

6-7 February 2020

Eionet NRC EIS and INSPIRE MIWP 2016.5 Meeting

Designing END – INSPIRE data model for END reporting (Draft data model)

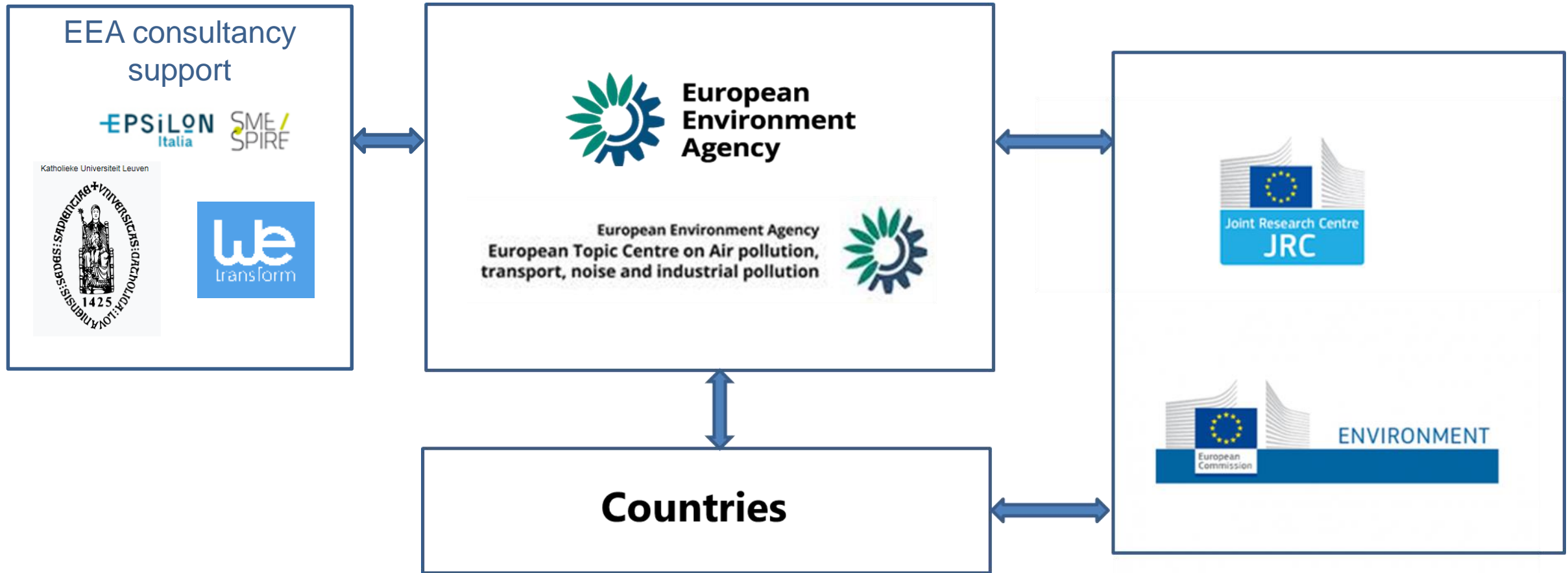


Darja Lihteneger

Outline

- Legal basis
- Data model overview
- Mapping to INSPIRE spatial data themes
- Developing combined data models – content matching
- Data model - noise sources
- Data model - strategic noise maps
- Summary - use of INSPIRE elements
- Testing cases – geoPackage and GML

Team



Legal basis

Noise Directive (END) 2002/49/EC

Directive 2007/2/EC (INSPIRE)

Regulation (EU) 2019/1010 - alignment of reporting obligations of environmental legislation

L 189/12	EN	Official Journal of the European Communities	18.7.2002
DIRECTIVE 2002/49/EC OF THE EUROPEAN PARLIAM AND OF THE COUNCIL of 25 June 2002 relating to the assessment and management of environmental noise			
THE EUROPEAN PARLIAM AND THE COUNCIL OF THE EUROPEAN UNION,			
Having regard to the Treaty establishing the European Community, and in particular Article 175(1) thereof,			
Having regard to the proposal from the Commission (1),			
Having regard to the opinion of the Economic and Social Committee (2),			
Having regard to the opinion of the Committee of the Regions (3),			
Acting in accordance with the procedure laid down in Article 251 of the Treaty (4), and in the light of the joint text approved by the Conciliation Committee on 8 April 2002,			
Whereas:			
(1)	It is part of Community policy to achieve a high level of health and environmental protection, and one of the objectives to be pursued is protection against noise. In the Green Paper on Future Noise Policy, the Commission addressed noise in the environment as one of the main environmental problems in Europe.	(5)	This Directive should inter alia provide a basis for developing and completing the existing set of Community measures concerning noise emitted by the major sources, in particular road and rail vehicles and infrastructure, aircraft, outdoor and industrial equipment and mobile machinery, and for developing additional measures, in the short, medium and long term.
(2)	In its Resolution of 10 June 1997 (5) on the Commission Green Paper, the European Parliament expressed its support for that Green Paper, urged that specific measures and initiatives should be laid down in a Directive on the reduction of environmental noise, and noted the lack of reliable, comparable data regarding the situation of the various noise sources.	(6)	Certain categories of noise such as noise created inside means of transport and noise from domestic activities should not be subject to this Directive.
(3)	A common noise indicator and a common methodology for noise calculation and measurement around airports were identified in the Commission Communication of 1 December 1999 on Air Transport and the Environment. This communication has been taken into account in the provisions of this Directive.	(7)	In accordance with the principle of subsidiarity as set out in Article 5 of the Treaty, the Treaty objectives of achieving a high level of protection of the environment and of health will be better reached by complementing the action of the Member States by a Community action achieving a common understanding of the noise problem. Data about environmental noise levels should therefore be collected, collated or reported in accordance with comparable criteria. This implies the use of harmonised indicators and evaluation methods, as well as criteria for the alignment of noise-mapping. Such criteria and methods can best be established by the Community.
(4)	Certain categories of noise emissions from products are already covered by Community legislation, such as Council Directive 70/157/EEC of 6 February 1970 on		
(1) OJ C 337 E, 28.11.2000, p. 251.			
(2) OJ C 116, 20.4.2001, p. 48.			
(3) OJ C 48, 18.5.2001, p. 7.			
(4) Opinion of the European Parliament of 14 December 2000 (OJ C 212, 17.8.2001), p. 305; Council Common Position of 7 June 2001 (OJ C 207, 23.12.2001), p. 49; and Decision of the European Parliament of 3 October 2001 (OJ C 27 E, 11.4.2002, p. 118); Decision of the European Parliament of 15 May 2002 and Decision of the Council of 21 May 2002.			
(5) OJ C 200, 30.6.1997, p. 28.			

Defines END reporting obligations

25.4.2007	EN	Official Journal of the European Union	L 101/1
1			
(Acts adopted under the EC Treaty/Euratom Treaty whose publication is obligatory)			
DIRECTIVES			
DIRECTIVE 2007/2/EC OF THE EUROPEAN PARLIAM AND OF THE COUNCIL of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE)			
THE EUROPEAN PARLIAM AND THE COUNCIL OF THE EUROPEAN UNION,			
Having regard to the Treaty establishing the European Community, and in particular Article 175(1) thereof,			
Having regard to the proposal from the Commission,			
Having regard to the opinion of the European Economic and Social Committee (1),			
After consulting the Committee of the Regions,			
Acting in accordance with the procedure laid down in Article 251 of the Treaty, in the light of the joint text approved by the Conciliation Committee on 17 January 2007 (2),			
Whereas:			
(1)	Community policy on the environment must aim at a high level of protection taking into account the diversity of situations in the various regions of the Community. Moreover, information, including spatial information, is needed for the formulation and implementation of this policy and other Community policies, which must integrate environmental protection requirements in accordance with Article 6 of the Treaty. In order to bring about such	(2)	The Sixth Environment Action Programme adopted by Decision No 1600/2002/EC of the European Parliament and of the Council of 22 July 2002 (3) requires full consideration to be given to ensuring that the Community's environmental policy-making is undertaken in an integrated way, taking into account regional and local differences. A number of problems exist regarding the availability, quality, organisation, accessibility and sharing of spatial information needed in order to achieve the objectives set out in that programme.
(2)	The problems regarding the availability, quality, organisation, accessibility and sharing of spatial information are common to a large number of policy and information themes and are experienced across the various levels of public authority. Solving these problems requires measures that address exchange, sharing, access and use of interoperable spatial data and spatial data services across the various levels of public authority and across different sectors. An infrastructure for spatial information in the Community should therefore be established.	(3)	The Infrastructure for Spatial Information in the European Community (INSPIRE) should assist policy-making in relation to policies and activities that may have a direct or indirect impact on the environment.
(3)	INSPIRE should be based on the infrastructures for spatial information that are created by the Member States and that are made compatible with common implementing rules and are supplemented with measures at Community level. These measures should ensure that the infrastructures for spatial information created by the Member States are compatible and usable in a Community and transboundary context.	(4)	OJ L 242, 10.9.2002, p. 1.
(4)	OJ C 221, 8.9.2005, p. 33.		
(5)	Opinion of the European Parliament of 7 June 2005 (OJ C 124 E, 25.5.2006, p. 116); Council Common Position of 23 January 2006 (OJ C 126 E, 30.2.2006, p. 14) and Position of the European Parliament of 13 June 2006 (not yet published in the Official Journal); Decision of the Council of 29 January 2007 and legislative resolution of the European Parliament of 13 February 2007 (not yet published in the Official Journal).		

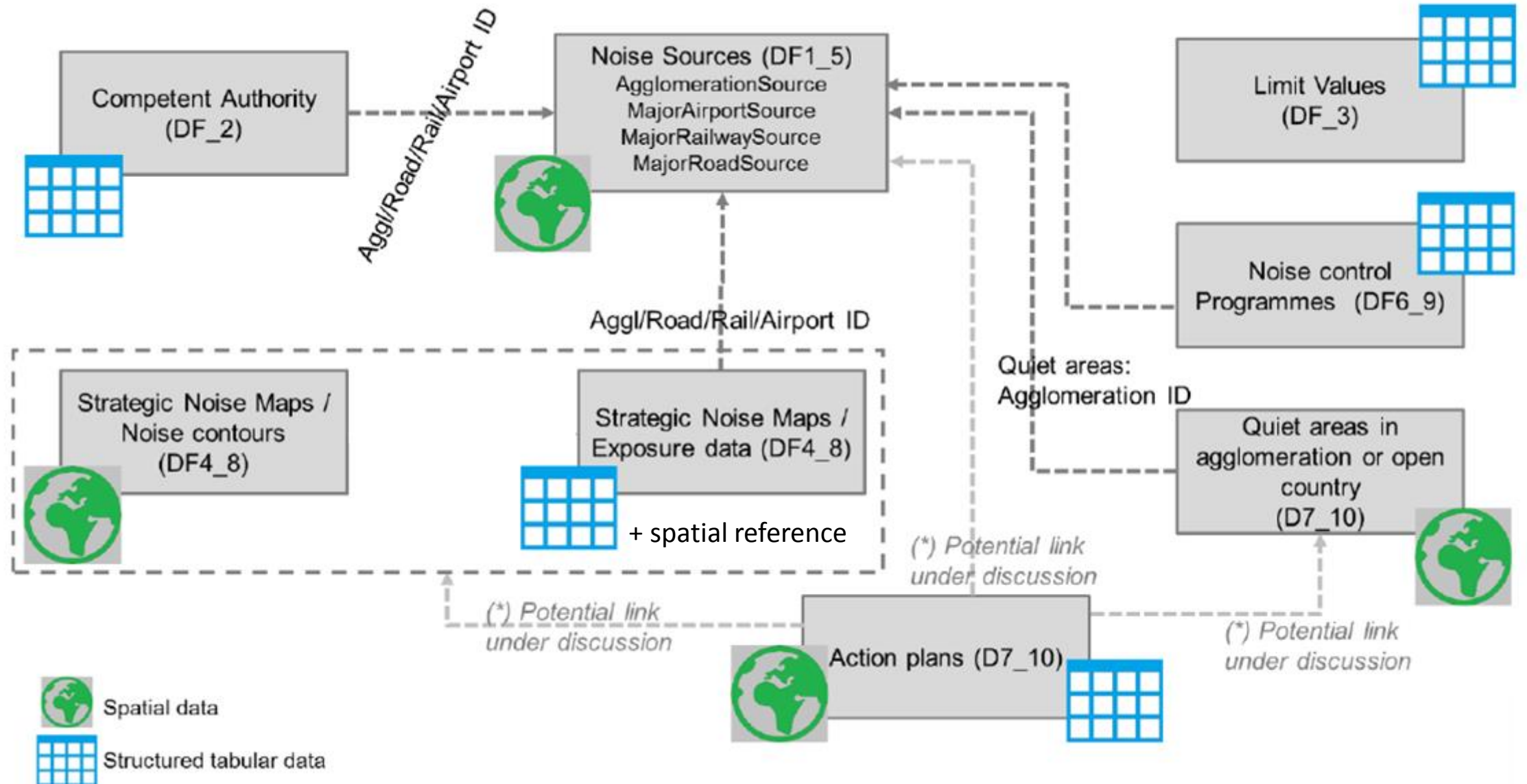
Spatial data themes reflecting on noise phenomena

25.6.2019	EN	Official Journal of the European Union	L 170/115
REGULATION (EU) 2019/1010 OF THE EUROPEAN PARLIAM AND OF THE COUNCIL of 5 June 2019 on the alignment of reporting obligations in the field of legislation related to the environment, and amending Regulations (EC) No 166/2006 and (EU) No 995/2010 of the European Parliament and of the Council, Directives 2002/49/EC, 2004/35/EC, 2007/2/EC, 2009/147/EC and 2010/63/EU of the European Parliament and of the Council, Council Regulations (EC) No 338/97 and (EC) No 2173/2005, and Council Directive 86/278/EEC			
(Text with EEA relevance)			
THE EUROPEAN PARLIAM AND THE COUNCIL OF THE EUROPEAN UNION,			
Having regard to the Treaty on the Functioning of the European Union, and in particular Articles 114, 192(1) and 207 thereof,			
Having regard to the proposal from the European Commission,			
After transmission of the draft legislative act to the national parliaments,			
Having regard to the opinion of the European Economic and Social Committee (1),			
After consulting the Committee of the Regions,			
Acting in accordance with the ordinary legislative procedure (2),			
Whereas:			
(1)	In order to address the need for implementation and compliance information, amendments to several Union legislative acts related to the environment should be introduced, taking into account the results of the Commission report of 9 June 2017 on Actions to Streamline Environmental Reporting and the accompanying Fitness Check on Reporting and Monitoring of EU Environment Policy of 9 June 2017 (together referred to as the Fitness Check on reporting).	(2)	This Regulation seeks to modernise information management and ensure a more consistent approach to the legislative acts within its scope by simplifying reporting so as to reduce the administrative burden, enhancing the database for future evaluations and increasing transparency for the benefit of the public, each time in accordance with the circumstances.

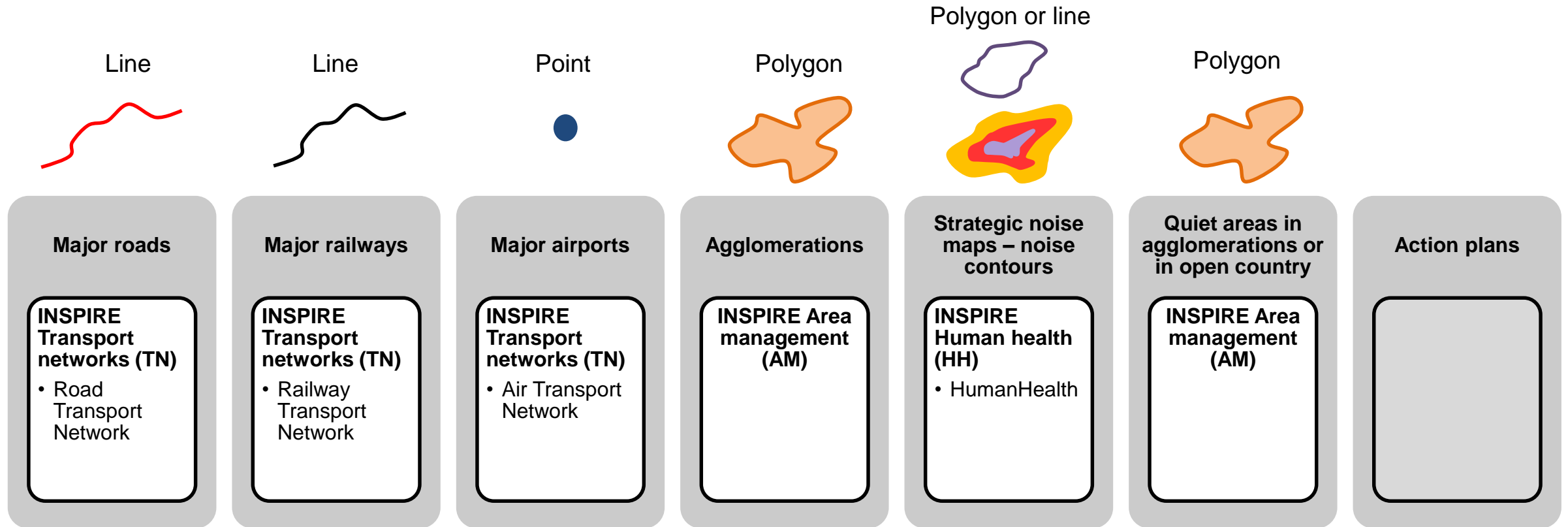
Includes link between END and INSPIRE Directive and dissemination of information, in particular strategic noise maps and action plans



Data model overview – six reporting data flows



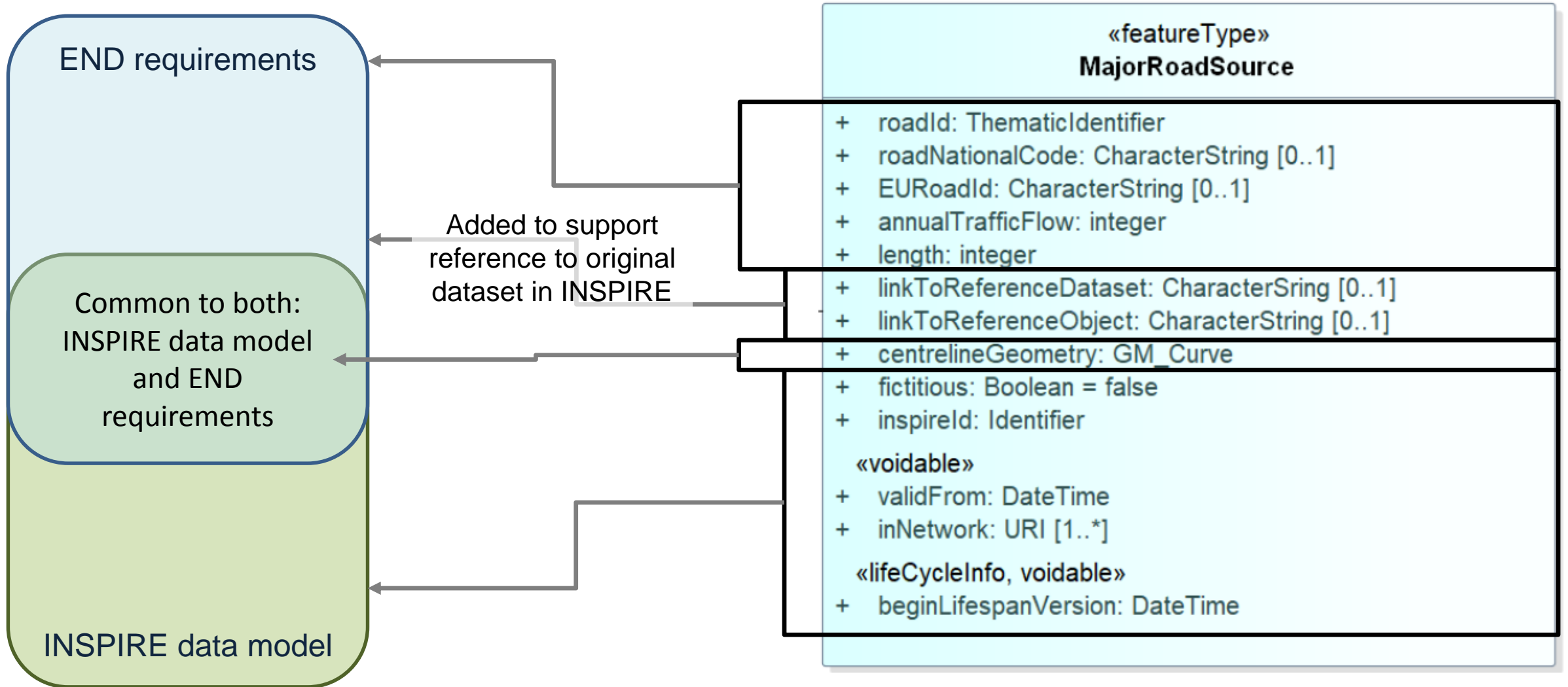
END – INSPIRE spatial data themes relations



References to noise sources, NUTS or LAU units, or particular areas of influence

 INSPIRE spatial data theme

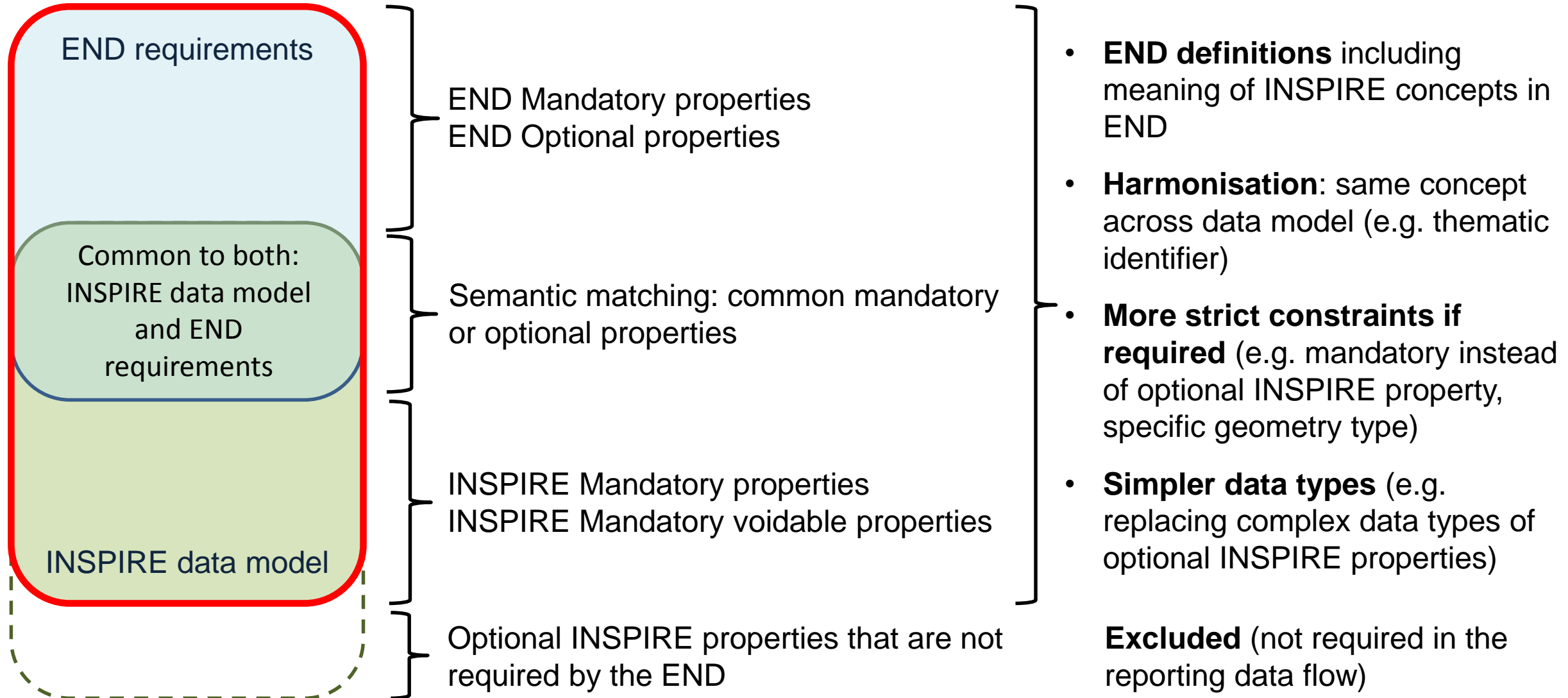
Content matching: END and INSPIRE



Combined data model -
semantically fulfils
END & INSPIRE

Streamlining and simplification

Reporting data model



----- *Datasets can include other INSPIRE properties (not used in END reporting)*



Noise sources and agglomerations

«featureType» MajorRoadSource

- + roadId: ThematicIdentifier
- + roadNationalCode: CharacterString [0..1]
- + EURoadId: CharacterString [0..1]
- + annualTrafficFlow: integer
- + length: integer
- + linkToReferenceDataset: CharacterString [0..1]
- + linkToReferenceObject: CharacterString [0..1]
- + centrelineGeometry: GM_Curve
- + fictitious: Boolean = false
- + inspireId: Identifier

«voidable»

- + validFrom: DateTime
- + inNetwork: URI [1..*]

«lifeCycleInfo, voidable»

- + beginLifespanVersion: DateTime

Based on
INSPIRE TN

RailwayLink

«featureType» MajorRailwaySource

- + railNationalCode: CharacterString [0..1]
- + railId: ThematicIdentifier
- + annualTrafficFlow: integer
- + length: integer
- + linkToReferenceDataset: CharacterString [0..1]
- + linkToReferenceObject: CharacterString [0..1]
- + centrelineGeometry: GM_Curve
- + fictitious: Boolean = false
- + inspireId: Identifier

«voidable»

- + validFrom: DateTime
- + inNetwork: URI [1..*]

«lifeCycleInfo, voidable»

- + beginLifespanVersion: DateTime

Based on
INSPIRE TN

Based on
INSPIRE AM

«featureType» AgglomerationSource

- + agglomerationName: SimpleGeographicalName
- + size: double
- + numberOfInhabitants: integer
- + inspireId: Identifier
- + thematicId: ThematicIdentifier
- + geometry: GM_Object
- + zoneType: ZoneTypeCode
- + specialisedZoneType: SpecialisedZoneTypeCode
- + environmentalDomain: EnvironmentalDomain

«voidable»

- + designationPeriod: TM_Period
- + competentAuthority: RelatedParty [1..*]
- + legalBasis: LegislationCitation [1..*]

«voidable, lifeCycleInfo»

- + beginLifespanVersion: DateTime

«featureType» MajorAirportSource

- + annualTrafficFlow: integer
- + ICAOCode: CharacterString
- + airportName: SimpleGeographicalName
- + geometry: GM_Point
- + linkToReferenceDataset: CharacterString [0..1]
- + linkToReferenceObject: CharacterString [0..1]

Reference to
TN air data

Link to reference dataset/object (INSPIRE)

+ linkToReferenceDataset: CharacterSring [0..1]	→	Optional, but if provided, there is: 1 dataset
+ linkToReferenceObject: CharacterString [0..1]	→	1 object within that dataset

- To support **connectivity with reference data** of transport networks datasets provided **in the INSPIRE infrastructure**
- In the END scope, it is applicable to **major roads, railways and airports**
- It presents a **simple relationship (related to)** between a major road / railway or airport under END with the transport network reference object provided in the INSPIRE infrastructure:
 - Exact (1 to 1)
 - A part of a reference object
 - Indication (a group references only one reference object)

Link to reference dataset/object (INSPIRE) - example

Example:

- Major airport ICAO code:

LOWW

- linkToReferenceDataset

<https://sdigeo-free.austrocontrol.at/geoserver/tn-a/wfs?typenames=tn-a:AerodromeNode&request=GetFeature&service=WFS&version=2.0.0>

- linkToReferenceObject

<https://inspire.austrocontrol.at/AT.0012.6bed1778-d6bf-11e8-9f8b-f2801f1b9fd1/tn-a.AerodromeNode.47>

```
<wfs:FeatureCollection numberMatched="unknown" numberReturned="1" timeStamp="2020-02-06T08:56:30.776Z" xsi:schemaLocation="http://www.opengis.net/wfs/2.0 http://schemas.opengis.net/wfs/2.0/wfs.xsd http://inspire.ec.europa.eu/schemas/tn-a/4.0 http://inspire.ec.europa.eu/schemas/tn-a/4.0/AirTransportNetwork.xsd http://www.opengis.net/gml/3.2 http://schemas.opengis.net/gml/3.2.1/gml.xsd">
```

```
<wfs:member>
```

```
<tn-a:AerodromeNode gml:id="AT.0012.6bed1778-d6bf-11e8-9f8b-f2801f1b9fd1.tn-a.AerodromeNode.47">
```

```
<gml:metaDataProperty xlink:href="https://inspire.austrocontrol.at/AT.0012.6bed1778-d6bf-11e8-9f8b-f2801f1b9fd1"/>
```

```
<gml:identifier codeSpace="http://inspire.jrc.ec.europa.eu/ids">
```

```
https://inspire.austrocontrol.at/AT.0012.6bed1778-d6bf-11e8-9f8b-f2801f1b9fd1/tn-a.AerodromeNode.47
```

```
</gml:identifier>
```

```
<net:beginLifespanVersion>2020-01-02T00:00:00Z</net:beginLifespanVersion>
```

```
<net:inspireId>
```

```
<base:Identifier>
```

```
<base:localId>tn-a.AerodromeNode.47</base:localId>
```

```
<base:namespace>
```

```
https://inspire.austrocontrol.at/AT.0012.6bed1778-d6bf-11e8-9f8b-f2801f1b9fd1/
```

```
</base:namespace>
```

```
<base:versionId>2020-01-02</base:versionId>
```

```
</base:Identifier>
```

Identifier

```
<gml:Point gml:id="AT.0012.6bed1778-d6bf-11e8-9f8b-f2801f1b9fd1.tn-a.AerodromeNode.47.GEOM"
```

```
srsDimension="2" srsName="http://www.opengis.net/def/crs/EPSSG/0/4258">
```

```
<gml:pos>48.11034793 16.56961347</gml:pos>
```

```
</gml:Point>
```

Geometry

```
<gn:text>Wien-Schwechat</gn:text>
```

Airport name

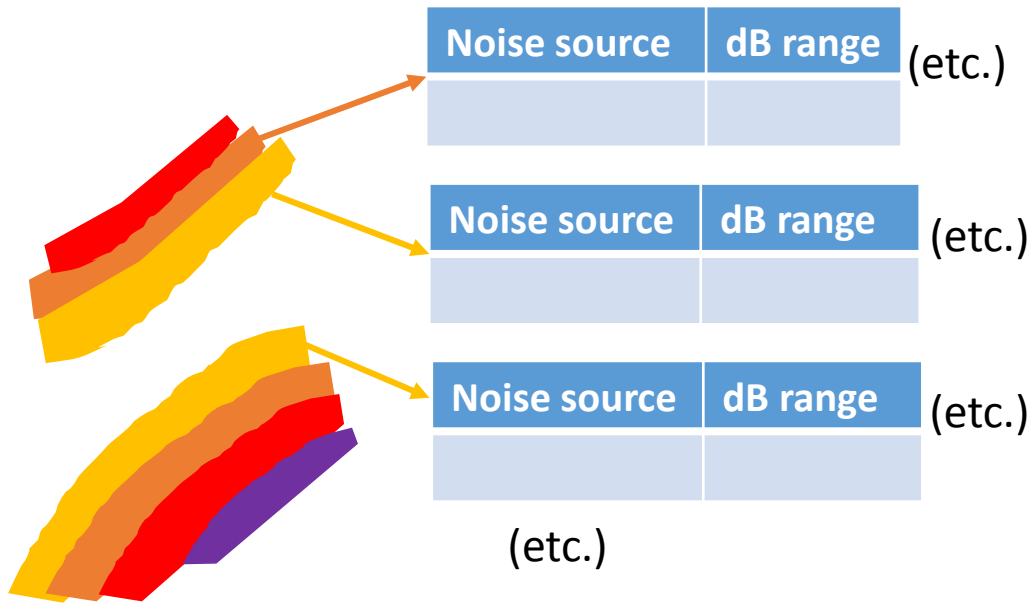
```
<tn-a:locationIndicatorICAO>LOWW</tn-a:locationIndicatorICAO>
```

ICAO code



Strategic noise maps (DF4_8): noise contours and exposure data concept

Noise contours

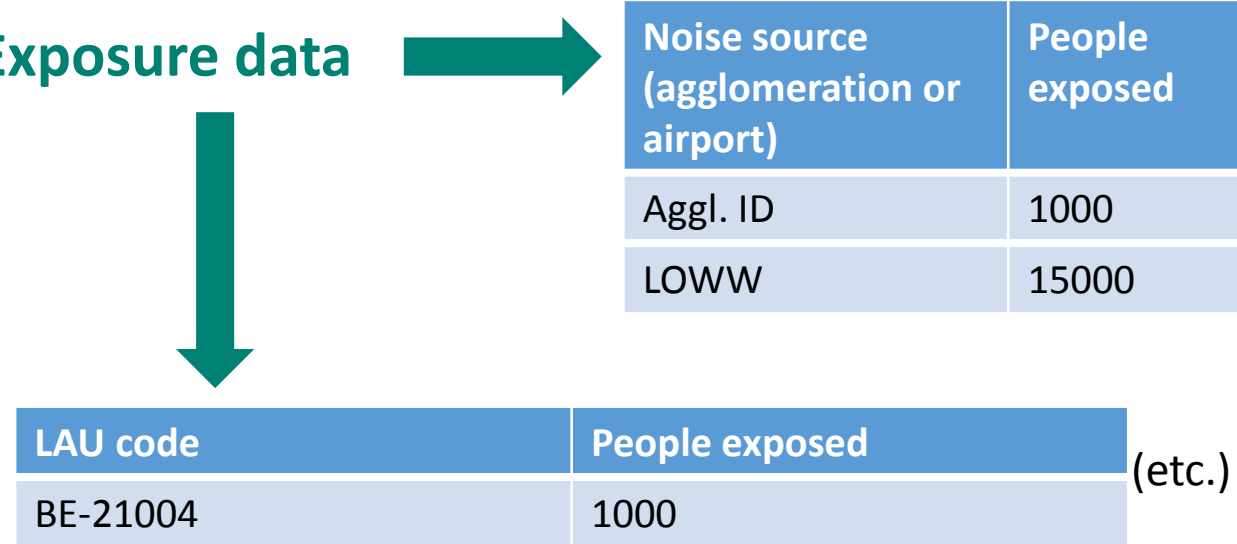


Noise contours provided based on INSPIRE HH

Combination of data through geospatial data overlay (postprocessing of reported data)



Exposure data



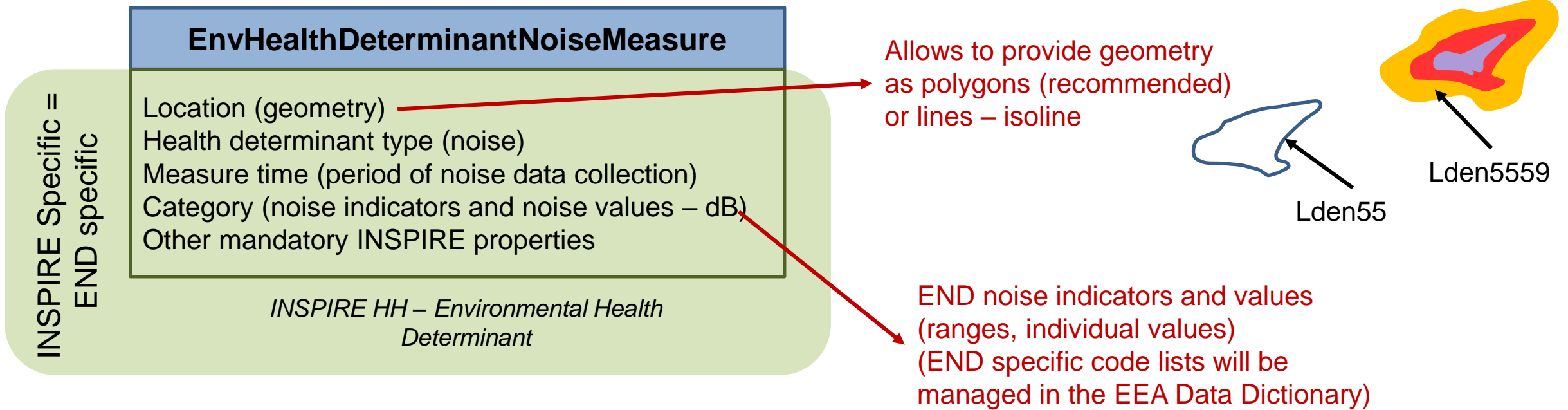
Reference to administrative / territorial units (spatial data):
 NUTS1, NUTS2, NUTS3, LAU
 Recommended to use LAU (higher granularity of details)

Exposure data (population, noise indicators, noise sources):

- Exposed population
- Exposed population in different types of dwellings
- Number of dwellings
- Number of schools
- Number of hospitals



Strategic noise maps (DF4_8): noise contours



INSPIRE HH:

- INSPIRE HH includes noise as one of environmental health determinants
- INSPIRE HH data model is currently in revision to correct errors and fit with END noise contours

Changes and improvements:

- New data model, completely re-using INSPIRE data model
- Geometry is to be provided according to geospatial data practice
- More uniform way of providing noise indicators and values (range or individual value) by using code lists
- Noise range values aligned between noise contours and exposed population data



Strategic noise maps (DF4_8): exposure data / draft

Major roads

- NUTS, LAU units

Major railways

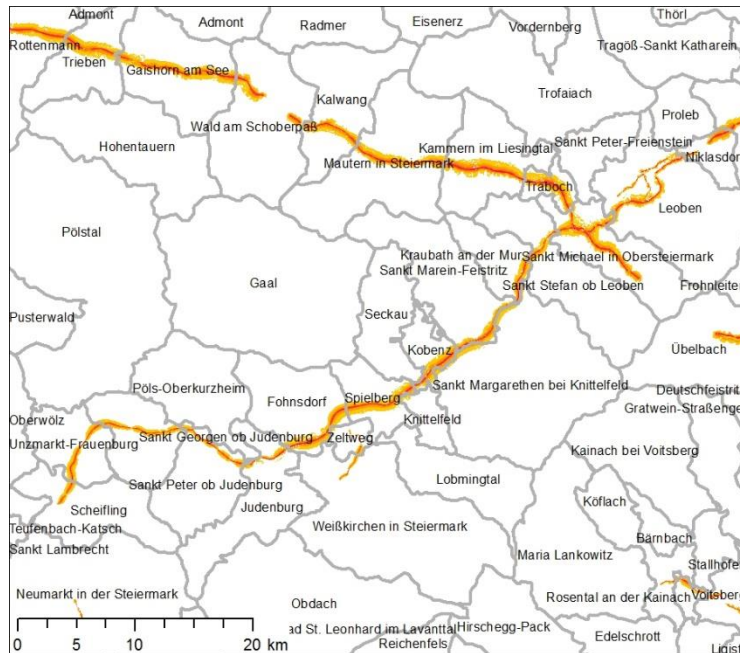
- NUTS, LAU units

Major airports

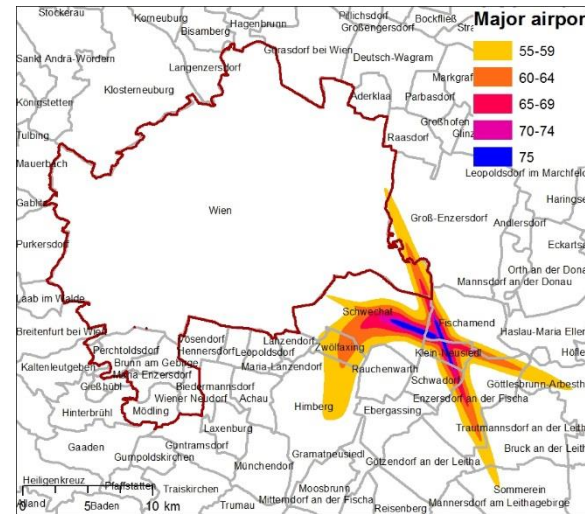
- ICAO code
- LAU

Agglomeration

- Agglomeration ID
- LAU



Exposure data per NUTS / LAU units
(in scope with noise contours)



Provision of exposure data at
LAU level or at ICAO level
code: country will need to
select the granularity (in
scope with noise contours)



Provision of exposure data at
LAU level or at agglomeration
level: country will need to
select the granularity (in
scope with noise contours)

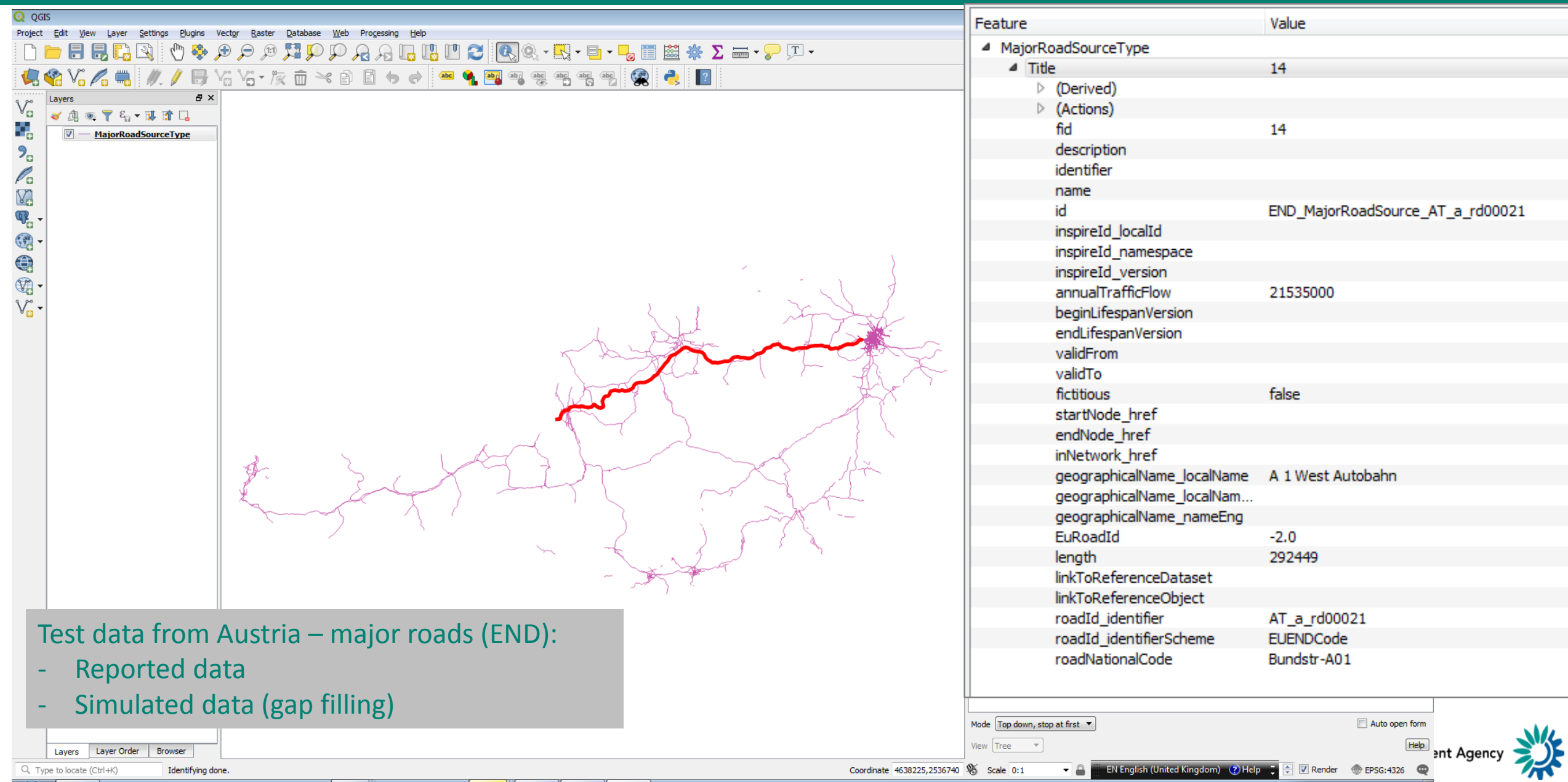
Summary: use of INSPIRE elements in data modelling

- INSPIRE data models
- Geometry
- Strengthening use of identifiers:
 - External object identifiers (Identifier)
 - Thematic identifiers (ThematicIdentifier)
- Common use of simplified INSPIRE data types across data models:
 - Simple geographical name
 - Simple citation
- Strengthening use of code lists:
 - Extended INSPIRE code lists
 - Specific END code lists

Testing cases - encodings

- **Major roads as geoPackage:**
 - geoPackage schema (flat structure)
 - Data transformation (using reported data)
 - Open issues:
 - Scope of generic information
 - Voidable information
 - Code values (value, URL, both ?)
- **Noise agglomerations as GML:**
 - Extended INSPIRE GML application schema
 - Data transformation (using reported data)
 - Data validation with INSPIRE Validator

Testing case – encoding geoPackage (example, draft)



The screenshot shows the QGIS interface with a map of Austria. A network of roads is visible, with one segment highlighted in red. The attribute table on the right provides detailed information for this feature.

Feature	Value
MajorRoadSourceType	
Title	14
(Derived)	
(Actions)	
fid	14
description	
identifier	
name	
id	END_MajorRoadSource_AT_a_rd00021
inspireId_localId	
inspireId_namespace	
inspireId_version	
annualTrafficFlow	21535000
beginLifespanVersion	
endLifespanVersion	
validFrom	
validTo	
fictitious	false
startNode_href	
endNode_href	
inNetwork_href	
geographicalName_localName	A 1 West Autobahn
geographicalName_localNam...	
geographicalName_nameEng	
EuRoadId	-2.0
length	292449
linkToReferenceDataset	
linkToReferenceObject	
roadId_identifier	AT_a_rd00021
roadId_identifierScheme	EUENDCode
roadNationalCode	Bundstr-A01

Test data from Austria – major roads (END):

- Reported data
- Simulated data (gap filling)

Coordinate: 4638225,2536740 | Scale: 0:1 | EN English (United Kingdom) | Help | Render | EPSG:4326

Thank you for your attention!

Questions ...

