Webinar: INSPIRE good practices – Alternative Encodings

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Agenda

- General methodology for alternative encodings

- The GeoJSON Encoding
  - Structure
  - Model Transformation Rules
  - The GeoJSON Encoding
  - An Example for the Addresses Theme with GN elements
  - An Example for the Environmental Monitoring Facilities Theme with O&M elements

- Usability of the GeoJSON Encoding
  - Test methodology
  - CanIUse results
  - Planned enhancements

- Discussion and Questions
Alternative Encodings

Approach & Structure
## A Quick Clarification

<table>
<thead>
<tr>
<th>Default Encoding</th>
<th>Additional Encoding</th>
<th>OR</th>
<th>Alternative Encoding</th>
</tr>
</thead>
<tbody>
<tr>
<td>The default encoding is part of all data specifications</td>
<td>Does not have to satisfy all IR requirements for a data set</td>
<td></td>
<td>Shall satisfy all IR requirements for a data set</td>
</tr>
<tr>
<td>Data that complies to default encoding is INSPIRE compliant</td>
<td>Data owner does <em>not</em> need to prove compliance</td>
<td></td>
<td>Data owner needs to prove compliance</td>
</tr>
<tr>
<td>Central Tooling is available, e.g. the INSPIRE Validator</td>
<td>Central tooling is not required</td>
<td></td>
<td>Central tooling is not available (yet)</td>
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</table>
General Requirements for Encodings

The Implementing Rules on interoperability of spatial data sets and services (Commission Regulation (EU) No 1089/2010, Article 7) lays down the following requirements for encoding rules:

Every encoding rule used to encode spatial data shall conform to EN ISO 19118. In particular, it shall specify **schema conversion rules** for all spatial object types and all attributes and association roles and the output data structure used.

Every encoding rule used to encode spatial data shall be made available.

**Additional rules:**
- Spatial Reference Systems
- Character Encoding (UTF-8)

**Recommendation:**
- Encoding rules should be based on international, preferably open, standards
An Approach to defining the Alternative Encoding

**Why?**
- Why do we create this encoding?
- Which problems need to be solved?
- Which themes and use cases are covered?

**What?**
- What model transformation rules need to be applied to match the conceptual model to the capabilities of the format’s logical model?

**How?**
- How can this encoding be implemented?
- How can we validate that all IR requirements are addressed?
Structure of the Alternative Encoding

- Background
- Scope
  - Use Cases
  - INSPIRE Themes
  - Cross-cutting INSPIRE requirements
- Terms & Definitions
- Normative References
- Schema Conversion Rules
- Instance Conversion Rules
- Optional: ATS/ETS, Examples
- Optional: Model Transformations (for Simplification, Flattening)

Make the Specification modular!
The GeoJSON Alternative Encoding

Structure, General Encoding Rules, and INSPIRE Themes
The components of the GeoJSON Encoding Rule

- INSPIRE UML-to-GeoJSON encoding rule
- GeoJSON Encoding Rule for INSPIRE Addresses
- GeoJSON Encoding Rule for INSPIRE Environmental Monitoring Facilities
- Other GeoJSON Theme encoding rule
- Model Transformation Rules
- Examples

Glossary

Other encoding rule
1. Preface
2. Introduction
3. Scope
   1. Use Cases
   2. Themes
   3. Technical Issues
   4. Technical Limitations
4. Cross-cutting INSPIRE requirements
5. Normative References
6. Terms and Definitions
7. Schema Conversion Rules
   1. Types
   2. Properties
   3. Associations
8. Instance Encoding Rules
   1. Requirements and Recommendations
   2. Mapping from Conceptual Model to GeoJSON Logical Model
   3. Alternative Coordinate Reference Systems
   4. Identifiers
9. INSPIRE Theme Encoding Rules
Glossary for Alternative Encodings

**INSPIRE Alternative Encoding Rule**

alternative encoding rule alternative encoding

An encoding rule is a rule that describes how data is encoded in a particular format. This includes rules for converting data from one format to another, as well as rules for validating data against a particular format.

**INSPIRE Additional Encoding Rule**

additional encoding rule additional encoding

An encoding rule that is not part of the INSPIRE encoding rule set may be defined in a separate document.

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Alternative Encodings - GeoJSON

**INSPIRE default encoding rule**

default encoding rule default encoding

encoding rule that is specified in [D2.7, Annex B (normative) Default encoding rule]

NOTE The INSPIRE default encoding rule is the encoding rule specified in ISO 19136 Annex B with the extensions in GML 3.3 together with the additional rules stated in [D2.7, Annex B].

**Encoding**

Conversion of data into a series of codes

[ISO 19115:2011]

**Encoding process**

Encodings

Identifiable collection of conversion rules that define the encoding for a particular data structure

NOTE The term “encoding” is used as a synonym for both Encoding Rule and Encoding Process and should therefore not be used in the alternative encoding specifications.

[ISO 19115:2011]

**Information**

Knowledge concerning objects, such as facts, events, things, processes, or ideas, including concepts, that within a certain context has a particular meaning

[ISO/IEC 2382-1:1999]

**Format**

Language construct that specifies the representation, in character form, of data objects in a record, file, message, storage device, or transmission channel

GeoJSON Encoding Rule for INSPIRE ADS/EMS

1. Preface
2. Normative References
3. **Conformance Class Core**
   1. Model Transformation
   2. Model Mapping
4. Examples (Informative)
5. ATS/ETS (Informative)
Catalogue of Model Transformation Rules

MT001: Flattening of nested structures
MT002: Extract Primitive Arrays
MT003: Association/Aggregation to Composition with Hard Typing
MT004: Association/Aggregation to Composition with Soft Typing
MT005: Simple Geographic Name
MT006: Property Composition to Association
MT007: Simple Citation
MT008: Simple Codelist Reference
MT009: Simple Period
Model Transformation Rule Structure

- Category
- Description
- UML Representation (if applicable)
- Original Instance in Default Encoding
- Transformed Instance in Default/Alternative Encoding
- Model Transformation Rule
- Instance Transformation Rule
- Solves Usability Issues
- Known Usability Issues
- INSPIRE compliance
- Known Examples
Examples

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Next Steps & Timeline

– Editorial Changes and Fixes
– Addressing/Closing open issues from GitHub Repo
– Addressing changes and requests from community
– Acceptance & Release 1.0
Usability of the GeoJSON Encoding

Testing, Results, Open issues
Testing Methodology

- Definition of test cases
- Provision of test data sets
- Manual testing with each software
- Documentation in JSON Format
- Generation of readable documentation
Can the Encoding be used?

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Required Enhancements (for GeoJSON/GML/...)

To be discussed with vendors in June Meeting

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<td>TBT</td>
<td>Multi-Type Collections</td>
<td>Multiple features in one location can’t be identified</td>
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<td>Better support for arrays in attribute table</td>
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Time for your Contributions 😊!

- Questions & Discussion
- Editorial issues:
  - Create issues and Pull Requests on GitHub
- Implementations:
  - Report any implementations & Experiences
- Add theme-specific Encoding Rules
Questions? Feedback?
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https://twitter.com/tr_xsdi