Organisation, Licensing, Technology: How to build successful, sustainable solutions on INSPIRE

Thorsten Reitz, Christopher Hönn (wetransform)
June 3rd, 2020

Virtual INSPIRE Conference 2020
Welcome @ INSPIRE Goes Virtual!
<table>
<thead>
<tr>
<th>Year</th>
<th>Location</th>
<th>Theme</th>
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<tbody>
<tr>
<td>2016</td>
<td>Barcelona</td>
<td>“INSPIRING a sustainable environment”</td>
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<td>2017</td>
<td>Strasbourg/Kehl</td>
<td>“Thinking out of the Box”</td>
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<td>2018</td>
<td>Antwerp</td>
<td>“Make it work together”</td>
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<tr>
<td>2019</td>
<td>Helsinki</td>
<td>“Harvest the Sea of European spatial data”</td>
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Agenda

- How relevant is INSPIRE for current policy and industry?
- How can I solve organisational challenges?
- How can I efficiently implement INSPIRE and be compliant?
- How can I provide truly useful resources?
About wetransform

- „Make Open Standards work“
- Improve Design and Implementation of Standards
- Effective Data Infrastructures
- ETL tools for complex data
- Make data useable & useful!
sli.do – Warm-Up

- Go to [www.slido.com](http://www.slido.com)
- Event code: #INSPIRE2020
- Room: Organisation, Licensing, ...

- Use sli.do to submit **questions** as well as **ideas** at any time during the workshop.
- After each block, we will use 5mins to discuss questions & ideas!
How relevant is INSPIRE for current policy and industry?

Thorsten Reitz (wetransform)
To address major societal/global challenges...

1. No Poverty
2. Zero Hunger
3. Good Health and Well-being
4. Quality Education
5. Gender Equality
6. Clean Water and Sanitation
7. Affordable and Clean Energy
8. Decent Work and Economic Growth
9. Industry, Innovation and Infrastructure
10. Reduced Inequalities
11. Sustainable Cities and Communities
12. Responsible Consumption and Production
13. Climate Action
14. Life Below Water
15. Life on Land
16. Peace, Justice and Strong Institutions
17. Partnerships for the Goals
...Policy & Public debate need trusted facts
major aspirations: the EU Green Deal

- “Accessible and interoperable data are at the heart of data-driven innovation.”¹

- Knowledge and data as key components
- Organised in data spaces...
- ...around which ecosystems form
- Green Deal Data Space (GreenData4All)
- Mobility and Agriculture

¹ Source: https://ec.europa.eu/info/sites/info/files/european-green-deal-communication_en.pdf, pg. 18
Fostering Innovation

- Route multimodal, CO₂-efficient transport (AELER)
- Integrate UAVs into the airspace (fAIRport)
- Support Forest Transformation (futureforest.ai)
- Recognize and mitigate geohazards (Minerva Intelligence)
- Deliver smart circular applications (…)

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INSPIRE is related to many other regulations...

- INSPIRE
- PSI Re-Use
- Open Data
- Public access to environmental information
...and Data Standards

- AIXM
- XPlan
- XBau
- Green Building
- SOSI
- eCH 0118
- CityGML
- IFC
- SoilML
- NEN3610
- 3A/NAS
- GeoSci ML
- BoreholeML

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Is INSPIRE ready for this?

As-is Data → Harmonised Data → Useful Data
- As-is Data: Manual (shp) → Harmonised Data: Automatic (gml) → Useful Data: Automatic (gpk)
- As-is Service: Manual (*** API) → Harmonised Service: Automatic (WFS) → Middleware
- Adaptive API: API

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www.wetransform.to
Issues to be solved

- CIF vs. INSPIRE Raster Download Service (WCS)
- Simpler, stable metadata
- Simpler linkage
- Model Overspecification
  - Simplification
- Model Underspecification
  - 70+ known extensions
- Better processes & annual updates
Organisational challenges and patterns for implementing and operating INSPIRE

Christopher Hönn (wetransform)
Organizational Challenges

- Lack of resources
- Running SDIs by projects
- Immature SDIs
- Using synergies
Lack of Resources

- Structural deficiencies:
  - Lack of personnel
  - Lack of expertise (INSPIRE, IT etc.)
  - No budget
- Underestimated efforts:
  - Data harmonization
  - Systems integration
  - IT operations
- Self-defined limits:
  - Avoidance of procurements
  - Treating INSPIRE as an obligation rather than an opportunity
SDIs require stable business processes

- Project Approach:
  - “Operations” turns into a series of problems to be fixed
  - Applications are not (well) maintained
  - Missing or outdated data and metadata

- Process Approach:
  - Strong focus on problem prevention
  - Full integration into the organization
# Maturity of SDIs

<table>
<thead>
<tr>
<th>Specification</th>
<th>Implementation</th>
<th>Maturity</th>
</tr>
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</table>
| • International: INSPIRE  
• National: GDI-DE  
• Regional: GDIS | • Identified and described Datasets  
• View & Download Services  
• Realtime APIs (STA) | National Level: Annex I + II |
| • International: INSPIRE  
• National: GDI-DE  
• Regional: GDIS | • Interoperable Datasets  
• Validated Datasets  
• View & Download Services | National Level: Annex III |
| • Barrier-free customer journey: Find, assess, use  
• Priority use cases  
• Optimize content & delivery | | Regional Level: Annex I, II, III |
| | | Local Level: Annex I, II, III |

- **accessible**
- **usable**
- **useful**
# Using Synergies for Data Providers

## Across Use Cases (internal)

Combine INSPIRE with
- national/regional SDI standards
- environmental regulations
- spatial planning standards
- public sector information and open data initiatives
- other initiatives

## Across Activities (external)

Combine SDI with providers of
- Standard applications
- IT infrastructure
- IT operations
- Network services
- Data management

**Synergies must be a win-win for all stakeholders.**
How to Collaborate: A Glance at our Audience

- University
- Consultant
- National SDI
- Systems Integrator
- INSPIRE Service Provider
- EC
- Technology Provider
- Geodata User

Data Provider:
- Local
- Regional
- National
## INSPIRE Value Chain & Major Players

<table>
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<th>Data Provider</th>
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<td>Build and operate IT system</td>
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<td>Develop SW</td>
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*Sample Organizations*: Local, regional & national agencies and SDIs
## Patterns of Collaboration

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**Sample Organizations**
- Mostly local agencies, some regional & national agencies
- Local and regional data centers, national SDIs
- ESRI, Safe, wetransform, Open Source, SW developer
- National and regional data centers
- ESRI, Safe, wetransform, Open Source, SW developer
- ESRI, Safe, wetransform, Open Source
Collaboration is Key to Synergy Gains

- Full Service and Platform offerings allow data providers to **build open platforms and achieve significant efficiency gains**.

- 150 municipal data providers with one platform operator reduces TCO for IT systems and IT operations to 100 € per data provider and year.
Create your own Google – together!

- Strong Open Platforms foster usefulness and enable innovation
- Open Platforms help stopping the data drain
- There is no better way to ensure digital sovereignty and plain level field for every data provider
sli.do – Challenges & Synergies

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How can I efficiently implement INSPIRE and be compliant?

Thorsten Reitz (wetransform)
INSPIRE Building Blocks

Identify & Describe Data
Accessible Data
Usable Data
Useful Data

Dataset Metadata
View Service
Interoperable Data
APIs

Download Service
View Service
Download Service
Analytics

Service Metadata
Service Metadata
Extensions
Applications

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... and their implementation: Metadata

- Automated Generation & Validation
- Re-use where available
- Consistent to multiple profiles (ISO, INSPIRE, ...)
- Continuous updates
- Automated publishing to Geoportals/catalogues
Network Services

- Automated Publishing
- One Dataset, many APIs
  - WFS, OGC Feature API, Atom
  - Attachments
  - WMS, WCS, STA, ...
- Extended Capabilities
- Service Coupling
- Scalable
- Monitoring
INSPIRE Interoperable Data

- Full harmonisation
  - Geometry
  - Semantics
- Validation
  - Schema
  - ETF (Consistency, Constraints)
Beyond compliance to Usefulness

- Optimize Data for AI/Analytics
- Provide Data via additional APIs
- Extend data models to match business processes
- Go beyond the Map to make the most of the data
... in one integrated workflow
How can I provide truly useful resources?

Thorsten Reitz (wetransform)
Our Experience finding data for the Helsinki challenge

Observations:
- Initial responsiveness is slow (11 work days median)
- Only about 40% of contacts answered
- There are no standard license models or fees for usage of data as part of a cloud app or within a competition
- Average time to resolve usage rights for the challenge was 9 weeks with 6 to 14 contacts

Potential Solutions:
→ Use standardized licenses and transparent conditions
→ Have internal process to deal with licensing requests effectively
Data providers challenges vs. Data user challenges

Data Requirements

- Published data and metadata
- Harmonized and interoperable data
- Relevant data for defined use cases
- Presented in a way that reflects the use case (and not the data characteristics)
Better Documentation

...helps making data usable.

Observations:
- More than 50% of data sets we harmonise do not have any written documentation
- If there is documentation, it is mostly written for an internal audience in a limited set of languages
- There are only few experts on the data available, even in concrete projects

Enhancements through harmonisation:
→ Documented concepts in multiple languages
→ Conceptual documentation, e.g. UML models
→ Detailed technical specifications available
Consistent Quality Assurance

...makes data sets from multiple sources usable.

Observations:
- Most data sets have had only limited quality assurance and have errors in positional accuracy CRS, consistency, completeness and topology
- Quality standards are not documented anywhere or have never been defined
- Implicit standards (e.g. relational database schema) are the most common form of QA

Enhancements through harmonisation:
→ CRS issues are identified and resolved
→ Internal and external Topology issues are resolved
→ Consistency and completeness are improved
Clearly defined semantics

...enable re-use of solutions and analytic processes.

Observations:
- In about 60% of data sets, semantics are defined in a local legal context and represent that well.
- In 40% of data sets, semantics are not well defined, or there are mismatches to definitions.

Enhancements through Harmonisation:
- Usage of standard Code Lists/Taxonomies.
- Data can be combined with other data.
- Tools and processes can be re-used.
- High-quality, low-mismatch standard-to-standard harmonisation possible.
Enable Solutions

...to build an ecosystem of INSPIRE-based apps and professional tools

Observations:
- Mismatch Data <> GIS
- Mismatch current data users <> future data users

Potential Solutions:
→ Provide Libraries to create new types of visualisations from INSPIRE data
→ Fully leverage Graph APIs, Linked Data and Object Oriented Data
→ Provide Adaptive Data Services and other APIs to make data accessible
Data Ecosystems are...

(Open) Data Ecosystem

Dynamic

Distributed

Open

Governance Focus

Democratisation (Share, Self-Service)


Source: https://theodi.org/article/creating-ecosystem-maps-for-open-data/
Enable European SMEs/Start-Ups to contribute fully

...to bring innovation to the ecosystem

Observations:
- Procurement costs and duration
- Selection criteria
- De-Facto Monopolies
- Ordering Services instead of Solutions

Potential Solutions:
→ Innovation procedure types
→ Partnerships with Start-Ups
→ Up-Front contracts
→ Long-term partnerships instead of transactional business
Summary

Thorsten Reitz (wetransform)
A few takeaways

- INSPIRE will become a key component of the European Green Deal Data space
- INSPIRE needs to prove itself, and quickly
- INSPIRE needs evolution (at the core) and revolution (at the user interface)
- Implementers need to find and exploit synergies
- INSPIRE can be easy, cost effective and useful 😊!
The Zen of INSPIRE

Any questions? Reach out to us!

+49 6151 6290 890

info@wetransform.to

www.wetransform.to

www.linkedin.com/company/wetransform-gmbh

https://twitter.com/tr_xsdii
More INSPIRE Virtual Workshops 2020

- 04.06.2020 16:00: Leveraging INSPIRE Data into Artificial Intelligence Applications
- 05.06.2020 09:00: GO-PEG - Generation Of cross border PanEuropean Geospatial Datasets and Services
- 08.06.2020 16:00: OGC API - Features
- 09.06.2020 11:00: Pan-European datasets management, visualisation and dissemination
- 10.06.2020 09:00: INSPIRE Reference Data – Ready to take off?