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Creating INSPIRE external unique object identifiers in the scope of the END reporting data

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INSPIRE data specifications and Implementing Rules

The INSPIRE data specifications include an external unique object identifier published by the responsible body, which may be used by external application to reference the spatial object. The unique object identifier shall ensure characteristics of uniqueness, persistence, traceability, and feasibility. The external object identifier shall not be changed during the life-cycle of the spatial object.

In the INSPIRE specifications, an external unique object identifier is composed of two parts:

- A **namespace** (*namespace* in data type *Identifier*) to identify the data source;
- A **local identifier** (*localId* in data type *Identifier*), assigned by the data provider.

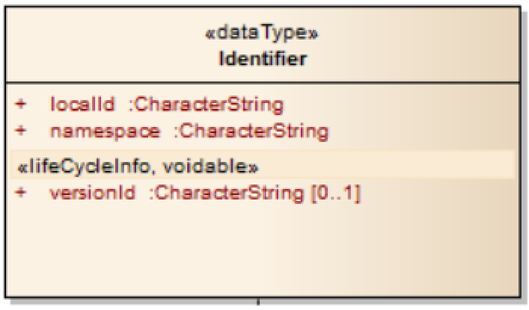
Several guidelines and additional information have been published to facilitate the development and management of external unique object identifiers used in the data sets in the scope of the INSPIRE Directive implementation, shortly described below.

INSPIRE Generic Conceptual Model

The INSPIRE Generic Conceptual Model provides detailed information on creation of external unique object identifiers.

Typically, the INSPIRE spatial object type includes property *inspireId* with data type *Identifier* for providing external unique object identifier. Data type *Identifier* is one of the INSPIRE base types and it is composed of three attributes: *localId* (local identifier), *namespace* and *versionId* (the identifier of the particular version of the spatial object), as shown in Figure 1.

Figure 1 INSPIRE type Identifier


«dataType»
Identifier
+ localId :CharacterString
+ namespace :CharacterString
«lifeCycleInfo, voidable»
+ versionId :CharacterString [0..1]

Description:

- ***localId***: A local identifier, assigned by the data provider. The local identifier is unique within the namespace, i.e. no other spatial object carries the same unique identifier.
- ***namespace***: Namespace uniquely identifying the data source of the spatial object. The namespace is owned by the data provider.
- ***versionId***: The identifier of the particular version of the spatial object. It is voidable. If the specification of a spatial object type with an external object identifier includes life-cycle information, the version identifier is used to distinguish between the different versions of a spatial object. Within the set of all versions of a spatial object, the version identifier is unique.

Assigning local identifier

A local identifier is assigned by a data provider. The local identifier is unique within the namespace, i.e., no other spatial object carries the same unique identifier. It is also the responsibility of the data provider to guarantee uniqueness of the local identifier within the namespace. As the local identifier is part of the unique external object identifier, it can be different from an internal identifier used in data management practice, or from thematic object identifiers that could be defined by different thematic domains.

Defining namespace as “data provider / data source - product” pattern

The namespace defines the data source. Typically, the namespace will consist of two parts: The first part will identify the data provider within the member state and the second part will be used to distinguish between different data sources maintained and provided by the data provider. For example, if a data provider assigns unique object identifiers in the context of a product, then the namespaces defined by the data provider may include information about the data provider and the product.

Defining namespace as “data provider / spatial object type” pattern

Using a “product code/name” in the namespace may create problems if a data provider changes the organisation of its data products. This rule can accommodate different current identifier assignment rules of data providers. If, for example, a data provider assigns local identifiers not per data product but per spatial object type, then the namespace will include the name of the spatial object type, i.e., the data provider will define a number of namespaces.

Identifier of the particular version of the spatial object

The voidable version identifier attribute (*versionId*) is not part of the unique identifier of a spatial object and may be used to distinguish two or several versions of the same spatial object. If the specification of a spatial object type with an external object identifier includes life-cycle information, the version identifier is used to distinguish between the different versions of a spatial object. Within the set of all versions of a spatial object, the version identifier is unique. The INSPIRE specifications define two properties *beginLifespanVersion* and *endLifespanVersion* for carrying life-cycle information of a spatial object.

This is used to number sections.

Implementation of Identifiers using URIs in INSPIRE

Another option in creating unique identifiers is to provide them in a form of URI, which allows referencing information resources on the web. In the web, http URIs have become the primary way to reference information resources on the web. To keep INSPIRE connected with the development of related information infrastructures, in particular in the e-government context, the use of http URIs is considered prudent. The URI is relatively easy to deploy and allows to build INSPIRE on the powerful and highly scalable infrastructure of the web. Integrating INSPIRE in the web architecture supports also the reuse of spatial data from INSPIRE by other communities as familiar technologies and protocols are used (more information, see also the URI guide in D2.5 Annex H).

Other guidelines

Good practices and guidelines for INSPIRE implementation and management of external unique object identifiers may be established by each data provider or other bodies responsible for or supporting the INSPIRE implementation. A few examples are listed below:

- Clarifications and Best Practices
- INSPIRE-namespace register in The Netherlands

Proposal for creating INSPIRE identifiers for the new END data model

Spatial objects in the scope of the END reporting data follow the INSPIRE data specifications including the external unique object identifiers defined as the INSPIRE data type ***Identifier***, which is composed of the three attributes:

- ***localId***: A local identifier, assigned by the data provider, unique within the namespace;
- ***namespace***: Namespace uniquely identifying the data source of the spatial object;
- ***versionId***: The identifier of the particular version of the spatial object, voidable - optional.

Data providers who will prepare the END reporting geospatial data can apply own rules for creating external unique object identifiers according to the INSPIRE specifications, considering also that the spatial objects keep external unique object identifiers across different use cases.

Spatial objects and data sets for the END reporting scope may be based on, or may include a sub-set from other INSPIRE compliant data sets, e.g. transport networks would be a typical example. In such cases, it is recommended to keep already defined external unique object identifiers from the reference source data set.

The following list provides a few proposals to facilitate the creation of the INSPIRE identifiers in the scope of the END geospatial data (the list is not exhausted, and it can be extended with other practices from the END reporting community).

Proposal for creating local identifier

A local identifier (*localId*) must be unique within the namespace. The following options are listed below:

a) The *localId* can use combination of country code, administrative level, END thematic domain or other characters;
b) The *localId* can be the same as the local identifier of the reference spatial object in the INSPIRE compliant data set used as underlying spatial data to provide END thematic data, in case the spatial objects are the same;
c) The *localId* can be derived from the local identifier of the reference spatial object in the INSPIRE compliant data set used as underlying spatial data to provide END thematic data, in case the END spatial object is derived from the reference INSPIRE spatial object. Additionally, an indication of the END thematic scope could be included in the local identifier, e.g.:
    - Thematic domain: END

- END spatial object type name, e.g.: AgglomerationSource, MajorRoadSource, MajorRailwaySource, QuietArea, NoiseActionPlanCoverageArea;

The *localId* could be the same as the thematic identifier of the spatial object in the END scope. In that case, the proposed common rules described in the "Proposal on how to build the unique thematic identifiers for the new END data model" apply.

Recommendation for creating local identifier (INSPIRE) for the END geospatial data:
The *localId* could be the same as the thematic identifier of the spatial object in the END scope. In that case, the proposed common rules described in the "Proposal on how to build the unique thematic identifiers for the new END data model" apply.

Proposal for creating namespace

A namespace uniquely identifies the data source of the spatial object. Creation of a namespace shall follow the general rules of the INSPIRE data specifications and Implementing Rules (see the first section in this document). Additionally, the following options are listed below:

a) The namespace can be the same as in the reference spatial object in the INSPIRE compliant data set used as underlying spatial data to provide END thematic data, in case the spatial objects are the same;
b) The namespace can be derived from the namespace of the reference spatial object(s) in the INSPIRE compliant data set used as underlying spatial data to provide END thematic data, in case the END spatial object is derived from the reference INSPIRE spatial object(s). Additionally, an indication of the END thematic domain could be included in the namespace, see option c) below;
c) In the case, a data provider prefers to include the END thematic domain into a namespace, the following list of the END thematic keywords are proposed for the END geospatial data:

DF1_5 Agglomeration source	end_agglomeration
DF1_5 Major roads source	end_majorroad
DF1_5 Major railways source	end_majorrailway
DF7_10 NAP agglomeration	end_actionplan_agglomeration
DF7_10 NAP major road	end_actionplan_majorroad
DF7_10 NAP major railway	end_actionplan_majorrailway
DF7_10 NAP major airport	end_actionplan_majorairport
DF7_10 Quiet areas	end_quietarea

d) The proposed thematic keywords can be combined with other information such as country code, administrative level, data provider, product (e.g. data set or END data flow), or END spatial object type, etc.

A few examples of creating namespace:

- DF1_5 Agglomeration source:

  - end_agglomeration_CC
    - Note: namespace in the form of the END thematic keyword and country code (CC represents country code)

- DF1_5 Agglomeration source:
  - end_agglomeration_CC_XX
    - Note: namespace in the form of the END thematic keyword, country code and regional / administrative level (CC represents country code and XX represents regional / administrative level)

- DF1_5 Agglomeration source:
  - end_agglomeration_CC_XX_YY
    - Note: namespace in the form of the END thematic keyword, country code, regional / administrative level and data provider (CC represents country code, XX represents regional / administrative level, and YY represents a data provider)

- DF1_5 Major roads source (example in the INSPIRE Geoportal, Malta):
  - https://data.gov.mt/so/TN/RoadLink/DF1_5
    - Note: namespace in the form of URI indicating also the INSPIRE theme (TN), INSPIRE spatial object type (RoadLink) and the END data flow (DF1_5)

- DF1_5 Major roads source (example in the INSPIRE Geoportal, Austria):
  - https://data.inspire.gv.at/ef7a7f26-4582-4241-8016-79050f6ddd5a/tn/RoadLink/
    - Note: namespace in the form of URI indicating also the data set, INSPIRE theme (tn) and the INSPIRE spatial object type (RoadLink)

Recommendation for creating namespace (INSPIRE) for the END geospatial data:
If not defined otherwise, the *namespace* should use the proposed END thematic keyword (see option c) above) combined with the country code and, where applicable, the regional / administrative level (option d) above).

Examples of creating INSPIRE identifiers

Local identifier (*localId*)	Namespace (*namespace*)	Description
AG_AT_00_1	end_agglomeration_AT	• Thematic identifier is used as local identifier (option d) • Namespace is composed of the END thematic keyword and country code (options c and d)
DF5Agg	Environmental_Noise_Agglomeration	Spatial object from data set in the INSPIRE Geoportal, metadata data set file identifier: d6d68e3f-fc51-4cf7-97ce-78769d7c5389
MT_E_rd00001	https://data.gov.mt/so/TN/RoadLink/DF1_5	Spatial object from the data set in the INSPIRE Geoportal, metadata data set file identifier: 025a972f-8c01-482d-bcf1-28424169d58c

Local identifier (*localId*)	Namespace (*namespace*)	Description
AT_a_rd00520	https://data.inspire.gv.at/ef7a7f26-4582-4241-8016-79050f6ddd5a/tn/RoadLink/	Spatial object from the data set in the INSPIRE Geoportal, metadata data set file identifier: ef7a7f26-4582-4241-8016-79050f6ddd5a

Several data providers already make END reporting data available in the national spatial data infrastructures according to the INSPIRE Directive. These data sets can be visible also in the INSPIRE Geoportal through the Priority Data Sets Viewer, selecting further the environmental domain noise or environmental legislation Environmental Noise Directive (END). With the adoption of the new END mandatory digital information exchange mechanism, new END reporting data sets shall be provided according to the new END reporting guidelines.

Proposal for creating identifier of the particular version of spatial object

The END reporting data flows don't monitor the versioning of the spatial objects, therefore it is recommended that *versionId* can be omitted.

Recommendation for creating identifier of the particular version of spatial object:

If not defined otherwise, it is recommended to omit *versionId*.

If it is used, *versionId* could include the reporting year.

Thematic identifiers in the END data model

Primarily, the END data model defines the thematic identifiers for objects in all data flows. The thematic identifier is defined based on the INSPIRE base type *ThematicIdentifier*, which is composed of two parts: the identifier (*identifier*) and the identifier scheme (*identifierScheme*). The unique identifier scheme is defined for the END reporting scope for all the END data flows, named EUENDCode.

The thematic identifiers have similar characteristics as the INSPIRE external unique object identifier and apply to spatial objects and other objects in the END data model and reporting scope. They must be unique and persistent throughout the END reporting cycles.

Requirement to maintain unique and persistent identifiers in the END reporting scope

Consistency of object identifiers must be preserved between the END data flows and between the END reporting cycles. Once an object in the scope of the END is defined (e.g. agglomeration), it shall keep the unique thematic identifier and/or the INSPIRE external unique object identifier (in case of spatial objects), while the object properties may change.