

SME / SPIRE



Metadata and Data validation for INSPIRE



Authors: Giacomo Martirano, Stefania Morrone, Fabio Vinci (EPSILON ITALIA).

www.epsilon-italia.it



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Introduction

This self-learning module provides examples of metadata and data validation against the requirements of the applicable Implementing Rules and Technical Guidelines of INSPIRE.

Using different tools, examples are given on how to validate existing metadata and/or create compliant metadata according to INSPIRE Implementing Rules for Metadata (Commission Regulation (EC) N° 1205/2008).

Examples are also given on how to integrate your metadata with the six additional metadata elements for interoperability required by INSPIRE Implementing Rules for interoperability of spatial data sets and services (Commission Regulation (EU) N° 1089/2010).

This module shows how to assess the degree of conformity to the requirements specified by Commission Regulation (EU) No 1089/2010 relevant to a GML dataset belonging to INSPIRE Annex I/II/III data themes. Conformity is assessed through an Executable Test Suite (ETS), i.e. physical implementation of the Abstract Test Suite (ATS) defined in the Annex A of the Data Specifications.

Learning outcomes: After the module, the participant will be able to validate existing metadata, create and validate INSPIRE compliant metadata, assess the conformity of an INSPIRE GML dataset.

Intended Audience: GIS and ICT professionals aiming to validate their metadata and datasets against INSPIRE requirements.

Pre-requisites: Basic knowledge of INSPIRE.

Module: “Procedures for Data and Metadata Harmonization”.

Referenced files:

- *eu_IT_Calabria_Arcfuel_FCM_metadata_Conformity.xml*: metadata file generated within the ArcFUEL EU-founded project
- *eu_IT_Calabria_Arcfuel_FCM.gml*: dataset file generated within the ArcFUEL EU-founded project

Summary

1. Metadata validation
2. Create INSPIRE compliant metadata
3. “Discovery Metadata” validation
4. “Metadata for interoperability” validation
5. Data validation: ATS and Conformance classes
6. From ATS to ETS

Metadata validation

Reference Legislations:

- Commission Regulation (EC) N° 1205/2008
- Commission Regulation (EC) N° 1089/2010

Technical Reference document:

- INSPIRE Metadata Technical Guidelines (INSPIRE Metadata Implementing Rules: Technical Guidelines based on EN ISO 19115 and EN ISO 19119)

Metadata validation

To claim INSPIRE metadata conformance, two steps are required:

1. “Discovery Metadata” validation:

Conformance to Commission Regulation (EC) N° **1205/2008** also referred to as “**Implementing Rules for Metadata**”.

2. “Metadata for interoperability” validation:

Conformance to Commission Regulation (EC) No **1089/2010** also referred to as “**Implementing Rules for Interoperability of Spatial Datasets and Services**” or ISDSS Regulation.

Discovery Metadata

Metadata Regulation Section	Metadata element	Multiplicity	Condition
1.1	Resource title	1	
1.2	Resource abstract	1	
1.3	Resource type	1	
1.4	Resource locator	0..*	Mandatory if a URL is available to obtain more information on the resource, and/or access related services.
1.5	Unique resource identifier	1..*	
1.7	Resource language	0..*	Mandatory if the resource includes textual information.
2.1	Topic category	1..*	
3	Keyword	1..*	
4.1	Geographic bounding box	1..*	
5	Temporal reference	1..*	
6.1	Lineage	1	
6.2	Spatial resolution	0..*	Mandatory for data sets and data set series if an equivalent scale or a resolution distance can be specified.
7	Conformity	1..*	
8.1	Conditions for access and use	1..*	
8.2	Limitations on public access	1..*	
9	Responsible organisation	1..*	
10.1	Metadata point of contact	1..*	
10.2	Metadata date	1	
10.3	Metadata language	1	

8.2 Metadata elements for interoperability

IR Requirement

Article 13

Metadata required for Interoperability

The metadata describing a spatial data set shall include the following metadata elements required for interoperability:

1. Coordinate Reference System: Description of the coordinate reference system(s) used in the data set.

2. Temporal Reference System: Description of the temporal reference system(s) used in the data set.

This element is mandatory only if the spatial data set contains temporal information that does not refer to the default temporal reference system.

3. Encoding: Description of the computer language construct(s) specifying the representation of data objects in a record, file, message, storage device or transmission channel.

4. Topological Consistency: Correctness of the explicitly encoded topological characteristics of the data set as described by the scope.

This element is mandatory only if the data set includes types from the Generic Network Model and does not assure centreline topology (connectivity of centrelines) for the network.

5. Character Encoding: The character encoding used in the data set.

This element is mandatory only if an encoding is used that is not based on UTF-8.

6. Spatial Representation Type: The method used to spatially represent geographic information.

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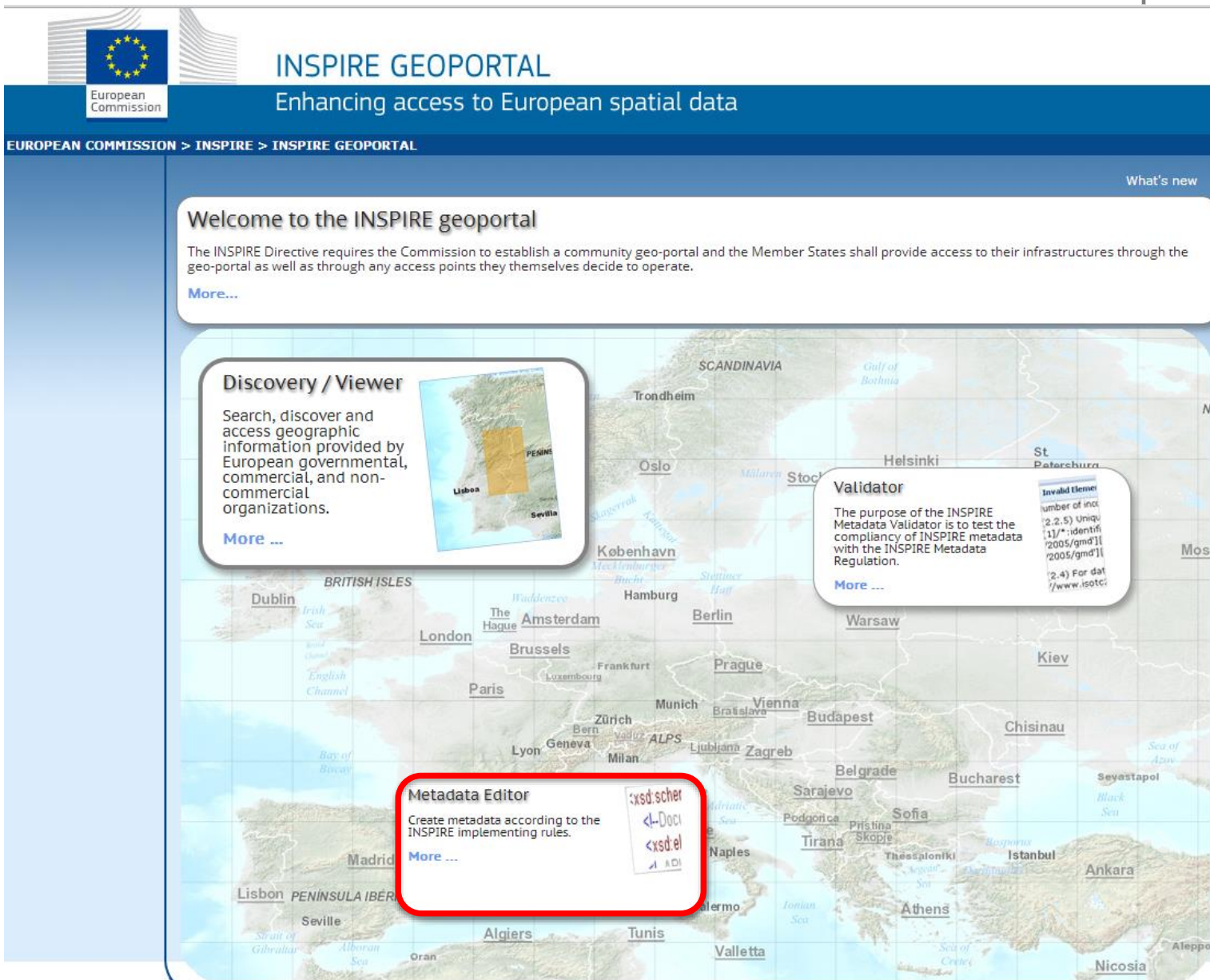
Create INSPIRE compliant metadata

In order to create INSPIRE compliant metadata, the INSPIRE Geoportal Metadata Editor can be used. It is an implementation of the INSPIRE Metadata Technical Guidelines published on the INSPIRE website, whose aim is to define how the requirements of the Implementing Rules for Metadata stated in Commission Regulation (EC) N° 1205/2008 can be implemented using EN ISO 19115 and EN ISO19119.

The INSPIRE Geoportal Metadata Editor is available from the INSPIRE EU Geoportal at <http://inspire-geoportal.ec.europa.eu/>.

By means of the INSPIRE Metadata Editor it is possible to insert the metadata information into the related fields, validate the metadata and save them as xml file.

Compliance is assessed for the **discovery metadata**



The screenshot shows the INSPIRE Geoportal interface. At the top, there's a header with the European Commission logo and the text "INSPIRE GEOPORTAL Enhancing access to European spatial data". Below this is a navigation bar with "EUROPEAN COMMISSION > INSPIRE > INSPIRE GEOPORTAL".

The main content area features a large map of Europe. Overlaid on the map are several informational boxes:

- Welcome to the INSPIRE geoportal**: A text box explaining that the INSPIRE Directive requires the Commission to establish a community geo-portal and that Member States shall provide access to their infrastructures through the geo-portal as well as through any access points they themselves decide to operate. It includes a "More..." link.
- Discovery / Viewer**: A box with a small map of the Iberian Peninsula and text stating: "Search, discover and access geographic Information provided by European governmental, commercial, and non-commercial organizations." It also includes a "More ..." link.
- Validator**: A box with text: "The purpose of the INSPIRE Metadata Validator is to test the compliancy of INSPIRE metadata with the INSPIRE Metadata Regulation." It includes a "More ..." link and a small code snippet:


```
Invalid Element
number of inco
(2.2.5) Uniqu
1/1/*:identi
2005/gmd]]
2005/gmd]]
(2.4) For dat
/www.isotc/
```
- Metadata Editor**: A box with text: "Create metadata according to the INSPIRE implementing rules." It includes a "More ..." link and a small code snippet:



```
<xsd:schem
<Doc
<xsd:el
A DI
```

The background map shows various European cities and regions, including Scandinavia, the British Isles, the Alps, and the Mediterranean coast.

The INSPIRE Geoportal Metadata editor

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[Contact](#) | [Search](#) | [Legal notice](#) | [English](#)



INSPIRE GEOPORTAL
Enhancing access to European spatial data

EUROPEAN COMMISSION > INSPIRE > INSPIRE GEOPORTAL > Metadata Editor

[User guide](#) | [What's new](#)

New Open Validate Save Save as template Help About | INSPIRE Spatial Dataset - en

Metadata Identification Classification Keyword Geographic Temporal Quality&Validity Conformity Constraints Response

Basic Refresh

Metadata on metadata

▼ Metadata point of contact (*) + i

▼ Point of contact 1

▼ Organisation name (*)

▼ E-mail (*)

 +

▼ Metadata date i

▼ Metadata language (*) i

english ▼


(*) This field is mandatory

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Discovery Metadata validation with the INSPIRE Metadata validator

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INSPIRE GEOPORTAL

Enhancing access to European spatial data

EUROPEAN COMMISSION > INSPIRE > INSPIRE GEOPORTAL

What's new

Welcome to the INSPIRE geoportal


The INSPIRE Directive requires the Commission to establish a community geo-portal and the Member States shall provide access to their infrastructures through the geo-portal as well as through any access points they themselves decide to operate.

[More...](#)

Discovery / Viewer

Search, discover and access geographic information provided by European governmental, commercial, and non-commercial organizations.

[More ...](#)



Validator

The purpose of the INSPIRE Metadata Validator is to test the compliance of INSPIRE metadata with the INSPIRE Metadata Regulation.

[More ...](#)

Invalid Element
 number of inco
 (2.2.5) Uniqu
 (1/*:identi
 /2005/gmd/1
 /2005/gmd/1
 (2.4) For dat
 /www.iso/

Metadata Editor

Create metadata according to the INSPIRE implementing rules.

[More ...](#)

<xsd:schema
 <!--Docu
 <xsd:el
 />

Discovery Metadata validation with the INSPIRE Metadata validator

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INSPIRE GEOPORTAL

Enhancing access to European spatial data

EUROPEAN COMMISSION > INSPIRE > INSPIRE GEOPORTAL > Validator

INSPIRE Geoportal Metadata Validator

[\(Change log\)](#) [\(Documentation\)](#) [\(About\)](#)

This validator replaces the former [schematron validator](#) and implements the same validation criteria applied during the INSPIRE Geoportal discovery process.

It is possible to use this validator as a Web Service (instructions available [here](#)).

Paste your resource in the text field below

(ISO 19139 Metadata or OGC Service Endpoint or CSW GetRecords or GetRecordById GET Request or URL to metadata)



You can also upload a file to test



Select the file to be tested: Nessun file selezionato

Test Resource

For security reasons, HTTP resources using ports other than 80 and 443 cannot be contacted.

DISCLAIMER: This service is used in the context of the INSPIRE Geoportal to perform validation of the metadata of resources discovered through the Member State Discovery Services. It is provided as is and it is not to be considered a full INSPIRE compliance test. While we have tried to ensure compliance with the INSPIRE Regulations and the relevant Technical Guidance documents we do recognise that there may still be issues that will need to be addressed. We would appreciate if you could [report to us](#) any issue you find with this validator so that we can improve it.

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Metadata for interoperability validation

In order to be conformant to Commission Regulation (EC) N° 1089/2010, the metadata describing a spatial data set shall include the following metadata elements:

1. Coordinate reference system (**mandatory**)
2. Temporal reference system (**conditional**)
3. Encoding (**mandatory**)
4. Character encoding (**conditional**)
5. Spatial representation type (**mandatory**)
6. Data Quality – Logical consistency – Topological consistency (**conditional**)

Reset
Save
Save and close
Check
⊕ Other actions

No preview available

Default view

INSPIRE view

By Group

ISO

Minimum

ISO Core

ISO All

By Package

Metadata

Identification

Maintenance

Constraints

Spat. Info

Ref. system

Distribution

Data quality

App. schema

Catalog

Content Info

Ext. Info

XML view

IDENTIFICATION INFO

Title *

Date *

Date type *

Unique resource identifier *

Codespace ☒ (Suggestions:)

Abstract *

ArcFuel project aims developing a generic methodology for creating forest fuel maps which can be used for supporting the operational use of fire simulation applications in context of forest fire management. ArcFuel uses the results of a recent effort of JRC Ispra, which aimed creating a standardized scheme of fuel types representative of the European forest regions and based on this it defines a methodology for producing forest fuel

Point of contact ☒

Organisation name ☒

Role *

Electronic mail address ☒

Descriptive keywords ☒

Keyword *

Thesaurus name ☒

Title *

Date *

Date type *

GeoNetwork tool

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Installing the software — x My GeoNetwork catalogu — x

localhost:8080/geonetwork/srv/eng/metadata.edit?id=1

Applicazioni PrIMA Shopping - Di... Epsilon Italia Back Office 27 Calendario Facebook Twitter YouTube LinkedIn Analytics Places Aruba.it - CP Apps » Altri Preferiti

Collective title
ISBN
ISSN

Descriptive keywords
Resource specific usage

▼ Resource constraints

▼ Constraints

Use limitation No conditions apply

Use limitation

▼ Resource constraints

▼ Legal constraints

Use limitation

Access constraints Other restrictions

Access constraints

Use constraints

Other constraints no limitation

Other constraints

Resource constraints Constraints (gmd:MD_Constraints)

Aggregation information

Spatial representation type Grid

Spatial representation type

▼ Spatial resolution

▼ Resolution

Distance 50 Units of measure meters (Suggestions:)

Spatial resolution

Language English

Language ISO Language code (gmd:LanguageCode)

Character set

▼ Topic category

Topic category code Imagery base maps earth cover

Topic category

Environment description

▼ Extent

▼ Extent

Description

▼ Geographic element

Extent type code

▼ Geographic bounding box

WGS 84 Google Mercator

North bound

39.76250

gemet-theme.rdf

Mostra tutti i download...

GeoNetwork tool

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▼ REFERENCE SYSTEM INFORMATION ⓘ

▼ Reference system

▼ Reference system identifier ⓘ

▼ Identifier

Authority ⓘ

Unique resource identifier *

Codespace ⓘ

Version ⓘ

ETRS89

INSPIRE RSregistry

(Suggestions: ▼)

▼ REFERENCE SYSTEM INFORMATION ⓘ

▼ Reference system

Reference system identifier ⓘ

Reference System Information ⓘ
Content Information ⓘ

Coverage description (gmd:MD_CoverageDescription) ▼

▼ DISTRIBUTION INFORMATION ⓘ

▼ Distribution

▼ Distribution format ⓘ

▼ Format

Name *

Version *

Amendment number ⓘ

Specification ⓘ

File decompression technique ⓘ

Format distributor ⓘ

TIFF (for the coverage range)

6.0

TIFF Specification

(Suggestions: ▼)

| | | | | | |
|---------------------|----------------------|------|----------------|-------|-----------------|
| Default view | Reset | Save | Save and close | Check | + Other actions |
| INSPIRE view | No preview available | | | | |
| By Group | | | | | |
| ISO Minimum | | | | | |
| ISO Core | | | | | |
| ISO All | | | | | |
| By Package | | | | | |
| Metadata | | | | | |
| Identification | | | | | |
| Maintenance | | | | | |
| Constraints | | | | | |
| Spat. Info | | | | | |
| Ref. system | | | | | |
| Distribution | | | | | |
| Data quality | | | | | |
| App. schema | | | | | |
| Catalog | | | | | |
| Content Info | | | | | |
| Ext. Info | | | | | |
| XML view | | | | | |

IDENTIFICATION INFO

Title * eu.Italy.Calabria.ArcFuel.Project_FuelClassif

Date * 2013-11-05

Date type * Creation

Unique resource identifier * eu.Italy.Calabria.ArcFuel_FCM

Codespace ☒ ArcFuel_FCM (Suggestions:)

Abstract *
ArcFuel project aims developing a generic methodology for creating forest fuel maps which can be used for supporting the operational use of fire simulation applications in context of forest fire management. ArcFuel uses the results of a recent effort of JRC Ispra, which aimed creating a standardized scheme of fuel types representative of the European forest regions and based on this it defines a methodology for producing forest fuel

Point of contact + ☒

Organisation name ☒ Epsilon Italia Electronic mail address info@ep

Role * Point of contact

Graphic overview +

Descriptive keywords ☒ -

Keyword * + Fuel Load/Characteristic

Thesaurus name ☒

Title * GEOS

Date * 2011-0

Date type * Public

Validation report
Reset Save Save and close Check Other actions Cancel Minor edit

☐ View errors only

Compliance to metadata standard (XML Schema) ✓

Compliance to metadata recommendations (Schematron)

GeoNetwork recommendations ✓

▶ [Language] - Metadata language is not defined and other language are declared and Main metadata language MUST NOT be defined in other language section.

✓ Main metadata language is: "eng"

✓ No duplicate languages found.

INSPIRE implementing rules ✓

▶ Identification

✓ Resource type is: dataset

✓ Resource abstract is : ArcFuel project aims developing a generic methodology for creating forest fuel maps which can be used for supporting the operational use of fire simulation applications in context of forest fire management. ArcFuel uses the results of a recent effort of JRC Ispra, which aimed creating a standardized scheme of fuel types representative of the European forest regions and based on this it defines a methodology for producing forest fuel maps compatible with the relevant scheme of JRC making use of available European spatial data sets and Landsat TM images. The proposed methodology of forest fuel map creation is applicable in all EU regions and is currently tested and validated in the ArcFuel project pilot areas in Greece, Portugal, Spain and Italy.

✓ Resource title found: eu.Italy.Calabria.ArcFuel.Project_FuelClassificationMap

✓ Resource locator found: http://www.epsilon-italia.it/public/ArcFuel/ArcFuel_forest_fuel_classes.pdf

▶ Data Identification

✓ Resource language is: eng

✓ ISO topic category is: imageryBaseMapsEarthCover

✓ Unique resource identifier is: eu.Italy.Calabria.ArcFuel_FCM

✓ Unique resource identifier codespace is: ArcFuel_FCM

▶ Service Identification

▶ Keyword and INSPIRE themes

✓ 1 INSPIRE theme(s) found.

✓ Thesaurus: GEOSS - Earth Observation Vocabulary, version 1.0GEMET - INSPIRE themes, version 1.0, 2011-05-012008-06-01 ()

▶ INSPIRE Service taxonomy

▶ Geographic location

✓ WestBoundLongitude found: 15.5135409375

✓ EastBoundLongitude found: 17.31529875

✓ SouthBoundLongitude found: 37.65312

✓ NorthBoundLongitude found: 39.762495

▶ Temporal reference

✓ Date of creation of the resource found: 2013-11-05

▶ Quality and validity

✓ Spatial resolution is set.

✓ Lineage is set.

▶ Conformity

✓ Specification: INSPIRE Data Specification on Land Cover – Draft Guidelines, (2013-02-04, publication)

✓ Degree of conformity found: true

✓ Specification: Commission Regulation (EU) No 1089/2010 of 23 November 2010 implementing Directive 2007/2/EC of the European Parliament and of the Council as regards interoperability of spatial data sets and services, (2010-12-08, publication)

✓ Degree of conformity found: true

▶ Constraints related to access and use

✓ 1 instance(s) of 'accessConstraints' found.

✓ Limitation on public access (otherConstraints) found: no limitation

✓ Limitation on public access (accessConstraints) found: otherRestrictions

▶ Responsible organisation

✓ Responsible organisation for the resource found.

✓ Organisation name and email found for : Epsilon Italia (pointOfContact)

▶ Metadata on metadata

✓ Metadata date stamp is : 2014-01-03T13:01:52

✓ Metadata language is : eng

✓ Metadata point of contact found.

Validation report
Reset Save Save and close Check Other actions Cancel Minor edit

- ✓ Degree of conformity found: true
- ✓ Specification: Commission Regulation (EU) No 1089/2010 of 23 November 2010 implementing Directive 2007/2/EC of the European Parliament and of the Council as regards interoperability of spatial data sets and services, (2010-12-08, publication)
- ✓ Degree of conformity found: true
- ✱ Constraints related to access and use
 - ✓ 1 instance(s) of 'accessConstraints' found.
 - ✓ Limitation on public access (otherConstraints) found: no limitation
 - ✓ Limitation on public access (accessConstraints) found: otherRestrictions
- ✱ Responsible organisation
 - ✓ Responsible organisation for the resource found.
 - ✓ Organisation name and email found for :Epsilon Italia (pointOfContact)
- ✱ Metadata on metadata
 - ✓ Metadata date stamp is :2014-01-03T13:01:52
 - ✓ Metadata language is :eng
 - ✓ Metadata point of contact found.
 - ✓ Organisation name and email found for :Epsilon Italia srl (pointOfContact)

ISO 19115/19119 rules ✓

- ✱ CharacterString must have content or its parent must have a valid nilReason attribute.
- ✱ CRS attributes constraints
- ✱ [ISOFTDS19139:2005-TableA1-Row24] - A name is required for contact
 - ✓ One or more of individualName, organisationName or positionName found in contact:Epsilon Italia srl-
 - ✓ One or more of individualName, organisationName or positionName found in contact:Epsilon Italia-
- ✱ [ISOFTDS19139:2005-TableA1-Row07] - OtherConstraints required if otherRestrictions
 - ✓ Other restrictions set to: no limitation
- ✱ [ISOFTDS19139:2005-TableA1-Row16] - Units required for values
- ✱ [ISOFTDS19139:2005-TableA1-Row13] - Description required if no sourceExtent
- ✱ [ISOFTDS19139:2005-TableA1-Row10] - Content mandatory for dataset or series
 - ✓ Statement is documented.
- ✱ [ISOFTDS19139:2005-TableA1-Row11 Row12] - Lineage
 - ✓ Source required if no statement or processStep.
 - ✓ Process step required if no statement or source.
- ✱ [ISOFTDS19139:2005-TableA1-Row08] - Dataset must have report or lineage
 - ✓ Report or lineage is defined.
- ✱ [ISOFTDS19139:2005-TableA1-Row09] - LevelDescription needed unless dataset or series
 - ✓ Level description set to:
- ✱ [ISOFTDS19139:2005-TableA1-Row17] - Units required for density values
- ✱ [ISOFTDS19139:2005-TableA1-Row18] - Distribution format required
 - ✓ 2 distributor format(s) found.
- ✱ [ISOFTDS19139:2005-TableA1-Row23] - Extent element required
 - ✓ One description, geographicElement, temporalElement, verticalElement found.
- ✱ [ISOFTDS19139:2005-TableA1-Row04] - Dataset must have extent
 - ✓ Extent defined for dataset.
- ✱ [ISOFTDS19139:2005-TableA1-Row05] - Dataset or series must have a topic category
 - ✓ Topic category is: "imageryBaseMapsEarthCover"
- ✱ [ISOFTDS19139:2005-TableA1-Row06] - Either aggregateDataSetName or aggregateDataSetIdentifier must be documented
- ✱ [ISOFTDS19139:2005-TableA1-Row02] - Character set indication
- ✱ [ISOFTDS19139:2005-TableA1-Row19] - Detail required unless simple term
- ✱ [ISOFTDS19139:2005-TableA1-Row20] - Condition
- ✱ [ISOFTDS19139:2005-TableA1-Row21] - DomainCode
- ✱ [ISOFTDS19139:2005-TableA1-Row22] - ShortName
- ✱ [ISOFTDS19139:2005-TableA1-Row15] - Check point description required if available
- ✱ [ISOFTDS19139:2005-TableA1] - HierarchyLevelName must be documented if hierarchyLevel does not contain "dataset"
 - ✓ Hierarchy level name is: "dataset"

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Abstract Test Suite (ATS) included in the Annex A of the INSPIRE Data Specifications is the starting point for the conformance testing process of datasets.

Annex A - Part 1: includes tests aiming at assessing the conformity of GML datasets to “COMMISSION REGULATION (EU) No 1089/2010 of 23 November 2010 implementing Directive 2007/2/EC of the European Parliament and of the Council as regards interoperability of spatial data sets and services” and its successive amendment “COMMISSION REGULATION (EU) No 1253/2013 of 21 October 2013”.

Annex A - Part 2: includes tests aiming at assessing conformity of GML datasets to relevant INSPIRE Data Specifications - Technical Guidelines (TG) requirements.

The requirements to be tested are grouped in several conformance classes. Each of these classes covers a specific aspect: one conformance class contains tests reflecting the requirements on the application schema, another on the reference systems, etc ...

If a dataset is not yet conformant with all requirements of the data specification, conformity to individual conformance classes can be claimed. In order to be conformant to a specific conformance class, a data set has to pass all tests defined for that conformance class.

| Conformance Class | Tests |
|---|---|
| A.1 Application Schema Conformance Class | A.1.1 Schema element denomination test |
| | A.1.2 Value type test |
| | A.1.3 Value test |
| | A.1.4 Attributes/associations completeness test |
| | A.1.5 Abstract spatial object test |
| | A.1.6 Constraints test |
| | A.1.7 Geometry representation test |
| A.2 Reference Systems Conformance Class | A.2.1 Datum test |
| | A.2.2 Coordinate reference system test |
| | A.2.3 Grid test |
| | A.2.4 View service coordinate reference system test |
| | A.2.5 Temporal reference system test |
| | A.2.6 Units of measurements test |
| A.3 Data Consistency Conformance Class | A.3.1 Unique identifier persistency test |
| | A.3.2 Version consistency test |
| | A.3.3 Life cycle time sequence test |
| | A.3.4 Validity time sequence test |
| | A.3.5 Update frequency test |
| A.4 Data Quality Conformance Class | A.4.1 Data quality target results test |
| A.5 Metadata IR Conformance Class | A.5.1 Metadata for interoperability test |
| A.6 Information Accessibility Conformance Class | A.6.1 Code list publication test |
| | A.6.2 CRS publication test |
| | A.6.3 CRS identification test |
| | A.6.4 Grid identification test |
| A.7 Data Delivery Conformance Class | A.7.1 Encoding compliance test |
| A.8 Portrayal Conformance Class | A.8.1 Layer designation test |

Data Validation: **ATS** - Part 2

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| Conformance Class | Tests |
|---|--|
| A.9 Technical Guideline Conformance Class | A.9.1 Multiplicity test |
| | A.9.1 CRS http URI test |
| | A.9.2 Metadata encoding schema validation test |
| | A.9.3 Metadata occurrence test |
| | A.9.4 Metadata consistency test |
| | A.9.5 Encoding schema validation test |
| | A.9.6 Coverage multipart representation test |
| | A.9.7 Coverage domain consistency test |
| | A.9.8 Style test |

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From ATS to ETS :

an example of how to assess the conformity of a gml dataset

For the purpose of this tutorial, we consider a single conformance class, namely:

A.1 Application Schema Conformance Class

and we describe how to implement the abstract tests associated to this conformance class with reference to a gml dataset, in order to evaluate that it fulfils the requirements included in the relevant data specification.

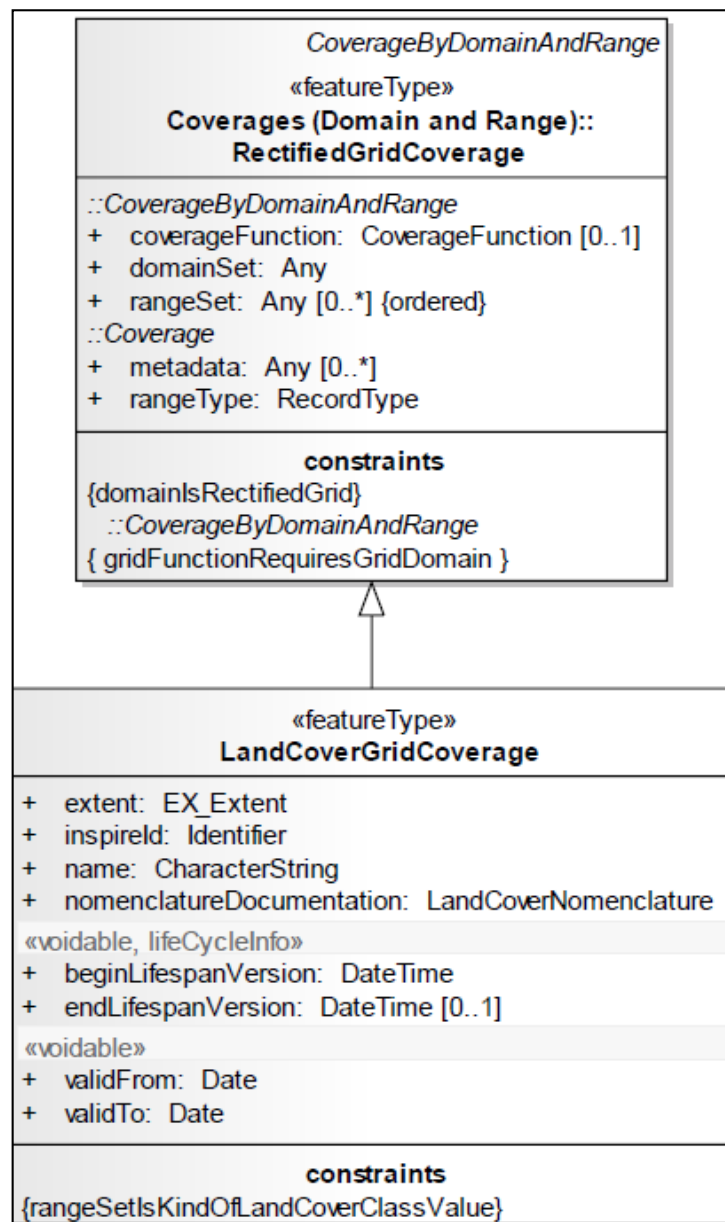
More specifically in the following we describe the steps applied to test the dataset generated within the ArcFUEL EU-founded project. The ArcFUEL project output dataset consists of a raster file containing a Fuel Type classification dataset, obtained after a quite complex workflow based on the processing of multi-source remote sensing data.

The relevant INSPIRE Data Specification is Land Cover, and, in particular, the relevant application schema is LandCoverRaster.

For more details see Annex A of the [INSPIRE_DataSpecification_LC_v3.0](#) downloadable from the INSPIRE webportal.

Land cover raster application schema

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Tests in the A.1 Application Schema Conformance Class

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A brief description of the tests to be executed to claim conformance to the A.1 Application Schema Conformance Class is provided in the following.

(For more details see Annex A of the INSPIRE_DataSpecification_LC_v3.0).

A.1.1 Schema element denomination test

Test Method: Examine whether the corresponding elements of the source schema (spatial object types, data types, attributes, association roles, code lists, and enumerations) are mapped to the target schema with the correct designation of mnemonic names.

A.1.2 Value type test

Test Method: Examine whether the value type of each provided attribute or association role adheres to the corresponding value type specified in the target specification

A.1.3 Value test

Test Method: When an attribute / association role has an enumeration or code list as its type, compare the values of each instance with those provided in the application schema.

A.1.4 Attributes/associations completeness test

Test Method: Examine whether all attributes and association roles defined for a spatial object type or data type are present for each instance in the dataset.

Tests in the A.1 Application Schema Conformance Class

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A.1.5 Abstract spatial object test

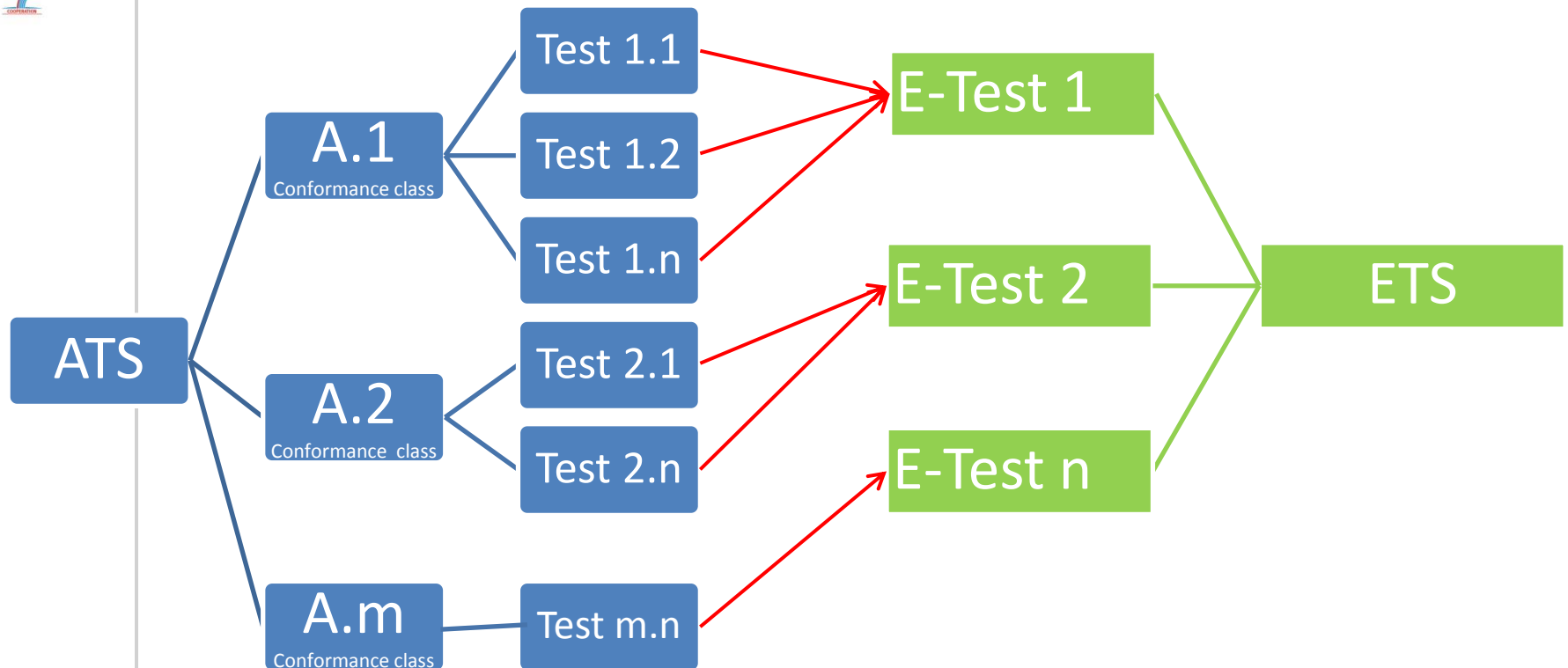
Test Method: Examine that there are NO instances of abstract spatial object / data types in the dataset provided.

A.1.6 Constraints test

Test Method: Examine all instances of data for the constraints specified for the corresponding spatial object / data type. Each instance shall adhere to all constraints specified in the target application schema(s).

A.1.7 Geometry representation test

Test Method: Check whether all spatial properties only use 0, 1 and 2-dimensional geometric objects that exist in the right 2-, 3- or 4-dimensional coordinate space, and where all curve interpolations respect the rules specified in the reference documents.



Tests in the A.1 Application Schema Conformance Class

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Some of the tests required in the conformance classes can be automated by means of xml schema validation tools such as open source tool HALE (HUMBOLDT Alignment Editor) or proprietary software tools such as for example GoPublisher or FME.

In our example, for A.1 conformance class, tests from A.1.1 to A.1.5 have been executed by means of the xml schema validation tool HALE. In the Hale project the raster file *Italy_Calabria.tiff* has been transformed into the harmonised gml file *eu_IT_Calabria_Arcfuel_FCM.gml* which has been validated against LandCoverRaster application schema.

Example of dataset validation using the HALE open source tool can be found in training [Module 2: 'Examples of Data Transformation'](#)

Tests A.1.6 and A.1.7 have been executed manually.

To identify the constraints the datasets have to comply with, the INSPIRE Data Specification on the related theme must be considered.

In the case of our example, to identify the constraints of the ArcFUEL dataset, the INSPIRE Data Specification on Land Cover and the LandCoverRaster application schema have been considered. For the ArcFUEL dataset, three constraints must be fulfilled:

- *rangeSetIsKindOfLandCoverClassValue* constraint which states that the values in the range set shall belong to a single classification code.

Here follows a snippet of the ArcFuel project gml file showing our implementation of the rangeSet element as a link to the file Italy_Calabria.tiff.

```
<gml:rangeSet>
  <gml:File>
    <gml:rangeParameters xlink:href="http://www.epsilon-italia.it/public/ArcFuel/Italy_Calabria.tiff"/>
    <gml:fileReference>Italy_Calabria.tiff</gml:fileReference>
    <gml:fileStructure>Record Interleaved</gml:fileStructure>
  </gml:File>
</gml:rangeSet>
```

According to the constraint requirements, all the pixels values in the tiff file belong to the FCM codelist defined in the ArcFuel project and referenced through the nomenclatureCodeList attribute of the LandCoverGridCoverage class.

This can be verified using, for instance, the GIS software.



Other two constraints

- *domainsIsRectifiedGrid* which states that the domain shall be a rectified grid.
- *gridFunctionRequiresGridDomain* which states that the grid function shall only be valid for domains that are grids.

Here is an extract of the ArcFuel project gml file showing our implementation of the constraint *domainsIsRectifiedGrid*.

```
<gml:domainSet>
  <gml:RectifiedGrid dimension="2" gml:id="tiff_domain">
    <gml:limits>
      <gml:GridEnvelope>
        .....
      </gml:RectifiedGrid>
    </gml:domainSet>
```

The *gridFunctionRequiresGridDomain* constraint is not applicable in our case as we have no function defined.

The only geometry used in the dataset is the one specified in the envelope definition, i.e. the point of origin of the rectified grid, which is described by means of latitude and longitude attributes (2-dimensional geometric objects). This way we adhere to the requirement that all spatial properties only use 0, 1 and 2-dimensional geometric objects.

Here follows a snippet of the ArcFuel project gml file showing our implementation of the relevant element:

```
<gml:axisLabels>x y</gml:axisLabels>  
<gml:origin>  
  <gml:Point gml:id="grid_origin_tiff"  
    srsName="http://www.opengis.net/def/crs/EPSG/0/3045">  
    <gml:pos>550780.00 4452960.00</gml:pos>  
  </gml:Point>  
</gml:origin>
```

The part of the test requiring that “all curve interpolations respect the rules specified in the reference documents” is not applicable in our case, because our dataset is a raster.

The Conformity metadata element in the ArcFuel project metadata

```

<gmd:specification>
<gmd:CI_Citation>
<gmd:title>
<gco:CharacterString>INSPIRE Data Specification on Land Cover – TG - AS -
LandCoverRaster</gco:CharacterString>
</gmd:title>
<gmd:date>
<gmd:CI_Date>
<gmd:date>
<gco>Date>2013-12-10</gco>Date>
</gmd:date>
<gmd:dateType>
<gmd:CI_DateTypeCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas/resources/Cod
elist/ML_gmxCodeLists.xml#CI_DateTypeCode" codeListValue="publication"/>
</gmd:dateType>
</gmd:CI_Date>
</gmd:date>
</gmd:CI_Citation>
</gmd:specification>
<gmd:explanation>
<gco:CharacterString>Conformance has been claimed to A.1 Application Schema Conformance Class
(http://inspire.ec.europa.eu/conformance-class/ir/lc/as/LandCoverRaster). Tests from A.1.1 to A.1.5
have been executed by means of the xml schema validation tool GoPublisher, whilst tests A.1.6 and
A.1.7 have been executed manually</gco:CharacterString>
</gmd:explanation>
<gmd:pass>
<gco:Boolean>true</gco:Boolean>
</gmd:pass>

```