



Vorwort für die AT-Netzdienste-Gruppe

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Fazit:

Nach einer allgemeinen Einleitung zum Thema INSPIRE Extension durch Morten Borrebaek und Michael Lutz wurden Anwendungsfälle aus verschiedenen Ländern präsentiert. Im Rahmen der Präsentationen wurden einerseits INSPIRE Erweiterungen präsentiert, welche die INSPIRE Modelle für die nationalen Anwendungsfälle erweitern. Durch die Haltung der nationalen Daten in einer zumindest INSPIRE-ähnlichen Datenstruktur gestaltet sich der Prozess der Datenharmonisierung wesentlich zeiteffizienter. In einigen Präsentationen wurden die Datenmodelle hingegen für sehr projektspezifische Anwendungsfälle erweitert. Durch diese Vorgangsweise soll sichergestellt werden, dass auf diesen Datenmodellen aufsetzenden Modellierungen nach der Instandsetzung von INSPIRE mit geringem Aufwand in anderen Regionen Europas anwendbar sind.

In Österreich gibt es bisher keinen Bedarf INSPIRE Datenmodelle zu erweitern. Nach dem Instandsetzen von INSPIRE und dem Vorhandensein harmonisierter Datensätze könnte dieser Ansatz aber für Projekten durchaus eine attraktive Alternative darstellen. Einerseits erleichtert die Vorgangsweise die Zusammenführung von Datensätzen des gleichen ANNEX Themas, welche in weiterer Folge für die projektspezifischen Fragestellungen mit weiteren Eigenschaften angereichert werden.

Ein zweiter Use Case ist die Umstellung der eigenen Geodateninfrastruktur auf INSPIRE Datenmodell, wodurch die im Rahmen der INSPIRE Verpflichtungen anfallenden Kosten wesentlich reduziert werden können. Aufgrund der hohen erstmaligen Investitionskosten und den nicht verfügbaren GML Technologien erscheint aber eine derartige Vorgangsweise zum aktuellen Zeitpunkt nicht realistisch.

Neben der potentiellen Datenmenge wurden in der abschließenden Diskussion 3 weitere wichtige Punkte aufgegriffen:

- Ist das INSPIRE Modell im erweiterten Modell valide, dann kann der Datensatz samt der Erweiterung als INSPIRE Datensatz veröffentlicht werden.
 - Vorsicht: Der Datensatz darf nur 1x als solcher publiziert werden (nicht 1x mit und 1x ohne Extensions => diskutiert wurde auch, ob die Feature-IDs in beiden Fällen gleichbleiben)

- Modell-Extensions werden vom INSPIRE Validator nicht überprüft.
- Eine Erweiterung sollte vorzugsweise mit englischen Tags definiert werden (bei vielen der präsentierten Use Cases wurde die jeweilige Landessprache verwendet, was Austausch & Wiederverwendung nochmal erschwert)
- Erweiterungen sollten vorzugsweise in GML, in jedem Fall aber in einer wohldefinierten Auszeichnungssprache formuliert werden.

Im Allgemeinen ist die Möglichkeit Modelle im Rahmen der verpflichtenden Datenharmonisierung erweitern zu können durchaus zu begrüßen. Nutzen und der Bedarf solcher Erweiterungen gehen aber zweifelsfrei mit der Entwicklung von geeigneten Werkzeugen und Anwendungen für die Arbeit mit INSPIRE Daten für End-User Hand in Hand.

https://books.google.at/books?id=h89cDgAAQBAJ&pg=PA156&lpg=PA156&dq=modelling+dimension+of+time+GML&source=bl&ots=dcx4V2QTFV&sig=-H0V-qfFYLmQjwxhus1_KIDDU4c&hl=de&sa=X&ved=0ahUKEwjrr-OE5O_UAhWFbBoKHfNKAhM4ChDoAQhKMAY#v=onepage&q=modelling%20dimension%20of%20time%20GML&f=false

Minutes INSPIRE KEN workshop on extension of INSPIRE data specifications

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These minutes aim to complement the presentations by providing short summary and the discussion topics.

1. Link to presentations

<http://www.eurogeographics.org/content/workshop-inspire-extension-june-2017>

2. Participants

List of participants is available on:

http://www.eurogeographics.org/sites/default/files/INSPIRE_Extension_ws_participants1.pdf

3. Introduction -

○ Workshop welcome and introduction

Morten Borrebaek reminds the context and objectives of the workshop and the rules of the INSPIRE Generic Conceptual Model regarding the “formal” extensions that ensure compliance with INSPIRE.

○ Why INSPIRE needs extensions – the European perspective

Michael Lutz presents the 2 potential scenarios for data producers: supply national data and INSPIRE data through two channels, national one and INSPIRE one (INSPIRE just for “ticking the box”) or through a single implementation. The INSPIRE TWG have already developed core and extended data models, these extensions being of heterogeneous quality. The extensions and profiles of INSPIRE data models may be stored on the INSPIRE register federation.

Discussion:

- Data models extensions depend on the INSPIRE documentation. How active are you in developing INSPIRE?

Currently, MIG has endorsed a set of errors and bugs correction. This corrigendum has been integrated in the Technical Guidelines and are in the process to be integrated into the Implementing Rules.

○ Influence of INSPIRE on European/national data specifications

Saulius Urbanas presents the long-term vision of EuroGeographics and its struggle to get harmonized, pan-European, authoritative data. This has been (partially) achieved through the EuroGeographics products and then through the ESDIN and ELF projects; these projects aimed to implement INSPIRE and developed data model extensions mainly in order to keep the whole content of the pan-European products EBM, ERM and EGM.

- Learnings and questions about data interoperability in the biodiversity community

Dominique Laurent presents the main conclusions and questions coming from a seminar about data interoperability that took place among the French biodiversity. Main common topic of interest is the ideal organization of knowledge that is also in general the objective of INSPIRE extensions.

4. Implementation examples (day 1)

- Pilot project on EU Disaster damage and loss database (Giacomo Martirano)

The pilot project has developed a new data model focusing on “AffectedElement” that is linked to the core model of theme NZ. This data model has been designed in a generic way in order to enable to use it for the JRC indicators but also with indicators coming from other methodologies (such as the Sendai one). The model may also address various granularities as the loss assessment may be done at object level (e.g. on buildings) or on aggregated areas (e.g. AU or SU).

- Danish models inspired by INSPIRE (Heidy Vanparys)

The Danish NMCA has chosen to derive both INSPIRE and national data from a single database, using a data conceptual model inspired by INSPIRE: same modelling principles but no formal use of INSPIRE. Main reasons for doing so are the following:

- Show what we have without too much noise
- Avoid dependency towards INSPIRE schemas and code lists
- Semantics better defined in national context than in INSPIRE.

	INSPIRE extension	Danish model
Pros	<ul style="list-style-type: none"> • European standard • Based on pan-European needs • Well-described methodology • Possibility of reuse • Possibility of exchanging nationally defined data via a European format 	<ul style="list-style-type: none"> • National standard • Based on national needs • Terms that have meaning for the users in the domain are used • Model can immediately be part of the Basic Data Model • Possibility to refer to classes from other models in the Basic Data Model
Cons	<ul style="list-style-type: none"> • High level of complexity • INSPIRE skills are needed • Certain values in code lists are not clear defined semantically • Dependency on any future changes in INSPIRE data specs • INSPIREs code lists must be used 	<ul style="list-style-type: none"> • Not as specific as and less mature than INSPIRE rules • Exchange via INSPIRE format limited to what is defined in the INSPIRE data models.

Discussion:

- You talked about INSPIRE skills. But it doesn't seem more difficult to adapt INSPIRE than other models and standards. To implement other standards, you also need to get knowledge about legislative context, data models, technical guidelines ...
- How to do implement the delivery of national and INSPIRE data? Do you do it on-the-fly?

Yes, we use database views.

- Extending INSPIRE Cadastral Parcels model to cover the whole Cadastral Map according to the Czech law (Michal Mad)

INSPIRE content is simpler than the INSPIRE one and doesn't enable to provide a view service of cadastral map, according to the national standard. Therefore, the INSPIRE model has been extended with new features such as geodetic points, easements and cartographic symbols and arrows and with attributes such as land use (using the INSPIRE HILUCS classification). It has also been extended to include analog cadastral parcels with just a point geometry.

- Extending the INSPIRE theme Utility Networks Data Model, from a business point of view (Ad van Houtum)

The KLIC application enables excavating companies to get information about underground utility network and aims to avoid the digging accidents, using the national data models. It was decided to provide INSPIRE as an additional product of the KLIC application: for this,

Geonovum developed an extended data model using the mixing multiple inheritance principle that enables to combine the two models in a flexible way. In addition to technical issues, the implementation of INSPIRE raises business issues: the KLIC application must be funded by stakeholders (INSPIRE should not cannibalise KLIC) and utility managers are reluctant to open their data for INSPIRE.

Discussion

- What about X-border use cases? There is also KLIP in Flanders. Do you share extensions? Are there X-border utility companies?

We have sportive competition with Flanders, trying to be first ones! But we have also regular conversations and yes, there are some X-border companies.

- o Norwegian standards based on the INSPIRE Network models (Knut Jetlund)

The SOSI standards about road network and about network and linear referencing aim to be based both on INSPIRE and on ISO 19148. This is done with a realization of INSPIRE classes. Main differences include additional properties (370 feature types in SOSI) expressed in Norwegian language, some properties (formOfWay, FunctionnalRoadClass) carried directly by RoadLinks, use of more linear referencing methods than allowed by INSPIRE.

The SOSI standards are used to exchange data with municipalities (in charge of road maintenance) and with road mappers.

Discussion

- Realization is very loose linking. In practice, you can do anything.

It is mainly for illustration, not for implementation. We don't keep whole INSPIRE content. How to model the realization, i.e. the mappings is still an open issue for us.

There is an on-going debate in the INSPIRE community about simplification and simpler encodings. Per legal requirements, the encoding is up to you but you must publish the encoding rules. You must publish the mappings to be compliant with INSPIRE. We must see what are the most efficient ways: are UML schemas better than matching tables? UML does not look so adapted for code lists but it may be easier to understand than matching tables.

- What about changes in the INSPIRE TN model to include the other referencing methods allowed by ISO 19148?

Knut made a post two years ago, but nothing occurred. MIG should find the right balance between stability and agility. However, if the change is more permissive, this might be easier to change.

- o Data exchange in local level in Sweden (Gunhild Lönnberg)

Sweden has developed extended models of INSPIRE for 9 themes, using the realization pattern. Several issues have been raised, such as multi-geometry or not, the use of poor definition translations, the metadata "any" for coverages, the versioning in identifiers.

Discussion

- What is the issue for versioning?

In Sweden, we use numbers but in INSPIRE, it may be anything, for instance dates. How to know what is the best solution?

- o How INSPIRE has influenced the redesign of the French hydrographic network (Stéphane Garcia)

The French Water community has developed a data model for hydrography that is merging the INSPIRE application schemas on PhysicalWaters and on HydroNetwork and that is adding specific national requirements.

Discussion

- This is interesting approach with a UML model but not in English and a reuse of INSPIRE properties in new feature types. There are some similarities with the linked data approach.
- Have you also included the WFD requirements, such as transition waters shown in your model?

This requirement comes from the questionnaire sent to users.

- o New Environment and planning Act: Information standards will partly re-use INSPIRE but not extend (Paul Janssen)

For planned Land Use, the Netherlands have chosen a different approach compared to INSPIRE. The Dutch approach is based on 3 pillars: the text, the semantics (extracted from the text and modelled according linked data principles) and the location; no redundancy is allowed. The texts are annotated with XML tags to make it machine-readable. Mapping with INSPIRE is still possible but there are different logics behind.

Discussion

- We do similar in Norway
- Does this method apply to all texts or only to new ones?

Only to the new ones. This is a smart way of digitalisation.

- Doing the same for EU regulations would help a lot
- Why location not as triple?

May be in future. We might keep geometry in GML or provide it in RDF.

- Is it automatic annotating?

Yes, we need software. This would not be possible to have it done by human beings at municipality level.

- How INSPIRE has influenced the redesign of French topographic database (Dominique Laurent)

IGN France has redesigned its large scale topographic database. One of the objectives was to make easier and of better quality the transformation to the INSPIRE data models. The difficulties for data transformation raised during the matching tables exercise have been used as input.

Discussion

- If you consider the TN model not suitable, why not complaining in the Thematic Cluster? For instance, in the EuroRoadS project, both solution (properties as attributes directly carried by the spatial objects or properties as feature types attached by linear referencing to the network) were allowed. This might be also a good solution for INSPIRE

To be usable in GIS context, the core basic properties should be carried as attributes by the spatial objects, but linear referencing might be useful to link business information.

- Data model extension on NGI standard products: yes, no ? (Nathalie Delattre)

NGI has wondered about extending the INSPIRE data models but has finally decided to keep two workflows, one for national products, one for INSPIRE. There were too many uncertainties regarding the maintenance of extended models (what happens if changes in INSPIRE?) and the validation of the “extended” data. In future, NGI might move to more “inspired” data models but not just on their own side but taking decisions in a community of stakeholders.

- ELF modelling guidelines (Heidi Vanparys)

ELF has developed extended models by subtyping according to the rules of the Generic Conceptual Model, using new classes, attributes, constraints and associations but also tagged values, e.g. to document for which LoD a feature type is relevant.

Discussion

- What is the use of ELF INSPIRE guidelines?

They have been used in Sweden, for operational and research purposes. They have also been used in the Geonovum survey.

One of the challenges is not to bring all “voidable” information into national specifications. The ELF guidelines may help to solve this issue.

- INSPIRE compliant e-reporting under the Air Quality directives from a member state perspective (Olav Peeters)

The Air Quality e-reporting requires geographic data (AM, EF, AC) and other input; this requires extended data models and extended OGC services for view and download (e.g. SOS).

- Pilot project on energy extending INSPIRE buildings 2D (Giacomo Martirano)

The pilot project has developed a “formal” extension of INSPIRE core 2D data model on Buildings, adding some concepts of the INSPIRE Extended 2D Buildings, CityGML Energy ADE and some specific attributes. The INSPIRE Extended 2D Buildings has not been used as starting point because including multiple inheritance.

Discussion

- What is the status of INSPIRE extended data models?

The INSPIRE extended data models are of various qualities, the BU ones being a priori more mature than others. The GML schemas are not published and there is no roadmap to achieve this. JRC lacks resources to review these extensions ... though there have been several requests in Thematic Cluster about the BU extensions.

CUZK has provided the GML schema for extended 2D Buildings data model that might be endorsed as good practice.

- Some key attributes are missing in core BU. We should put them in core INSPIRE BU model

Keep core data models, if not it would be jungle.

Extensions may be done by business communities, doing what they want. For changes in core INSPIRE data models, make requests in MIG Thematic Cluster.

- Why to use INSPIRE to solve a local issue?

This enables us to export the solution in another country; it powers local experience.

Look at local level but make it reusable.

3 Discussion session (day 1)

- **Validation**

Do you have to “cut” your extended data to have it validated?

No, you may publish extended data. The official INSPIRE validator validates data per an extended INSPIRE data model using the subtyping pattern. This does not work with simple realization, e.g. if renaming of feature types.

There is no validation of the extended schemas themselves (to check if the rules of the Generic Conceptual Model have been respected) as it is not possible to do it automatically.

- **Setting up view and download services**

In theory, no issue. In practice, there may be small differences and some extra work; for instance, degree has default configuration with the core INSPIRE schemas.

- **Encoding for extended data**

Should we use GML format for extension or another format?

You should be driven by what is useful; INSPIRE GML may be used as starting point but other formats may be envisaged, if more useful. Many data producers would like to provide alternative encodings (e.g. with flatten models behind) but they don't dare.

The Implementing Rule allows any encoding but there is need to respect ISO 19118 and so, to document the mapping to well-known encoding, i.e. to GML!

No, the request is to document mapping with UML.

- **Changing the INSPIRE standard**

We should make the process clearer and to explicit better what is responsibility of Thematic Cluster and of MIG. An issue posted 2 years ago, and not receiving any official answer is not good practice. We were expected people posting issues on Thematic Clusters but also discussing it, confirming or infirming the request for change. The discussion phase has not really occurred.

5. Implementation examples (day 2)

- INSPIRE federating national stakeholders for a national model on Buildings in Spain (Amalia Velasco)

The buildings data producers of both cadastral and topographic, from different levels of administration: national, regional and local, have been working to reach a consensus on the Spanish data model of buildings for INSPIRE.

- Planned land use from Norway (Morten Borrebaek)

There is a national strategy to align with INSPIRE, when appropriate. Regarding the planned Land Use, there is necessity to comply with 2 different legislations, the INSPIRE one and the national one. The extension pattern "subtype with redefine" was tested but methodology and tools were not yet mature enough. Therefore, the flexible "realization" extension pattern has been chosen, as the "subtyping" rules of INSPIRE are too strict.

Discussion

- Why are the INSPIRE extension rules too strict?

This is about the "avoidable" information that we don't provide. There is no need to keep them in the model at national level.

- GeoSmartCities (Stefania Morrone)

INSPIRE has been used as starting point for two scenarios: the green one (with extension of theme Buildings) and the underground one (with extension of theme US), using in both cases the subtyping approach. Regarding theme Buildings, we have chosen to extend the core model but we have used some concepts of BU Extended 2D, e.g. by transforming feature type BuildingInfo into a data type, to avoid the multiple inheritance issue.

Discussion

- Why choosing a "formal" extension?

The work took place 2 years ago; we did not have lots of experience and the subtyping method was well documented, there were guidelines. It was also best choice as there are several MS in the project; for instance, the “voidable” concept is meaningful, it enables to fit with all cases.

- UN GGIM Core data and adaptation of INSPIRE models (Dominique Laurent)

The UN-GGIM: Europe working group on core data is defining priorities to produce core data or the improvement of existing data, to ensure availability of minimum content to analyze, achieve and monitor sustainable development goals (SDG). The specification work is based both on user requirements (SDG) and on standards (INSPIRE). In practice, the core data content is a profile of INSPIRE models: in general, it is a subset but for some themes, extensions or even modifications must be envisaged.

- CAP and INSPIRE: history, perspectives and challenges (Katalin Toth)

Until now, there has been reluctance of payment agencies to include LPIS (Land Parcel Identification System) into INSPIRE because of issues about data privacy and of fear of errors if changing anything. However, some INSPIRE concepts (DocumentCitation, life-cycle attributes ...) and methodologies are already used in the CAP information system. In addition, there will be a new opportunity to push INSPIRE because of a reform in 2020 to encourage more practices good to environment ... but some lobbying may be required!

6. Research session

- CDDA 2018 - linked approach and the EURegistry -INSPIRE PF extension (Stefania Morrone)

EEA has defined 3 approaches for e-reporting: extension (one INSPIRE model + specific data), integration (several INSPIRE models + specific data), linking (report pointing to one or several INSPIRE themes). The extension of theme PF on industrial emission is a classical extension (according to the GCM rules) and is stored in the EU-register. Some simplifications have been done regarding voidable attributes (e.g. for Address as attribute or for CompetentAuthority). The linked data approach has been used to link the INSPIRE PS to the CDDA Designated Areas, using the inspireId to make the join.

Discussion

- What about code lists? Why using the UICN category in the CDDA Designated Areas rather than the INSPIRE classifications?

There are lots of different code lists dealing with similar concepts. There is a real need to register and to link these codelists.

- The linked approach is based on INSPIRE identifiers. Have you provided any guidelines about this topic?

They would be needed; if missing, there are risks. We might ask to follow D2.5 annex F that recommends to build identifiers as URI, with the request encapsulated in the identifier.

- Creation and Evaluation of an INSPIRE HY Extension – a Swedish case study (Helen Eriksson)

The research work aims to create a single data model extending the INSPIRE data model (Hydro PhysicalWaters) and the content of the Swedish standard and to assess the consequences of this single model for the implementation and delivery of data. Main purpose is to reduce the number of datasets and services.

- INSPIRE and Linked data : a EuroSDR road map (Bénédicte Bucher)

EuroSDR is conducting various activities aiming to increase mutual knowledge between the semantic Web and the geographic communities and to design shared benchmarks. To deal with heterogeneous data, these 2 communities have different approaches: common model – as INSPIRE – for geographic community and self-learning of data structure for the semantic Web community.

Discussion

- We should also encourage developers to use our INSPIRE data.
- There has not been so much progress, new services developed using the linked data; this is slow evolution
- Copernicus is also conducting hackathons with massive budgets; link between Copernicus and INSPIRE to be encouraged
- Cadaster is working hard regarding Linked data; we have published CP and AD in the ARE³NA project.
- INSPIRE is based on ISO. Make the ISO models available as RDF to W3C.

7. Discussion session (day 2)

- **Target of Linked data**

Address final users and deciders, not just developers.

Final users use applications and not data. INSPIRE is also back office. Format discussion is not an issue for developers. They are using API.

- **Organisational issues**

Future is not only about research but also about sharing extensions, better functioning of Thematic Cluster, integration of INSPIRE in European policies

- **Need for European wide data**

OSM provides the illusion of same data across Europe but it remains heterogeneous; there is need to document uncertainty.

There is discussion in the MIG; there is need for monitoring pan-European data sets and there is struggle for no gaps. Core data (Un-GGIM) might help to fill the gaps on priority data.

8. Conclusions

- Main learnings of Geonovum survey (Thorsten Reitz)

See PowerPoint presentation and the following web sites:

<http://inspire-extensions.wetransform.to/> (for the tutorial/methodology)

<https://www.haleconnect.com/> (for the modelling tools)

The Geonovum survey was launched due to the new Planning Act in Netherlands to investigate how to use INSPIRE extensions. There was a will to involve the whole INSPIRE community to get help and to share results.

Some main learnings:

- Have relevant persons on board, in the WG
- Put limits: decide what is in and what is out
- Consider data model as one brick in whole system; think about implementation
- Decide the compatibility ambition (with INSPIRE or other standard)
- Use data to build your model

In addition some results of the GDI-DE survey about potential simplification of INSPIRE data models and encodings have been shown. JRC asked MS to raise concrete issues regarding the complexity of INSPIRE and Germany took this initiative.

o Conclusion from Geonovum

- Each country has a national knowledge base (of data) serving many purposes, synergy between processes for realization the purposes is of great advantage.
- Fulfilling INSPIRE regulations can be achieved by 'ticking the box', but this is not the most advantageous approach.
- Alex is looking for existing data to relate his energy performance data to. INSPIRE is of big help and solves his use case in a much faster and cheaper way than before.
- Spatial data are interoperable, can be combined, by overlay; sometimes this simple solution for combining data (extending information) is good enough.
- Data base views on the fly (ETL tooling?) is an operational solution. One central database can serve many output formats and models, serving many use cases.
- The legacy of data models already used in domains can't be expected to be replaced by new externally defined (INSPIRE) models just like that. Translation and transformation helps in the understanding and acceptance.
- In land use planning, text documents are at the base of semantics expressed in geo. When the text documents themselves become digital and smart the role of geo might be changed.
- Flattening is a solution to decrease INSPIRE data complexity and can be combined with extending with extra semantics.
- Pumping up national datamodels with complexity defined in INSPIRE specifications adds extra semantics.
- ETL, Extract Transform and Load is a basic solution for transforming data in one model to another.
- Linking tabular data to INSPIRE spatial data is a simple way to extend INSPIRE semantics.

- Few user centric studies have been realized to access the users perspective on usage of existing INSPIRE data.
- GI is a niche technology where the (semantic) web is the mainstream. However, a successful niche is not easy to neglect.
- Matching tables for mapping between models is a fast start but will probably in the end not work; better to use advanced ETL mapping configurations from the start.

- Conclusion from NMCA

See PPT.

- Conclusion from EuroSDR

Cooperation means between EuroGeographics and EuroSDR should be reinforced (advertise more about events, share documents, increase communication).

We should increase our capacities to innovate; INSPIRE data (even just on sample zones) would be useful for researchers.