isDenormalised>
<defaultGeometry>gsml:MappedFeature/gsml:shape/gml:Polygon</defaultGeometry>
<attributeMappings>
</attributeMappings>
```

**1..N cardinality mappings** made simple (pending PR):

```xml
(...)
<AttributeMapping>
 <targetAttribute>st:tag</targetAttribute>
 <jdbcMultipleValue>
  <sourceColumn>ID</sourceColumn>
  <targetTable>TAGS</targetTable>
  <targetColumn>STATION_ID</targetColumn>
  <targetValue>TAG</targetValue>
 </jdbcMultipleValue>
</AttributeMapping>
```
Progress since 2017 WS example

Isolated workspace implementations for Geoserver, App-schema, GeoTools and HALE. **Goal: To allow the publishing of the same feature type in one Geoserver instance more than once using isolated workspaces to meet INSPIRE requirement 52 (one endpoint per dataset).** There are still some issues and work to be done but progress has been made:

- App-schema modifications
- Geoserver GUI modifications
- GeoTools implementation
- HALE modifications (next page)
HALE isolated workspaces

Open issue: Maintenance?
HALE isolated workspaces

Open issue: Maintenance?
HALE isolated workspaces

Open issue: Maintenance?
## Data Provision - Issues with download services

Open issues with GeoServer described by GeoSolutions on GitHub

<table>
<thead>
<tr>
<th>Issue ID</th>
<th>Title</th>
<th>Labels</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>#28</td>
<td>Multiple xlink not possible at base feature level</td>
<td>app-schema, backlog, geoserver</td>
<td>Open</td>
</tr>
<tr>
<td>#27</td>
<td>On a GetFeature WFS 2.0 request on a virtual service is not possible anymore to get the response in browser, the only response is the default one that is the file to be saved as “application”</td>
<td>backlog</td>
<td>Open</td>
</tr>
<tr>
<td>#26</td>
<td>On a WFS 2.0 request served with GeoServer and AppSchema, the GetPropertyValue for geometry returns a java.lang.ClassCastException message, while for all other properties it works</td>
<td>app-schema, backlog, geoserver</td>
<td>Open</td>
</tr>
<tr>
<td>#25</td>
<td>Extended capabilities in geoserver are incomplete and EC tests are not passed</td>
<td>app-schema, backlog, geoserver</td>
<td>Open</td>
</tr>
<tr>
<td>#24</td>
<td>GeoServer Global Settings don't apply to GML 3.2 GetFeature data</td>
<td>geoserver</td>
<td>Open</td>
</tr>
<tr>
<td>#23</td>
<td>Currently GeoServer's virtual services can't be used for ensuring a unique endpoint per dataset (but only per featureType)</td>
<td>duplicate, geoserver, limitation, multiple endpoints, ready</td>
<td>Open</td>
</tr>
<tr>
<td>#22</td>
<td>SLD editing fails sometimes when updating a ComplexFeature layer style</td>
<td>app-schema, backlog, bug</td>
<td>Open</td>
</tr>
</tbody>
</table>
we have an important request for your next TMC-Meeting: As you know degree3 is used by many governmental organizations for the implementation of web services according to INSPIRE. The next milestone (aka deadline...) on the INSPIRE roadmap will be 23/11/2017 and every responsible organization has to provide its interoperable spatial data sets (Annex I) until this date.

In this context many improvements and bugfixes were promoted by LDBV Bayern / LGB Brandenburg in cooperation with known service providers. Unfortunately many organizations are still working with degree3 3.4 RC3 or other versions (it's a small mess at the moment) and they encounter huge problems which are already solved in the developments we ordered.

For this reason, we strongly recommend to take the following tickets into account and we hope that you'll integrate these improvements in the new release (or at least into a release candidate):

- #573
- #742
- #713
- #745
- #747
- #781
- #782
- #749
- #827
- #711
Data Provision - Issues

Repository of deegree issues:

https://github.com/deegree/deegree3/issues

Link to ‘INSPIRE issues’ issue

https://github.com/deegree/deegree3/issues/860
Data Provision - Alternatives for coverage models

- Coverage models as provided in INSPIRE XSDs not suitable for provision via WCS
  - Directly derived from conceptual model, not taking WCS requirements into account
  - Additional information must be shifted to metadata element, not extended to new classes
  - Alignment with IRs must be maintained
- Alternatively, Coverage data can be provided via WFS, but doesn’t allow for subsetting to access required data
- Good news is we’re making progress, first datasets online with WCS
- More at the INSPIRE Coverage WS Thursday 9:00
Data Provision: Simplification Options

MIG Action 2017.2 on alternative encodings for INSPIRE data (until 12/2018)

Scope, based on the results of a survey (6/2018) and agreement with MIG:
- developing an encoding rule for GeoJSON as a first example
- developing generic rules / approaches for flattening the INSPIRE data models, which will be useful for a number of alternative encodings
- developing the overall procedure for proposing and endorsing additional encodings

Ongoing: collection of examples of GML simplifications and usage of GeoJSON encodings on github https://github.com/INSPIRE-MIF/2017.2/issues

1st draft encoding rules/simplification procedure in end of October & MS review in December

More information:
https://webgate.ec.europa.eu/fpfis/wikis/display/InspireMIG/Action+2017.2+on+alternative+encodings+for+INSPIRE+data
Codelists and Registers

- INSPIRE registry
  - JRC
  - National, i.e. AT
    - http://registry.inspire.gv.at/registry

- CSIRO register SW
  - IUGS CGI Geoscience Vocabularies for Linked Data
    - http://resource.geosciml.org/

- OGC Register activities
  - Being reworked, will allow multiple formats (content negotiation), including SKOS
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
- 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 xlink

- https://data.geoscience.fr/id/piezometer/06512X0037/STREMY.2
  vs.
dQuery_ID=GetEnvironmentalMonitoringFacilityById&ID=Piezometre.06512X0037.STREMY.2
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
  ○ Keeping in mind that since not all SW is equal, it doesn't always manage to resolve these filter requests correctly, or at all.
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
- 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
Resolver - overview

https://data.geoscience.fr/id/hydrogeounit/121AS01

Webpages/CMS (ex: Drupal)

OGC, INSPIRE, EU Projects compliant

Files, ldproxy

Semantic web (structure & data)

Nomenclature, codeList
Resolver - mechanics
Resolver – mechanics
Resolver – rewrite rules

# id - H
# ex : https://data.geoscience.fr/id/hydrogeounit/121A801
RewriteCond %{HTTP:Accept} 'text/html'
RewriteRule ^/id/hydrogeounit/([^/]*)$ https://bdlisarec.eaufrance.fr/hydrogeounit/$1 [P]

RewriteCond %{HTTP:Accept} 'application/gml+xml'
RewriteRule ^/id/hydrogeounit/([^/]*)$ http://geoserverref.brgm-rec.fr/geoserver/ows?service=wfs&version=2.0.0&request=GetFeature&StoredQuery_ID=GetAquiferById&ID=EntiteHydroGeo1.$1 [P]

RewriteCond %{HTTP:Accept} 'application/pdf'
RewriteRule ^/id/hydrogeounit/([^/]*)$ http://researec.eaufrance.fr/geotraitements/bdlisa/files/entite/$1.pdf [P]

RewriteCond %{HTTP:Accept} 'application/ld+json'
RewriteRule ^/id/hydrogeounit/([^/]*)$ /files/HydrogeoUnit_1.json [P]
Resolver – testing

- Browser access (Human oriented)
  - Simple test case for a chemical compound vocab entry:
    https://data.geoscience.fr/ncl/par/1340
  - More complex one for a hydrogeological unit more complex content negotiation:
    https://data.geoscience.fr/id/hydrogeounit/121AS01 (URI in production soon)

- Machine access - Or postman
  - "Accept: text/html"
  - "Accept: application/pdf"
  - "Accept: application/ld+json"
  - "Accept: application/gml+xml"
Data Usage - Available libraries and tools

GDAL GMLAS driver and QGIS GMLAS toolbox, QGIS 3.0
Data Usage: Better client support

MIG Action 2017.3 on improved client support for INSPIRE data

Expected outcomes:
- Study on the usability of INSPIRE datasets and metadata in different software products
  - Survey: Usability of INSPIRE data
- List of priority tools and specific functionalities that should be improved or developed
- Approach to tool improvement


Any additional information on this activity from the WS participants?
Discussion Panel
Discussion Panel - Participants

- Chair
  - DataCove: Kathi Schleidt

- Data Providers
  - SYKE: Hallin-Pihlatie Lena

- Software Producers
  - SAFE: Ken Bragg or Dean Hintz
  - GeoSolutions: Nuno Oliveira

- Technology Integrators
  - Epsilon Italia: Stefania Morrone
Discussion/Wrap-up
Thank you!

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