INSPIRE
Infrastructure for Spatial Information in Europe

D2.8.I.3 INSPIRE Data Specification on Geographical Names – Guidelines

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Foreword
How to read the document?

This guideline describes the INSPIRE Data Specification on *Geographical names* as developed by the Thematic Working Group Geographical Names using both natural and a conceptual schema languages. The data specification is based on the agreed common INSPIRE data specification template.

The guideline contains detailed technical documentation of the data specification highlighting the mandatory and the recommended elements related to the implementation of INSPIRE. The technical provisions and the underlying concepts are often illustrated by examples. Smaller examples are within the text of the specification, while longer explanatory examples are attached in the annexes. The technical details are expected to be of prime interest to those organisations that are/will be responsible for implementing INSPIRE within the field of *Geographical names*.

At the beginning of the document, two executive summaries are included that provide a quick overview of the INSPIRE data specification process in general, and the content of the data specification on *Geographical names* in particular. We highly recommend that managers, decision makers, and all those new to the INSPIRE process and/or information modelling should read these executive summaries first.

The UML diagrams (in Chapter 5) offer a rapid way to see the main elements of the specifications and their relationships. Chapter 5 also contains the Feature Catalogue including the definition of the spatial object types, attributes, and relationships. People having thematic expertise but not familiar with UML can fully understand the content of the data model focusing on the Feature Catalogue. Users might also find the Feature Catalogue especially useful to check if it contains the data necessary for the applications that they run.

The document will be publicly available as a ‘non-paper’. It does not represent an official position of the European Commission, and as such can not be invoked in the context of legal procedures.

Interoperability of Spatial Data Sets and Services – General Executive Summary

The challenges regarding the lack of availability, quality, organisation, accessibility, and sharing of spatial information are common to a large number of policies and activities and are experienced across the various levels of public authority in Europe. In order to solve these problems it is necessary to take measures of coordination between the users and providers of spatial information. The Directive 2007/2/EC of the European Parliament and of the Council adopted on 14 March 2007 aims at establishing an Infrastructure for Spatial Information in the European Community (INSPIRE) for environmental policies, or policies and activities that have an impact on the environment.

INSPIRE will be based on the infrastructures for spatial information that are created and maintained by the Member States. To support the establishment of a European infrastructure, Implementing Rules addressing the following components of the infrastructure are being specified: metadata, interoperability of spatial data themes (as described in Annexes I, II, III of the Directive) and spatial data services, network services and technologies, data and service sharing, and monitoring and reporting procedures.

INSPIRE does not require collection of new data. However, after the period specified in the Directive[1] Member States have to make their data available according to the Implementing Rules.

Interoperability in INSPIRE means the possibility to combine spatial data and services from different sources across the European Community in a consistent way without involving specific efforts of humans or machines. It is important to note that "interoperability" is understood as providing access to spatial data sets through network services, typically via Internet. Interoperability may be achieved by either changing (harmonising) and storing existing data sets or transforming them via services for publication in the INSPIRE infrastructure. It is expected that users will spend less time and efforts on understanding and integrating data when they build their applications based on data delivered within INSPIRE.

In order to benefit from the endeavours of international standardisation bodies and organisations established under international law their standards and technical means have been referenced, whenever possible.

To facilitate the implementation of INSPIRE, it is important that all stakeholders have the opportunity to participate its specification and development. For this reason, the Commission has put in place a consensus building process involving data users and providers together with representatives of industry, research, and government. These stakeholders, organised through Spatial Data Interest Communities (SDIC) and Legally Mandated Organisations (LMO)[2], have provided reference materials, participated in the user requirement and technical[3] surveys, proposed experts for the Data Specification Drafting Team[4] and Thematic Working Groups[5], expressed their views on the drafts of the technical documents of the data specification development framework[6]; they have reviewed and tested the draft data specifications and have been invited to comment the draft structure of the implementing rule on interoperability of spatial data sets and services.

The development framework elaborated by the Data Specification Drafting Team aims at keeping the data specifications of the different themes coherent. It summarises the methodology to be used for the

[1] For Annex I data: within two years of the adoption of the corresponding Implementing Rules for newly collected and extensively restructured data and within 7 years for other data in electronic format still in use.

[2] The number of SDICs and LMOs on 21/08/2009 was 301 and 176 respectively

[3] Surveys on unique identifiers and usage of the elements of the spatial and temporal schema,

[4] The Data Specification Drafting Team has been composed of experts from Austria, Belgium, Czech Republic, France, Germany, Greece, Italy, Netherlands, Norway, Poland, Switzerland, UK, and the European Environmental Agency

[5] The Thematic Working Groups of Annex I themes have been composed of experts from Belgium, Czech Republic, Denmark, Finland, France, Germany, Hungary, Italy Netherland, Norway, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland, UK, the European Commission, and the European Environmental Agency

[6] Four documents describing common principles for data specifications across all spatial data themes. See further details in the text.

data specifications and provides a coherent set of requirements and recommendations to achieve interoperability. The pillars of the framework are four technical documents:

- The Definition of Annex Themes and Scope[7] describes in greater detail the spatial data themes defined in the Directive, and thus provides a sound starting point for the thematic aspects of the data specification development.

- The Generic Conceptual Model[8] defines the elements necessary for interoperability and data harmonisation including cross-theme issues. It specifies requirements and recommendations with regard to data specification elements of common use, like the spatial and temporal schema, unique identifier management, object referencing, a generic network model, some common code lists, etc. Those requirements of the Generic Conceptual Model that are directly implementable will be included in the Implementing Rule on Interoperability of Spatial Data Sets and Services.

- The Methodology for the Development of Data Specifications[9] defines a repeatable methodology enabling to arrive from user requirements to a data specification through a number of steps including use-case development, initial specification development and analysis of analogies and gaps for further specification refinement.

- The "Guidelines for the Encoding of Spatial Data"[10] defines how geographic information can be encoded to enable transfer processes between the systems of the data providers in the Member States. Even though it does not specify a mandatory encoding rule it sets GML (ISO 19136) as the default encoding for INSPIRE.

Based on the data specification development framework, the Thematic Working Groups have created the INSPIRE data specification for each Annex I theme. The data specifications follow the structure of "ISO 19131 Geographic information - Data product specifications" standard. They include the technical documentation of the application schema, the spatial object types with their properties, and other specifics of the spatial data themes using natural language as well as a formal conceptual schema language[11].

A consolidated model repository, feature concept dictionary, and glossary are being maintained to support the consistent specification development process and potential further reuse of specification elements. The consolidated model consists of the harmonised models of the relevant standards from the ISO 19100 series, the INSPIRE Generic Conceptual Model, and the application schemas[12] developed for each spatial data theme. The multilingual INSPIRE Feature Concept Dictionary contains the definition and description of the INSPIRE themes together with the definition of the spatial object types present in the specification. The INSPIRE Glossary defines all the terms (beyond the spatial object types) necessary for understanding the INSPIRE documentation including the terminology of other components (metadata, network services, data sharing, and monitoring).

By listing a number of requirements and making the necessary recommendations, the data specifications enable full system interoperability across the Member States, within the scope of the application areas targeted by the Directive. They are published as technical guidelines and provide the basis for the content of the Implementing Rule on Interoperability of Spatial Data Sets and Services for data themes included in Annex I of the Directive. The Implementing Rule will be extracted from the data specifications keeping in mind the technical feasibility as well as cost-benefit considerations. The Implementing Rule will be legally binding for the Member States.

In addition to providing a basis for the interoperability of spatial data in INSPIRE, the data specification development framework and the thematic data specifications can be reused in other environments at

[7] http://inspire.jrc.ec.europa.eu/reports/ImplementingRules/DataSpecifications/D2.3_Definition_of_Annex_Themes_and_scope_v3.0.pdf
[8] http://inspire.jrc.ec.europa.eu/reports/ImplementingRules/DataSpecifications/D2.5_v3.1.pdf
[9] http://inspire.jrc.ec.europa.eu/reports/ImplementingRules/DataSpecifications/D2.6_v3.0.pdf
[10] http://inspire.jrc.ec.europa.eu/reports/ImplementingRules/DataSpecifications/D2.7_v3.0.pdf
[11] UML – Unified Modelling Language
[12] Conceptual models related to specific areas (e.g. INSPIRE themes)

local, regional, national and global level contributing to improvements in the coherence and interoperability of data in spatial data infrastructures.

Geographical names - Executive Summary

Geographical names are included in Annex I of the Directive, which means that they are considered as reference data, i.e. data that constitute the spatial frame for recognising geographical location in general, as well as linking to and/or pointing at other information that belong to specific thematic fields such as environment, addresses, area management, human health and many others.

Geographical names are widely used in every-day communication for referring to various natural and man-made objects in the real world. Consequently they are interconnected with other themes in INSPIRE. Administrative units, addresses, elements of hydrography (lakes, rivers etc.), elements of transport networks (airports, bridges etc.) and protected sites are usually referred to by their names.

Geographical names are used extensively when searching for information in web-services (including geoportals), navigating, referencing thematic information to a location (geocoding), visualising geographic information on maps and screens, as well as when processing spatial data sets comprising historical data. Correct usage of geographical names is a principal aspect of everyday communication; consequently the status (official, historical…) linguistic properties (language, spelling, eventual transliteration, etc.) are a prime interest of many users, including press agencies, map publishers, spatial analysts, authorities, etc.

The INSPIRE data specification on geographical names has been prepared following the participative principle of a consensus building process. The stakeholders, based on their registration as a Spatial Data Interest Community (SDIC) or a Legally Mandated Organisation (LMO), had the opportunity to bring forward user requirements and reference materials, propose experts for the specification development, and to participate in reviewing and testing the data specifications. The Thematic Working Group responsible for the specification development of *Geographical names* was composed of experts coming from Belgium, Finland, France, Germany, Norway, and Spain. The specification process took place according to the methodology elaborated for INSPIRE respecting the requirements and the recommendation of the INSPIRE Generic Conceptual Model.

In everyday life, the same place can be referred to by several names. In order to reflect this approach the central element of the INSPIRE geographical names data model is the spatial object “named place” that can carry one or more names. The specifications of geographical names can be used for modelling names in any other INSPIRE theme.

Each named place has a unique INSPIRE identifier. It is further characterised by the eventual name(s), geometrical representation and if available, type[13], local type[14], indicative scale of usage, and the possibly related spatial objects. The latter helps to preserve consistency between data at different levels of detail. In addition, life-cycle information[15] should be given if available.

Geographical names are proper nouns applied to real world entities. All names related to the same real world entity have to be provided with correct spelling. If available, further properties on the names are given, such as the language, the source and the status[16] of the name, the script[17] used, and (when relevant) the transliteration[18] scheme. A specific attribute describes if the name is an endonym[19] or exonym[20]. As part of linguistic information, the pronunciation of the name can be given either using the International Phonetic Alphabet, or linking the URI[21] of a sound file.

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[13] Characterisation of the kind of entity designated by the geographical names according to the code list of INSPIRE. Whenever possible, types are taken from the INSPIRE Feature Concept Dictionary (administrative units, buildings, hydrography, land cover, transport network, protected sites) that are complemented by other frequently used types like elements of landforms and populated places. The not categorised types belong to the Other category.

[14] Characterisation of the kind of entity as defined by the data provider.

[15] when the named place has been inserted / changed, or eventually superseded / retired in the spatial data set

[16] official, standardised, historical, other

[17] Set of graphic symbols employed in writing a particular name, like Latin, Cyrillic, Greek, etc.

[18] Method of conversion between different scripts

[19] “Name of a spatial object in an official or well established language occurring in that area where the feature is situated.” (from [UNGEGN Glossary 2007])

Interoperability is also supported by a common reference system[22] and provisions for visualisation. For the latter simple rules for default portrayal are given. The typefaces and fonts used for the portrayal of geographical names shall fully and correctly reproduce all the letters and diacritics/accents present in the spellings of the geographical names to be visualised.

The main value of the INSPIRE geographical names model is it is a simple yet flexible structure that allows geographical names to be used as an attribute of a spatial object, either modelled within the geographical names theme or in any other theme of INSPIRE. The possibility of linking more names with the same named places gives the opportunity to integrate minority languages and exonyms, which are an important contribution to European multilingualism.

As the specification on INSPIRE geographical names is the result of a detailed analysis of user requirements and involves strong consideration of existing initiatives[23] that go beyond the strictly environmental scope, it is expected that it will also be a solid element of a multi-purpose European spatial data infrastructure.

[20] "Name used in a specific language for a geographical feature situated outside the area where that language is widely spoken, and differing in its form from the respective endonym(s) in the area where the geographical feature is situated." (from [UNGEGN Glossary 2007])
[21] Unique Resource Identifier
[22] ETRS89 or (when applicable) ITRS
[23] For example UNGEGN and EuroGeoNames project

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1 Scope

This document specifies a harmonised data specification for the spatial data theme *Geographical Names* as defined in Annex I of the INSPIRE Directive.

This data specification provides the basis for the drafting of Implementing Rules according to Article 7 (1) of the INSPIRE Directive [Directive 2007/2/EC]. The entire data specification will be published as implementation guidelines accompanying these Implementing Rules.

2 Overview

2.1 Name and acronyms

INSPIRE data specification for the theme *Geographical Names*

2.2 Informal description

Definition:
Names of areas, regions, localities, cities, suburbs, towns or settlements, or any geographical or topographical feature of public or historical interest.
[Directive 2007/2/EC]

Description:
This data specification describes concepts related with geographical names, i.e. proper nouns applied to a natural, man-made or cultural real world entity. The data specification is guided by the multi-language and multi-scriptual situation in Europe: a geographic entity can have different names in one or several languages, and each name can have different spellings, i.e. spellings in different scripts.

Because of this multi-language and multi-scriptual context, this specification defines a product that is feature oriented in order to enable to express which different names are used to designate one given place. In other words, the spatial objects defined in this specification are the 'named places', and the 'geographical names' are seen as information related to a named place. However, the product focuses on the description of names rather than the description of spatial objects: it particularly describes characteristics of names like their language and spellings in different scripts.

In some cases names can be applied as attributes of appropriately modelled spatial objects in other themes defined by INSPIRE. However, often the definition, classification, geometry and other attributes of these objects do not necessary correspond with the respective named places as defined by this data specification, which focuses on the names aspects. Besides, commonly named geographic entities such as elevations, islands or coastal land formations are seldom modelled as spatial objects in other themes, while they are modelled as named places in this specification.

Requirement 1	Spatial data sets with a focus on Geographical Names (e.g. Toponymic data files, names data sets, gazetteers) shall be published according to the *Geographical names* specification.

Recommendation 1	Any other data set with information on geographical names may be published according to the *Geographical names* specification. This is recommended in particular for Member States if no names data set exists, or where the other data sets complement the information from the names data sets. In the latter case, the data provider should ensure consistency as the data is published and, if possible, undertake action to integrate the data sources.

Geographical names serve as a means to identify locations. They may be used, together with appropriate information on the named entity, in different products like maps and gazetteers as well as respective services. *Gazetteers* and gazetteer services associate the names with corresponding features – or locations – by means of co-ordinates, feature types and/or other necessary information. Among other needs, this data specification aims at answering to the need of a multi-lingual pan-European gazetteer (service) that shall most probably be established as a part of INSPIRE.

2.3 Normative References

[Directive 2007/2/EC] Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE)

[ISO 19112] EN ISO 19112:2003, Geographic information – Spatial referencing by geographic identifiers

[ISO 19115] EN ISO 19115:2005, Geographic information – Metadata (ISO 19115:2003)

[ISO 15924] EN ISO 15924:2004, Codes for the representation of names of scripts

[ISO 19136] EN ISO 19136:2007, Geographic information - Geography Markup Language (GML)

[ISO 19137] EN ISO 19137:2007, Geographic information -- Core profile of the spatial schema.

[ISO 19139] ISO/TS 19139:2007, Geographic information – Metadata – XML schema implementation

[ISO 639-2] EN ISO 639-2:1998, Codes for the representation of names of languages - Part 2: Alpha-3 Code.

[ISO 639-3] EN ISO 639-3:2007, Codes for the representation of names of languages - Part 3: Alpha-3 code for comprehensive coverage of languages

[ISO 639-5] EN ISO 639-5:2008, Codes for the representation of names of languages - Part 5: Alpha-3 code for language families and groups

[Regulation 1205/2008/EC] Regulation 1205/2008/EC implementing Directive 2007/2/EC of the European Parliament and of the Council as regards metadata

2.4 Information about the creation of the specification

Document title: INSPIRE Data Specification *Geographical names*
Reference date: 2009-09-07
Responsible party: INSPIRE TWG *Geographical names*
Language: English

2.5 Terms and definitions

Terms and definitions necessary for understanding this document are defined in the INSPIRE Glossary[24].

2.6 Symbols and abbreviations

EGN EuroGeoNames
ETRS European Terrestrial Reference System

[24] The INSPIRE Glossary is available from http://inspire-registry.jrc.ec.europa.eu/registers/GLOSSARY

ETRS-LAEA	ETRS - Lambert Azimuthal Equal Area
ETRS-LCC	ETRS - Lambert Conformal Conic
ETRS-TMzn	ETRS - Transverse Mercator
EU	European Union
EVN-DB	Exonyms and other Variant Names database (used by EuroGeoNames project)
EVRS	European Vertical Reference System
GML	Geography Markup Language
INSPIRE	Infrastructure for Spatial Information in the European Community
IPA	International Phonetic Alphabet
ISO	International Organization for Standardization
NMCA	National Mapping and Cadastral Agency
OGC	Open Geospatial Consortium
UID	Universal Identifier
UML	Unified Modelling Language
UN	United Nations
UNGEGN	United Nations Group of Experts on Geographical Names
UTC	Coordinated Universal Time
UTF	UCS (Universal Multiple-Octet Coded Character Set) Transformation Format
WFS	Web Feature Service

2.7 Notation of requirements and recommendations

To make it easier to identify the mandatory requirements and the recommendations for spatial data sets in the text, they are highlighted and numbered.

Requirement X Requirements are shown using this style.

Recommendation X Recommendations are shown using this style.

2.8 Conformance

Requirement 2 Any dataset claiming conformance with this INSPIRE data specification shall pass the requirements described in the abstract test suite presented in Annex A.

3 Specification scopes

This data specification has only one scope, the general scope.

4 Identification information

Table 1 – Information identifying the INSPIRE data specification *Geographical names*

Title	INSPIRE data specification *Geographical names*
Abstract	This specification describes how to model geographical names, i.e. proper nouns applied to a natural, man-made or cultural feature on Earth. Because of the multi-language and multi-scriptual context, this specification defines a product that is feature oriented in order to enable to express which different names are used to designate one given place. In other words, the spatial objects defined in this specification are the 'named places', and the 'geographical names' are seen as information related to a named place. However, the product focuses on the description of names rather than the description of spatial objects: it particularly describes characteristics of names like their language and spellings in different scripts.

Topic categories	Location
Geographic description	This INSPIRE data specification covers spatial data sets which relate to an area where a Member State has and/or exercises jurisdictional rights.
Purpose	The purpose of this document is to specify a harmonised data specification for the spatial data theme *Geographical names* as defined in Annex I of the INSPIRE Directive. Typically, geographical names may be useful - as search criteria (location), e.g. in a geoportal, for rescue services, geocoding, geoparsing and navigation. - as geographical identifiers, e.g. in gazetteer services. - for visualisation, e.g. as information layer in viewing services. - in standardisation, translation, and compilation of maps, reports, documents and articles. For instance, reliable information on the correct spelling and the status of names is required by press agencies and map producers. - for the processing of spatial data sets, e.g. for integration of historical data. - in human and social science, e.g. in linguistic research, onomastic science, archaeology and etymology.
Spatial representation type	Vector
Spatial resolution	*Geographical names* data are used at all levels of resolution. The spatial resolution of a geographical names data set is typically described by the scale of the map where it has been captured from, or for which it has been captured. Note1: At the data set level and for geographical names, the most significant aspect related to spatial resolution is the density of features, i.e. the number of named places per area. Other aspects related to the concept of spatial resolution, like the precision or granularity of geometries of named places, are also relevant but generally of secondary importance for most use cases. Note2: A typical names data source contains information at various spatial resolutions (e.g. names of mountain ranges together with names of hamlets). In this specification, the relevance of a given named place at a given scale may thus be described at the feature level (see attributes defining the viewing scale range in section 5.2.2.1.1). Note3: Beyond the spatial resolution, the richness of a geographical names data set may also be acknowledged through the number of names associated to each named place and their related properties (like names in different languages, or various forms of names such as complete and short forms of country and administrative unit names).
Supplemental information	The schema defined in this specification, and more precisely the class *GeographicalName*, together with its related classes *SpellingOfName* and *PronunciationOfName*, may be used for modelling names in any other INSPIRE theme. Some hints on this topic are given in Annex C, but this specification does not formally specify requirements on this issue. In addition, geographical names modelled according to this specification could be used to populate a gazetteer. Some hints on this topic are given in Annex D even if this specification does not formally specify requirements on this issue either.

5 Data content and structure

Requirement 3	Spatial data sets related to the theme Geographical names shall be provided using the spatial object types and data types specified in the application schema in this section.

Requirement 4	Each spatial object shall comply with all constraints specified for its spatial object type or data types used in values of its properties, respectively.

Recommendation 2	The reason for a void value should be provided where possible using a listed value from the VoidValueReason code list to indicate the reason for the missing value.

NOTE The application schema specifies requirements on the properties of each spatial object including its multiplicity, domain of valid values, constraints, etc. All properties have to be reported, if the relevant information is part of the data set. Most properties may be reported as "void", if the data set does not include relevant information. See the Generic Conceptual Model [INSPIRE DS-D2.5] for more details.

5.1 Basic notions

This section explains some of the basic notions used in the INSPIRE application schemas. These explanations are based on the GCM [DS-D2.5].

5.1.1 Placeholder and candidate types

Placeholder and candidate types are not applicable in the data specification on *Geographical names*,

5.1.2 Voidable characteristics

If a characteristic of a spatial object is not present in the spatial data set, but may be present or applicable in the real world, the property shall receive this stereotype.

If and only if a property receives this stereotype, the value of *void* may be used as a value of the property. A *void* value shall imply that no corresponding value is contained in the spatial data set maintained by the data provider or no corresponding value can be derived from existing values at reasonable costs, even though the characteristic may be present or applicable in the real world.

It is possible to qualify a value of void in the data with a reason using the VoidValueReason type. The VoidValueReason type is a code list, which includes the following pre-defined values:

- *Unpopulated*: The characteristic is not part of the dataset maintained by the data provider. However, the characteristic may exist in the real world. For example when the "elevation of the water body above the sea level" has not been included in a dataset containing lake spatial objects, then the reason for a void value of this property would be 'Unpopulated'. The characteristic receives this value for all objects in the spatial data set.
- *Unknown*: The correct value for the specific spatial object is not known to, and not computable by the data provider. However, a correct value may exist. For example when the "elevation of the water body above the sea level" *of a certain lake* has not been measured, then the reason for a void value of this property would be 'Unknown'. This value is applied on an object-by-object basis in a spatial data set.

NOTE It is expected that additional reasons will be identified in the future, in particular to support reasons / special values in coverage ranges.

The «voidable» stereotype does not give any information on whether or not a characteristic exists in the real world. This is expressed using the multiplicity:

- If a characteristic may or may not exist in the real world, its minimum cardinality shall be defined as 0. For example, an if an Address may or may not have a house number, the multiplicity of the corresponding property shall be 0..1.
- If at least one value for a certain characteristic exists in the real world, the minimum cardinality shall be defined as 1. For example, if an Administrative Unit always has at least one name, the multiplicity of the corresponding property shall be 1..*.

In both cases, the «voidable» stereotype can be applied. A value (the real value or void) only needs to be made available for properties that have a minimum cardinality of 1.

5.1.3 Code lists and Enumerations

5.1.3.1 Style

All code lists and enumerations use the following modelling style:

- No initial value, but only the attribute name part is used.
- The attribute name conforms to the rules for attributes names, i.e. is a lowerCamelCase name. Exceptions are words that consist of all uppercase letters (acronyms).

5.1.3.2 Governance

Two types of code lists can be distinguished:

- code lists that shall be managed centrally in the INSPIRE code list register and only values from that register may be used, and
- code lists that may be extended by data providers.

All code lists that are centrally managed shall receive the tagged value "codeList" with the preliminary value "urn:x-inspire:def:codeList:INSPIRE:<name of the class>".

5.1.4 Stereotypes

In the application schemas in this sections several stereotypes are used that have been defined as part of a UML profile for use in INSPIRE [INSPIRE DS-D2.5]. These are explained in Table 2 below.

Table 2 – Stereotypes (adapted from [INSPIRE DS-D2.5])

Stereotype	Model element	Description
applicationSchema	Package	An INSPIRE application schema according to ISO 19109 and the Generic Conceptual Model.
featureType	Class	A spatial object type.
type	Class	A conceptual, abstract type that is not a spatial object type.
dataType	Class	A structured data type without identity.
union	Class	A structured data type without identity where exactly one of the properties of the type is present in any instance.
enumeration	Class	A fixed list of valid identifiers of named literal values. Attributes of an enumerated type may only take values from this list.
codeList	Class	A flexible enumeration that uses string values for expressing a list of potential values.
placeholder	Class	A placeholder class (see definition in section 5.1.1).
voidable	Attribute, association role	A voidable attribute or association role (see definition in section 5.1.2).
lifeCycleInfo	Attribute, association role	If in an application schema a property is considered to be part of the life-cycle information of a spatial object type, the property shall receive this stereotype.
version	Association role	If in an application schema an association role ends at a spatial object type, this stereotype denotes that the value of the property is meant to be a specific version of the spatial object, not the spatial object in general.

5.2 Application schema Geographical names

5.2.1 Description

5.2.1.1 Narrative description and UML overview

Overview:

The core of the *Geographical names* application schema is described in figure 1 that shows its non-voidable elements.

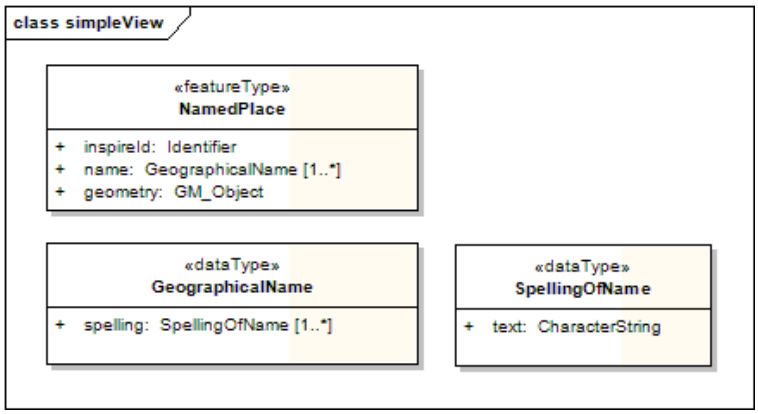


Figure 1 – UML class diagram: core of the *Geographical names* application schema

The only feature type of the schema is the feature type *NamedPlace*, representing any real world entity referred to by one or several proper nouns.

Each *NamedPlace* is associated with one or several geographical names, i.e. proper nouns applied to the spatial object, modelled with the data type *GeographicalName*. The different geographical names of one given spatial object may be for example the names in different languages or in different forms (e.g. complete and short forms of country and administrative unit names).

Each *GeographicalName* may have one or several spellings, i.e. proper ways of writing it, in one or several scripts like the Latin/Roman, Greek and Cyrillic scripts, modelled with the data type *SpellingOfName.*

For example:

- The city of Athens may be modelled in the schema as one NamedPlace.
- The endonym “Athína” (Greek language) and exonym “Athens” (English language) are two different GeographicalName of this unique NamedPlace.
- “Αθηνα" (Greek script) and its standard romanisation "Athína" (Latin script) are two different SpellingOfName of the same GeographicalName “Athína”.

Narrative summary of individual classes:

Figure 2 summarizes the *Geographical names* application schema. More complete and precise definitions of the types and attributes are given in the following sections.

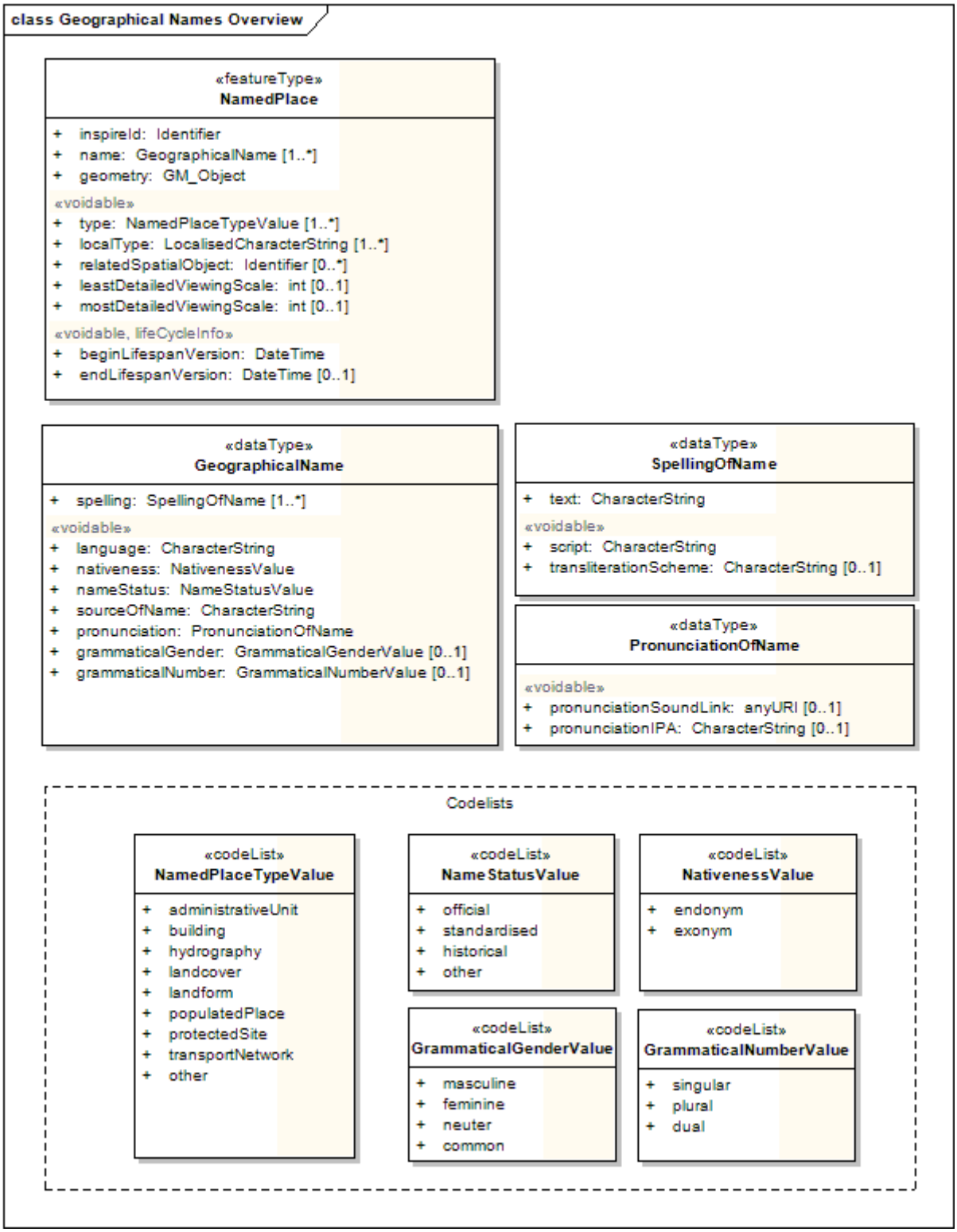


Figure 2 – UML class diagram: Overview of the *Geographical names* application schema

- One NamedPlace, representing any real world entity referred to by one or several proper nouns, is described by the following attributes:
  - One *inspireId (non voidable)*, identifier of the spatial object.
  - One or several *name(s)* (non voidable), referring to the *NamedPlace.*
  - One *geometry* (non voidable), describing the footprint or a reference point of the *NamedPlace.* The geometry may be any of the geometries defined by the Simple Feature Specification, including compound geometries.

- One or several *type(s),* characterising the kind of entity represented by the *NamedPlace,* chosen from a harmonised and high-level list of values.
- One or several *localType(s)*, which is a characterisation of the kind of feature represented by the *NamedPlace*, as defined by the data provider.
- From zero to several *relatedSpatialObject(s)*, which are the identifiers of spatial objects representing the same entity than the *NamedPlace* but appearing in other themes of INSPIRE.
- One or zero *LeastDetailedViewingScale* and zero or one *MostDetailedViewingScale*, representing at which viewing scale the names should be displayed, and holding some information about the importance of the *NamedPlace*.
- One *beginLifespanVersion* and zero or one *endLifespanVersion,* representing when this version of the spatial object was inserted / changed / deleted / superseded in the spatial data set.

– One GeographicalName, representing a proper noun of the NamedPlace, is described by the following attributes:
  - One or several *spelling(s)* (non voidable), representing proper ways of writing the *GeographicalName*.
  - One *language*, representing the language of the *GeographicalName*.
  - One *nativeness* (values *'endonym'* or *'exonym'*), enabling to acknowledge if the name is the one that is/was used in the area where the feature is situated at the instant when the name is/was in use.
  - One *nameStatus (values 'official', 'standardised', 'historical' or 'other')*, enabling to discern which credit should be given to the *GeographicalName* with respect to its standardisation and/or its topicality.
  - One *sourceOfName*, representing the (original) data source from which the geographical name is taken from (e.g. gazetteer, geographical names data set).
  - One *pronunciation*, representing the proper, correct or standard pronunciation of the *GeographicalName* expressed by means of text in the International Phonetic Alphabet, or with a link to an audio file, or both.
  - Zero or one *grammaticalGender (values 'masculine', feminine, 'neuter' or 'common')*.
  - Zero or one *grammaticalNumber (values 'singular', 'plural',* or *'dual'*).

– One SpellingOfName, representing the proper way of writing a GeographicalName, is described by the following attributes:
  - One *text* (non voidable), which is the textual spelling itself.
  - One *script*, representing the script in which the *Spelling* is rendered.
  - Zero or one *transliterationScheme* defining the method used for the conversion of the spelling from one script to another.

– One PronunciationOfName, representing the proper way of writing a GeographicalName, is described by at least one of the following attributes:
  - Zero or one *proncunciationIPA*, for expressing the pronunciation in the International Phonetic Alphabet
  - Zero or one *proncunciationSoundLink*, for expressing the pronunciation as a link to a sound file.

5.2.1.2 Consistency between spatial data sets

5.2.1.2.1 Consistency across borders

Explanation of context and example

Each Member State may provide geographical names associated to spatial objects, while some of these spatial objects do cross borders. The linkage of border-crossing spatial objects will be dealt within each data specification for the respective INSPIRE themes. However, for geographical names a special situation appears: the Member States are mainly responsible for providing the endonyms, whereas language communities take care of the collection of exonyms. Moreover, the mutual consent between the data providers of the Member States and the custodians of language groups are not yet established on a multi-lateral level.

The Danube river example illustrates the complexity of related geographical names issues for border-crossing spatial objects: Danube is a spatial entity crossing borders and associated with several names, endonyms as well as exonyms (see more detail in Annex B.7 or in [EGN D4.2e]). The number

of endonyms mainly depends on the languages spoken in that area where the spatial object is situated.

- Endonyms appearing in the respective countries (in Member States data sets): Donau (Germany, Austria), Dunaj (Slovakia), Duna (Hungary), Dunav (Croatia), Dunav (Serbia), Dunav (Bulgaria), Dunărea (Romania), Dunărea (Moldova), Dunaj (Ukraine)
- Exonyms appearing in the respective languages (in exonyms database): Danube (English), Dunava (Serbian.), etc.

Insights for managing this can be found within the EuroGeoNames project where it has been decided that the participating National Mapping and Cadastral Agencies (NMCAs) do provide one "compiled" spatial object for each national part of the Danube river. The respective endonyms are then associated to each national part of the Danube river and linked together within the EuroGeoNames pan-European gazetteer service. In addition, the existing exonyms, which are not part of the databases of the NMCAs, are linked to all related (national) "compiled" spatial objects across Europe through a centralised database of exonyms being a supplement database to the EGN gazetteer service.

Guidance for consistency across national borders

The correct relation of geographical names (endonyms and exonyms) with border-crossing spatial objects requires a solid understanding and experience of multi-lingual issues. Therefore, a coordinated approach on a European level should be preferred.

Note for cross-borders issues within national data sets

The same situation reported here for cross-international borders may appear within one Member State, and then within one single data set following this specification. Indeed, some spatial objects may cross different language areas within one state. It is thus let to the data providers to decide which more significant spatial objects should be delivered for holding names according to the situation in each state (e.g. only one spatial object for a full river in a country, or one spatial object for each part of the river in an administrative/linguistic area, or one spatial object for each river section…).

5.2.1.2.2 Consistency between different INSPIRE themes

Geometry is the only information that can be used to find out in which administrative units a named place is located. However, this is very important information when using names, for example as a search criterion. Queries on intersections between geometries of named places and administrative units should thus certainly be important in a lot of use cases. As a consequence, a special care should be made on the consistency of geometries between the *Administrative units* and *Geographical names* INSPIRE spatial data themes. For example, if the geometry of a spatial object (e.g. populated place) is a reference point, this point should lie inside the footprint of the administrative unit (e.g. municipality) containing it when this is applicable.

Recommendation 3 The geometry of the named places should be consistent with the geometry of administrative units depicted in the INSPIRE theme *ADMINISTRATIVE UNITS*.

Besides, the same spatial entity may be represented by different spatial objects in different INSPIRE themes, which raises the following recommendation.

Recommendation 4 If a spatial entity is modelled as a *NamedPlace* but also as other feature types defined in other INSPIRE themes, this multiple representation should be made explicit by populating the attribute *relatedSpatialObject* of *Geographical names*, which contains the identifier of the other themes' spatial objects in question. This is particularly recommended when data providers store data once (e.g. one river) but publish data according to several INSPIRE data specifications (e.g. *Hydrography* and *Geographical names*), as the information is then easily available.

5.2.1.2.3 Consistency across levels of detail

One single real world entity may appear in different local/national names data sets with different levels of detail. In this case, data providers could decide to deliver one or several spatial objects corresponding to the same real world entity in one compiled data set, or in several data sets, each one representing a certain level of detail.

This specification does not put any requirement on this issue: avoiding multiplicity of occurrences is the best way to avoid redundancies and inconsistencies; however in some situations different representations of the same spatial object may be useful to reflect different points of views. In any case, whatever the solution chosen by data providers, a special attention should be paid on consistency between levels of detail.

5.2.1.3 Identifier management

The generic requirements from the Generic Conceptual Model [DS-D2.5] apply for identifiers.

5.2.1.4 Modelling of object references

See Recommendation 4 in section 5.2.1.2.2 about *Consistency between different INSPIRE themes*.

5.2.1.5 Geometry representation

Requirement 5	The value domain of spatial properties used in this specification is restricted to the Simple Feature spatial schema as defined by ISO 1937.

NOTE: The specification restricts the spatial schema to 0-, 1-, 2-, and 2.5-dimensional geometries where all curve interpolations are linear.

NOPE: This data specification does not restrict the geometry types of *NamedPlace* objects. The most common geometry types for a *NamedPlace* are a reference point (of ISO type GM_Point) or a more precise geometry of the footprint (typically GM_Curve or GM_Surface). In addition, bounding boxes are also a common type of geometry in many names databases. Products defined by this specification should model bounding boxes with the ISO type GM_Polygon (this specification does not allow for ISO type GM_Envelope).

See also Recommendation 3 in section 5.2.1.2.2 about *Consistency between different INSPIRE themes*.

5.2.1.6 Temporality representation

The application schema uses the derived attributes "beginLifespanObject" and "endLifespanObject" to record the lifespan of a spatial object.

The attributes "beginLifespanVersion" specifies the date and time at which this version of the spatial object was inserted or changed in the spatial data set. The attribute "endLifespanVersion" specifies the date and time at which this version of the spatial object was superseded or retired in the spatial data set.

NOTE 1 The attributes specify the beginning of the lifespan of the version in the spatial data set itself, which is different from the temporal characteristics of the real-world phenomenon described by the spatial object. This lifespan information, if available, supports mainly two requirements: First, knowledge about the spatial data set content at a specific time; second, knowledge about changes to a data set in a specific time frame. The lifespan information should be as detailed as in the data set (i.e., if the lifespan information in the data set includes seconds, the seconds should be represented in data published in INSPIRE) and include time zone information.

NOTE 2 Changes to the attribute "endLifespanVersion" does not trigger a change in the attribute "beginLifespanVersion".

Recommendation 5 If life-cycle information is not maintained as part of the spatial data set, all spatial objects belonging to this data set should provide a void value with a reason of "unpopulated".

5.2.2 Feature catalogue

Table 3 – Feature catalogue metadata

Feature catalogue name	INSPIRE feature catalogue *Geographical names*
Scope	Geographical names
Version number	3.0
Version date	2009-08-31
Definition source	INSPIRE data specification *Geographical names*

Table 4 – Types defined in the feature catalogue

Type	Package	Stereotypes	Section
GeographicalName	Geographical names	«dataType»	5.2.2.2.1
GrammaticalGenderValue	Geographical names	«codeList»	5.2.2.3.1
GrammaticalNumberValue	Geographical names	«codeList»	0
NamedPlace	Geographical names	«featureType»	5.2.2.1.1
NamedPlaceTypeValue	Geographical names	«codeList»	5.2.2.3.3
NameStatusValue	Geographical names	«codeList»	5.2.2.3.4
NativenessValue	Geographical names	«codeList»	5.2.2.3.5
PronunciationOfName	Geographical names	«dataType»	5.2.2.2.2
SpellingOfName	Geographical names	«dataType»	5.2.2.2.3

5.2.2.1 Spatial object types

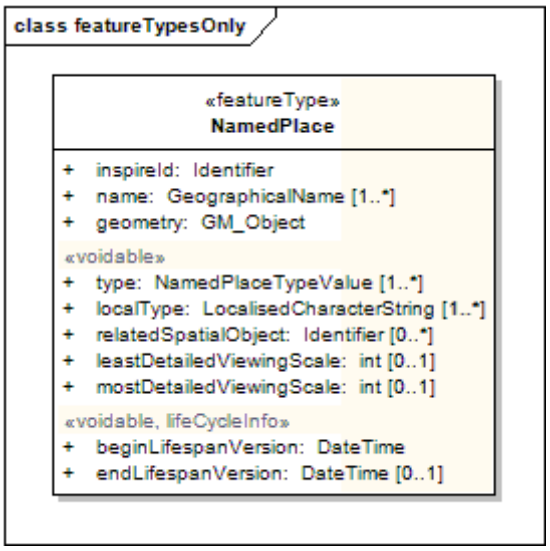


Figure 3 – UML class diagram: Spatial object types

5.2.2.1.1 NamedPlace

NamedPlace	
Definition:	Any real world entity referred to by one or several proper nouns.
Status:	Proposed
Stereotypes:	«featureType»
Attribute: beginLifespanVersion	
Value type:	DateTime
Definition:	Date and time at which this version of the spatial object was inserted or changed in the spatial data set.
Multiplicity:	1
Stereotypes:	«voidable,lifeCycleInfo»
Attribute: endLifespanVersion	
Value type:	DateTime
Definition:	Date and time at which this version of the spatial object was superseded or retired in the spatial data set.
Multiplicity:	0..1
Stereotypes:	«voidable,lifeCycleInfo»
Attribute: geometry	
Value type:	GM_Object
Definition:	Geometry associated to the named place. This data specification does not restrict the geometry types.
Description:	NOTE 1 The most common geometry types for a named place are a reference point (modelled as GM_Point), a more precise geometry of the footprint (typically modelled as GM_Curve or GM_Surface), or a bounding box (to be modelled as a GM_Envelope). NOTE 2 If the geometry depicts the spatial footprint of the named place, a reference point and a bounding box could be derived from it. However, this specification does not require the explicit provision of any specific type of geometry such as bounding boxes or reference points. NOTE 3 To avoid any misunderstanding, note that null geometry is not allowed by this specification. NOTE 4 3D geometries are not really required for *Geographical names*, but the model allows for it, so a data provider may publish it.
Multiplicity:	1
Attribute: inspireId	
Value type:	Identifier
Definition:	External object identifier of the named place.
Description:	NOTE An external object identifier is a unique object identifier published by the responsible body, which may be used by external applications to reference the spatial object. The identifier is an identifier of the spatial object, not an identifier of the real-world phenomenon.
Multiplicity:	1
Attribute: leastDetailedViewingResolution	
Value type:	MD_Resolution
Definition:	Resolution, expressed as the inverse of an indicative scale or a ground distance, above which the NamedPlace and its associated name(s) should no longer be displayed in a basic viewing service.

Description:	NOTE 1This information may be used to determine if the names of the named place should be displayed at a given scale of display, only in the context of basic viewing services intending to show the content of the data set containing names. Even if this information is a valuable one for mapping in general, it is only approximate; cartographic services intending to produce high quality maps should certainly rely on other criteria and techniques for selecting names for the map. NOTE 2 Even if this attribute is "voidable" for practical reasons linked to its availability in data sources, this information may be of first importance for viewing services. Without this viewing services will inefficiently manage named places. EXAMPLES The following examples use the equivalentScale attribute of MD_Resolution to express the attribute value. - Names of important cities in Europe may be displayed at all viewing scales greater than 1/5,000,000. In this case, the value of the attribute is 5,000,000 - Names of small hamlets may only be displayed from all viewing scale greater than 1/25,000. In this case, the value of the attribute is 25,000 - Names of countries may be displayed at any small scale. In this case, this attribute is not filled. NOTE 3 If the data set contains multiple representations of the same real world entity represented at different levels of detail, the scale ranges defined by the attributes leastDetailedViewingResolution and mostDetailedViewingResolution should not overlap, in order to avoid displaying the same names several times. NOTE 4 The geometry of the named place should have a level of detail (i.e. resolution, granularity, precision, etc.) roughly compatible with its associated viewing scales.
Multiplicity:	0..1
Stereotypes:	«voidable»

Attribute: localType

Value type:	LocalisedCharacterString
Definition:	Characterisation of the kind of entity designated by geographical name(s), as defined by the data provider, given in at least in one official language of the European Community.
Description:	SOURCE Adapted from [UNGEGN Manual 2007]. NOTE Local types may be defined in additional European languages, either EU official languages or other languages such as the language(s) of the geographical names provided.
Multiplicity:	1..*
Stereotypes:	«voidable»

Attribute: mostDetailedViewingResolution

Value type:	MD_Resolution
Definition:	Resolution, expressed as the inverse of an indicative scale or a ground distance, below which the NamedPlace and its associated name(s) should no longer be displayed in a basic viewing service.
Description:	NOTE See Description of leastDetailedViewingResolution EXAMPLES The following examples use the equivalentScale attribute of MD_Resolution to express the attribute value. - Names of wide areas like mountain ranges may not be displayed at all in viewing scales greater than 1/100,000. In this case, the value of the attribute is 100,000 - Names of small hamlets may be displayed at any large scale. In this case, this attribute is not filled.
Multiplicity:	0..1

Stereotypes:	«voidable»
Attribute: name	
Value type:	GeographicalName
Definition:	Name of the named place.
Multiplicity:	1..*
Attribute: relatedSpatialObject	
Value type:	Identifier
Definition:	Identifier of a spatial object representing the same entity but appearing in other themes of INSPIRE, if any.
Description:	NOTE If no identifier is provided with features of other INSPIRE themes, those features can of course not be referred by the NamedPlace.
Multiplicity:	0..*
Stereotypes:	«voidable»
Attribute: type	
Value type:	NamedPlaceTypeValue
Definition:	Characterisation of the kind of entity designated by geographical name(s).
Description:	SOURCE Adapted from [UNGEGN Manual 2007]. NOTE 1 This attribute should be consistent with the attribute 'relatedSpatialObject'. More precisely, if the attribute 'relatedSpatialObject' is filled in, the attribute 'type' should be filled in, and its value(s) should be consistent with the spatial data theme(s) of the related object(s). NOTE 2 Even if this attribute may introduce some redundancy with the attribute 'relatedSpatialObject', it has to be filled in order to allow to use geographical names on their own without accessing to any other INSPIRE data set, which may be necessary in most cases.
Multiplicity:	1..*
Stereotypes:	«voidable»

5.2.2.2 Data types

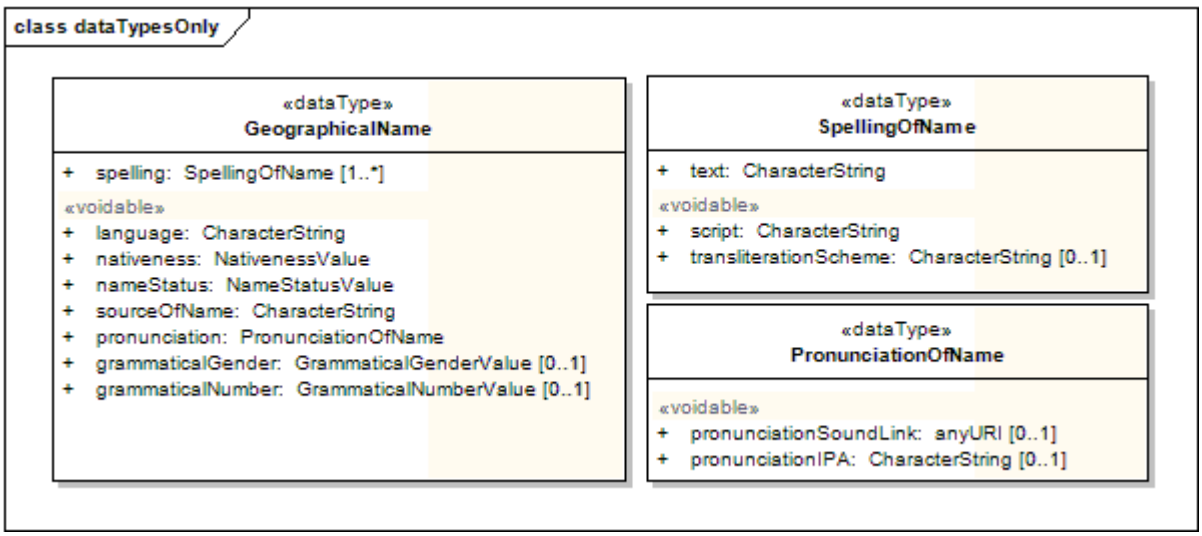


Figure 4 – UML class diagram: Data types

5.2.2.2.1 GeographicalName

GeographicalName	
Definition:	Proper noun applied to a real world entity.
Status:	Proposed
Stereotypes:	«dataType»
Attribute: grammaticalGender	
Value type:	GrammaticalGenderValue
Definition:	Classes of nouns reflected in the behaviour of associated words.
Description:	NOTE the attribute has cardinality [0..1] and is voidable, which means that: - in case the concept of grammatical gender has no sense for a given name (i.e. the attribute is not applicable), the attribute should not be provided. - in case the concept of grammatical gender has some sense for the name but is unknown, the attribute should be provided but void.
Multiplicity:	0..1
Stereotypes:	«voidable»
Attribute: grammaticalNumber	
Value type:	GrammaticalNumberValue
Definition:	Grammatical category of nouns that expresses count distinctions.
Description:	NOTE the attribute has cardinality [0..1] and is voidable, which means that: - in case the concept of grammatical number has no sense for a given name (i.e. the attribute is not applicable), the attribute should not be provided. - in case the concept of grammatical number has some sense for the name but is unknown, the attribute should be provided but void.
Multiplicity:	0..1
Stereotypes:	«voidable»
Attribute: language	
Value type:	CharacterString
Definition:	Language of the name, given as a three letters code, in accordance with either ISO 639-3 or ISO 639-5.
Description:	NOTE 1More precisely, this definition refers to the language used by the community that uses the name. NOTE 2 The code "mul" for "multilingual" should not be used in general. However it can be used in rare cases like official names composed of two names in different languages. For example, "Vitoria-Gasteiz" is such a multilingual official name in Spain. NOTE 3 Even if this attribute is "voidable" for pragmatic reasons, it is of first importance in several use cases in the multi-language context of Europe.
Multiplicity:	1
Stereotypes:	«voidable»
Attribute: nameStatus	
Value type:	NameStatusValue
Definition:	Qualitative information enabling to discern which credit should be given to the name with respect to its standardisation and/or its topicality.
Description:	NOTE The *Geographical names* application schema does not explicitly make a preference between different names (e.g. official endonyms) of a specific real world entity. The necessary information for making the preference (e.g. the linguistic status of the administrative or geographic area in question), for a certain use case, must be obtained from other data or information sources. For example, the status of the language of the name may be known through queries on the geometries of named places against the geometry of administrative units recorded in a certain source with the language statuses information.
Multiplicity:	1
Stereotypes:	«voidable»

GeographicalName	
Attribute: nativeness	
Value type:	NativenessValue
Definition:	Information enabling to acknowledge if the name is the one that is/was used in the area where the feature is situated at the instant when the name is/was in use.
Multiplicity:	1
Stereotypes:	«voidable»
Attribute: pronunciation	
Value type:	PronunciationOfName
Definition:	Proper, correct or standard (standard within the linguistic community concerned) pronunciation of the geographical name.
Description:	SOURCE Adapted from [UNGEGN Manual 2006].
Multiplicity:	1
Stereotypes:	«voidable»
Attribute: sourceOfName	
Value type:	CharacterString
Definition:	Original data source from which the geographical name is taken from and integrated in the data set providing/publishing it. For some named spatial objects it might refer again to the publishing data set if no other information is available.
Description:	EXAMPLES Gazetteer, geographical names data set.
Multiplicity:	1
Stereotypes:	«voidable»
Attribute: spelling	
Value type:	SpellingOfName
Definition:	A proper way of writing the geographical name.
Description:	NOTE 1 Different spellings should only be used for names rendered in different scripts. . NOTE 2 While a particular GeographicalName should only have one spelling in a given script, providing different spellings in the same script should be done through the provision of different geographical names associated with the same named place.
Multiplicity:	1..*

5.2.2.2.2 PronunciationOfName

PronunciationOfName	
Definition:	Proper, correct or standard (standard within the linguistic community concerned) pronunciation of a name.
Description:	SOURCE Adapted from [UNGEGN Manual 2006].
Status:	Proposed
Stereotypes:	«dataType»
Attribute: pronunciationIPA	
Value type:	CharacterString
Definition:	Proper, correct or standard (standard within the linguistic community concerned) pronunciation of a name, expressed in International Phonetic Alphabet (IPA).
Description:	SOURCE Adapted from [UNGEGN Manual 2006].
Multiplicity:	0..1
Stereotypes:	«voidable»
Attribute: pronunciationSoundLink	
Value type:	URI
Definition:	Proper, correct or standard (standard within the linguistic community concerned) pronunciation of a name, expressed by a link to any sound file.
Description:	SOURCE Adapted from [UNGEGN Manual 2006].

PronunciationOfName	
Multiplicity:	0..1
Stereotypes:	«voidable»
Constraint: pronunciationSoundLink or pronunciationIPA not empty	
Natural language:	At least one of the two attributes pronunciationSoundLink and pronunciationIPA shall not be void.
OCL:	inv: self.pronounciationIPA -> notEmpty() or self.pronounciationSoundLink -> notEmpty()

5.2.2.2.3 SpellingOfName

SpellingOfName	
Definition:	Proper way of writing a name.
Description:	SOURCE Adapted from [UNGEGN Manual 2006]. NOTE Proper spelling means the writing of a name with the correct capitalisation and the correct letters and diacritics present in an accepted standard order.
Status:	Proposed
Stereotypes:	«dataType»
Attribute: script	
Value type:	CharacterString
Definition:	Set of graphic symbols (e.g. an alphabet) employed in writing the name, expressed using the four letters codes defined in [ISO 15924], where applicable.
Description:	SOURCE Adapted from [UNGEGN Glossary 2007]. EXAMPLES Cyrillic, Greek, Roman/Latin scripts. NOTE 1The four letter codes for Latin (Roman), Cyrillic and Greek script are "Latn", "Cyrl" and "Grek", respectively. NOTE 2 In rare cases other codes could be used (for other scripts than Latin, Greek and Cyrillic). However, this should mainly apply for historical names in historical scripts. NOTE 3 This attribute is of first importance in the multi-scriptual context of Europe.
Multiplicity:	1
Stereotypes:	«voidable»
Attribute: text	
Value type:	CharacterString
Definition:	Way the name is written.
Multiplicity:	1
Attribute: transliterationScheme	
Value type:	CharacterString
Definition:	Method used for the names conversion between different scripts.
Description:	SOURCE Adapted from [UNGEGN Glossary 2007]. NOTE 1 This attribute should be filled for any transliterated spellings. If the transliteration scheme used is recorded in codelists maintained by ISO or UN, those codes should be preferred.
Multiplicity:	0..1
Stereotypes:	«voidable»

5.2.2.3 Enumerations and code lists

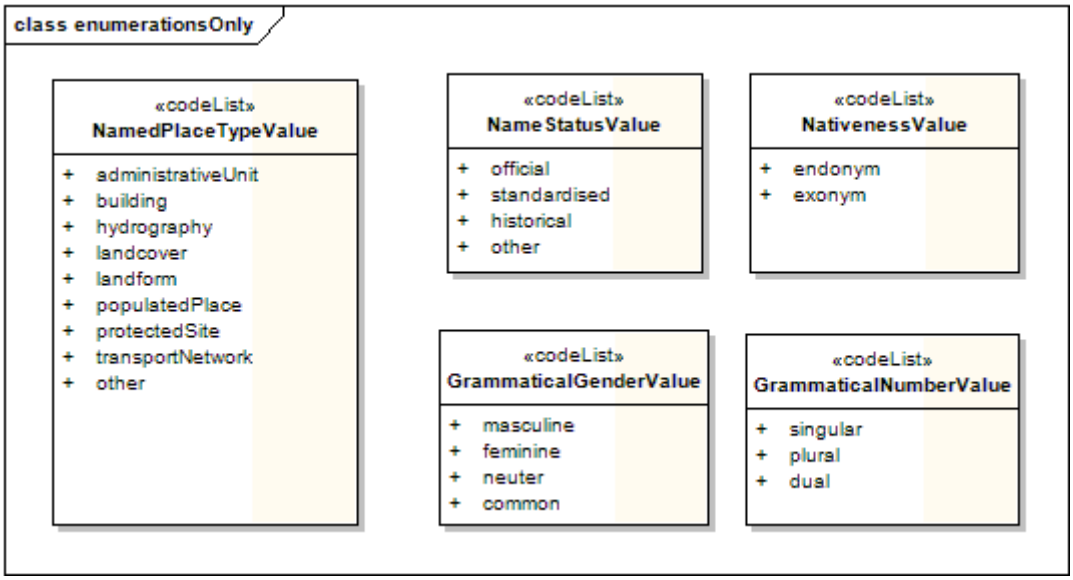


Figure 5 – UML class diagram: Enumerations and code lists

5.2.2.3.1 GrammaticalGenderValue

GrammaticalGenderValue	
Definition:	The grammatical gender of a geographical name.
Status:	Proposed
Stereotypes:	«codeList»
Governance:	Centrally managed in INSPIRE code list register. URN: urn:x-inspire:def:codeList:INSPIRE:GrammaticalGenderValue
Value: masculine	
Definition:	Masculine grammatical gender.
Description:	EXAMPLES Sena (Spanish), Schwarzwald (German).
Value: neuter	
Definition:	Neuter grammatical gender.
Description:	EXAMPLES Zwarte Woud (Dutch), Rheinland (German).
Value: common	
Definition:	'Common' grammatical gender (the merging of 'masculine' and 'feminine').
Value: feminine	
Definition:	Feminine grammatical gender.
Description:	EXAMPLES Seine (French), Forêt Noire (French).

5.2.2.3.2 GrammaticalNumberValue

GrammaticalNumberValue	
Definition:	The grammatical number of a geographical name.
Status:	Proposed
Stereotypes:	«codeList»
Governance:	Centrally managed in INSPIRE code list register. URN: urn:x-inspire:def:codeList:INSPIRE:GrammaticalNumberValue
Value: dual	
Definition:	Dual grammatical number.

GrammaticalNumberValue	
Value: plural	
Definition:	Plural grammatical number.
Description:	EXAMPLES Alps (English), Pays-Bas (French), Waddeneilanden (Dutch), Cárpatos (Spanish).
Value: singular	
Definition:	Singular grammatical number.
Description:	EXAMPLES Danube (English), Lac du Bourget (French), Praha (Czech), Nederland (Dutch).

5.2.2.3.3 NamedPlaceTypeValue

NamedPlaceTypeValue	
Definition:	The type of a named place.
Status:	Proposed
Stereotypes:	«codeList»
Governance:	Centrally managed in INSPIRE code list register. URN: urn:x-inspire:def:codeList:INSPIRE:NamedPlaceType
Value: administrativeUnit	
Definition:	Units of administration, dividing areas where Member States have and/or exercise jurisdictional rights, for local, regional and national governance, separated by administrative boundaries.
Description:	SOURCE Definition of Annex I theme, INSPIRE Directive [Regulation 1205/2008/EC]. EXAMPLES - Country; - Administrative unit within a country such as state, province, region, municipality.
Value: building	
Definition:	Geographical location of buildings.
Description:	SOURCE Definition of Annex III theme [INSPIRE Directive]. NOTE This definition of building should be refined from future works on the specification of the INSPIRE annex III theme *Buildings*. EXAMPLES - Public buildings such as theatre, museum, library; - Industrial facility; - Religious buildings such as church, mosque, synagogue; - Recreational buildings such as stadium; - Historical and ancient cite; - Cultural monument

Value: hydrography	
Definition:	Hydrographic elements, including marine areas and all other water bodies and items related to them, including river basins and sub-basins.
Description:	SOURCE Definition of Annex I theme *Hydrography*, INSPIRE Directive [Regulation 1205/2008/EC]. NOTE For the usage with *Geographical names* this includes named places in seas and oceans. EXAMPLES - Marine areas and parts of them such as sea, gulf, sea strait, sea channel, fjord, sea bay; - Inland water areas such as lake, reservoir, pond, lake strait, lake bay; - Watercourses such as river, stream, rapids, waterfall, canal; - Other hydrographic features such as glacier, snowfield, geyser, spring, fountain, well.
Value: landcover	
Definition:	Physical and biological cover of the earth's surface including artificial surfaces, agricultural areas, forests, (semi-)natural areas, wetlands, water bodies.
Description:	SOURCE Definition of Annex II theme, INSPIRE Directive. EXAMPLES - Forest; - Low vegetation areas such as thicket; - Wetlands such as marsh, swamp, bog; - Agricultural areas such as arable land, cultivated field, pasture; - Other terrain cover features such as desert, badland, lava field, remarkable tree.
Value: landform	
Definition:	Geomorphologic terrain feature.
Description:	EXAMPLES - Land elevations such as mountain range, mountain, mountainside, fell, highland, hill, ridge, peak; - Land depressions such as plain, valley, pass, gorge; - Island, rocky islet, archipelago; - Coastal land formations such as peninsula, headland, cape, delta, beach, cliff; - Other landforms such as cave, devil's churn, stone.
Value: other	
Definition:	A spatial object not included in the other types of the code list.
Value: populatedPlace	
Definition:	A place inhabited by people.
Description:	EXAMPLES - City, town, town district, village; - Hamlet, isolated house.
Value: protectedSite	
Definition:	Area designated or managed within a framework of international, Community and Member States' legislation to achieve specific conservation objectives.
Description:	SOURCE Definition of Annex I theme, INSPIRE Directive [Regulation 1205/2008/EC]. EXAMPLES National park, nature reserve.

Value: transportNetwork	
Definition:	Road, rail, air and water transport networks and related infrastructure. Includes links between different networks.
Description:	SOURCE Definition of Annex I theme, INSPIRE Directive [Regulation 1205/2008/EC]. EXAMPLES - Air transport structures and facilities such as airport, heliport; - Water transport structures and facilities such as harbour, dock, pier, ferry line; - Rail transport structures and facilities such as railway station, railway bridge, railway tunnel; - Road transport structures and facilities such as bus station, highway, road, street, road bridge, road tunnel.

5.2.2.3.4 NameStatusValue

NameStatusValue	
Definition:	The status of a geographical name, i.e. the information enabling to discern which credit should be given to the name with respect to its standardisation and/or its topicality.
Description:	NOTE The precise definition of the values 'Official', 'Standardised', 'Historical' and 'Other' can only be decided by Member States according to their legislation and practice.
Status:	Proposed
Stereotypes:	«codeList»
Governance:	Centrally managed in INSPIRE code list register. URN: urn:x-inspire:def:codeList:INSPIRE:NameStatusValue
Value: historical	
Definition:	Historical name not in current use.
Value: official	
Definition:	Name in current use and officially approved or established by legislation.
Value: other	
Definition:	Current, but not official, nor approved name.
Value: standardized	
Definition:	Name in current use and accepted or recommended by a body assigned advisory function and/or power of decision in matters of toponymy.

5.2.2.3.5 NativenessValue

NativenessValue	
Definition:	The nativeness of a geographical name.
Status:	Proposed
Stereotypes:	«codeList»
Governance:	Centrally managed in INSPIRE code list register. URN: urn:x-inspire:def:codeList:INSPIRE:NativenessValue
Value: endonym	
Definition:	Name for a geographical feature in an official or well-established language occurring in that area where the feature is situated.
Description:	SOURCE [UNGEGN Glossary 2007].
Value: exonym	
Definition:	Name used in a specific language for a geographical feature situated outside the area where that language is widely spoken, and differing in form from the respective endonym(s) in the area where the geographical feature is situated.
Description:	SOURCE [UNGEGN Glossary 2007].

5.2.2.4 Imported types (informative)

This section lists definitions for feature types, data types and enumerations and code lists that are defined in other application schemas. The section is purely informative and should help the reader understand the feature catalogue presented in the previous sections. For the normative documentation of these types, see the given references.

5.2.2.4.1 Identifier

Identifier	
Package:	Base Types [see DS-D2.5]
Definition:	Unique object identifier published by the responsible body, which may be used by external applications to reference the spatial object.
Description:	NOTE1 External object identifiers are distinct from thematic object identifiers. NOTE 2 The voidable version identifier attribute is not part of the unique identifier of a spatial object and may be used to distinguish two versions of the same spatial object. NOTE 3 The unique identifier will not change during the life-time of a spatial object.

6 Reference systems

6.1 Coordinate reference systems

6.1.1 Datum

Requirement 6	For the coordinate reference systems used for making available the INSPIRE spatial data sets, the datum shall be the datum of the European Terrestrial Reference System 1989 (ETRS89) in areas within its geographical scope, and the datum of the International Terrestrial Reference System (ITRS) or other geodetic coordinate reference systems compliant with ITRS in areas that are outside the geographical scope of ETRS89. Compliant with the ITRS means that the system definition is based on the definition of the ITRS and there is a well established and described relationship between both systems, according to EN ISO 19111.

6.1.2 Coordinate reference systems

Requirement 7	INSPIRE spatial data sets shall be made available using one of the three-dimensional, two-dimensional or compound coordinate reference systems specified in the list below. Other coordinate reference systems than those listed below may only be used for regions outside of continental Europe. The geodetic codes and parameters for these coordinate reference systems shall be documented, and an identifier shall be created, according to EN ISO 19111 and ISO 19127.

1. Three-dimensional Coordinate Reference Systems
   - Three-dimensional Cartesian coordinates
   - Three-dimensional geodetic coordinates (latitude, longitude and ellipsoidal height), using the parameters of the GRS80 ellipsoid

2. Two-dimensional Coordinate Reference Systems
   - Two-dimensional geodetic coordinates, using the parameters of the GRS80 ellipsoid
   - Plane coordinates using the Lambert Azimuthal Equal Area projection and the parameters of the GRS80 ellipsoid

- Plane coordinates using the Lambert Conformal Conic projection and the parameters of the GRS80 ellipsoid
- Plane coordinates using the Transverse Mercator projection and the parameters of the GRS80 ellipsoid

6.1.3 Display

Requirement 8	For the display of the INSPIRE spatial data sets with the View Service specified in D003152/02 Draft Commission Regulation implementing Directive 2007/2/EC of the European Parliament and of the Council as regards Network Services, at least the coordinates reference systems for two-dimensional geodetic shall be available

6.1.4 Identifiers for coordinate reference systems

Requirement 9	For referring to the non-compound coordinate reference systems listed in this Section, the identifiers listed below shall be used. For referring to a compound coordinate reference system, an identifier composed of the identifier of the horizontal component, followed by a slash (/), followed by the identifier of the vertical component, shall be used.

- ETRS89-XYZ for Cartesian coordinates in ETRS89
- ETRS89-GRS80h for three-dimensional geodetic coordinates in ETRS89 on the GRS80 ellipsoid
- ETRS89-GRS80 for two-dimensional geodetic coordinates in ETRS89 on the GRS80
- EVRS for height in EVRS
- LAT for depth of the sea floor, where there is an appreciable tidal range
- MSL for depth of the sea floor, in marine areas without an appreciable tidal range, in open oceans and effectively in waters that are deeper than 200m
- ISA for pressure coordinate in the free atmosphere
- PFO for Pressure coordinate in the free ocean
- ETRS89-LAEA for ETRS89 coordinates projected into plane coordinates by the Lambert Azimuthal Equal Area projection
- ETRS89-LCC for ETRS89 coordinates projected into plane coordinates by the Lambert Conformal Conic projection
- ETRS89-TMzn for ETRS89 coordinates projected into plane coordinates by the Transverse Mercator projection

6.2 Temporal reference system

Requirement 10	The Gregorian Calendar shall be used for as a reference system for date values, and the Universal Time Coordinated (UTC) or the local time including the time zone as an offset from UTC shall be used as a reference system for time values.

7 Data quality

This section includes a description of data quality elements and sub-elements as well as the associated basic data quality measures to be used to describe data related to the spatial data theme *Geographical names* (see Table 5).

NOTE Additional guidance documents on procedures and methods that can be used to implement the basic data quality measures introduced in this section will be provided at a later stage.

Data quality information can be described at level of spatial object (feature), spatial object type (feature type), dataset or dataset series. Data quality information at spatial object level is modelled directly in the application schema (see section 5.2).

Recommendation 6 Aggregated data quality information should ideally be collected at the level of spatial object types and included in the dataset (series) metadata.

Chapter 8 describes the corresponding metadata elements to report about this data quality information.

Table 5 – List of all data quality elements used in the spatial data theme *Geographical names*

Section	Data quality element	Data quality sub-element	Scope(s)
7.1.1	Completeness	Omission	spatial object type
7.2.1	Positional accuracy	Absolute or external accuracy	

7.1 Completeness

7.1.1 Omission

Omission should be documented using the rate of missing items.

Name	Rate of missing items
Alternative name	–
Data quality element	Completeness
Data quality sub-element	Omission
Data quality basic measure	Error rate
Definition	Number of missing items in the dataset in relation to the number of items that should have been present.
Description	–
Parameter	–
Data quality value type	Real, percentage, ratio (example: 0,0189 ; 98,11% ; 11:582)
Data quality value structure	–
Source reference	–
Example	–
Measure identifier	7 (ISO 19138)

7.2 Positional accuracy

7.2.1 Absolute or external accuracy

7.2.1.1 Mean value of positional uncertainties (2D)

Name	mean value of positional uncertainties (1D, 2D and 3D)
Alternative name	-
Data quality element	DQ_PositionalAccuracy
Data quality subelement	DQ_AbsoluteExternalPositionalAccuracy
Data quality basic measure	not applicable
Definition	Mean value of the positional uncertainties for a set of positions where the positional uncertainties are defined as the distance between a measured position and what is considered as the corresponding true position
Description	See ISO 19138
Parameter	-
Data quality value type	Measure
Data quality value structure	-
Source reference	-

Example	-
Measure identifier	28

8 Dataset-level Metadata

Metadata can be reported for each individual spatial object (spatial object-level metadata) or once for a complete dataset or dataset series (dataset-level metadata). Spatial object-level metadata is fully described in the application schema (section 5.2). If data quality elements are used at spatial object level, the documentation shall refer to the appropriate definition in section 7. This section only specifies dataset-level metadata elements.

For some dataset-level metadata elements, in particular on data quality and maintenance, a more specific scope can be specified. This allows the definition of metadata at sub-dataset level, e.g. separately for each spatial object type. When using ISO 19115/19139 to encode the metadata, the following rules should be followed:

- The scope element (of type DQ_Scope) of the DQ_DataQuality subtype should be used to encode the scope.
- Only the following values should be used for the level element of DQ_Scope: Series, Dataset, featureType.
- If the level is featureType the levelDescription/MDScopeDescription/features element (of type Set< GF_FeatureType>) shall be used to list the feature type names.

NOTE The value featureType is used to denote spatial object type.

Mandatory or conditional metadata elements are specified in Section 8.1. Optional metadata elements are specified in Section 8.2. The tables describing the metadata elements contain the following information:

- The first column provides a reference to a more detailed description.
- The second column specifies the name of the metadata element.
- The third column specifies the multiplicity.
- The fourth column specifies the condition, under which the given element becomes mandatory (only for Table 6 and Table 7)

8.1 Mandatory and conditional metadata elements

Requirement 11	The metadata describing a spatial data set or a spatial data set series related to the theme *Geographical names* shall comprise the metadata elements required by Regulation 1205/2008/EC (implementing Directive 2007/2/EC of the European Parliament and of the Council as regards metadata) for spatial datasets and spatial dataset series (Table 6) as well as the metadata elements specified in Table 7.

Table 6 – Metadata for spatial datasets and spatial dataset series specified in Regulation 1205/2008/EC (implementing Directive 2007/2/EC of the European Parliament and of the Council as regards 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	

NOTE: Regulation 1205/2008/EC mandates using ISO 639-2 for identifying the resource language, which doesn't contain all languages used in the Member States of the European Union. For the missing language codes TWG-GN recommend using ISO 639-3 or 639-5 as defined in the language attribute of geographicalName data type.

Table 7 – Mandatory and conditional theme-specific metadata for the theme *Geographical names*

INSPIRE Data Specification *Geographical names* Section	**Metadata element**	**Multiplicity**	**Condition**
8.1.1	Coordinate Reference System	1	
8.1.2	Temporal Reference System	0..*	Mandatory, if the spatial data set or one of its feature types contains temporal information that does not refer to the Gregorian Calendar or the Coordinated Universal Time.
8.1.3	Encoding	1..*	
8.1.4	Character encoding	0..*	Mandatory, if a non-XML-based encoding is used that does not support UTF-8

8.1.1 Coordinate Reference System

Metadata element name	**Coordinate Reference System**
Definition	Name of reference System used
ISO 19115 number and name	187. referenceSystemIdentifier
ISO/TS 19139 path	MD_Metadata/referenceSystemInfo/MD_ReferenceSystem/ referenceSystemIdentifier
INSPIRE obligation / condition	mandatory
INSPIRE multiplicity	1
Data type(and ISO 19115 no.)	Class (187)
Domain	Either the referenceSystemIdentifier (RS_Identifier) or the projection (RS_Identifier), ellipsoid (RS_Identifier) and datum (RS_Identifier) properties shall be provided. referenceSystemIdentifier: code:its domain is free text codeSpace: Its domain is free text
Implementing instructions	
Example	referenceSystemIdentifier: code: ETRS_89 codeSpace: INSPIRE RS registry
Example XML encoding	
Comments	

8.1.2 Temporal Reference System

Metadata element name	**Temporal Reference System**
Definition	Name of reference System used
ISO 19115 number and name	187. referenceSystemIdentifier
ISO/TS 19139 path	MD_Metadata/referenceSystemInfo/ MD_ReferenceSystem/ referenceSystemIdentifier
INSPIRE obligation / condition	mandatory, if the spatial data set or one of its feature types contains temporal information that does not refer to the Gregorian Calendar or the Coordinated Universal Time.
INSPIRE multiplicity	0..*
Data type(and ISO 19115 no.)	Class (187)

Domain	No specific type is defined in ISO 19115 for temporal reference systems. Thus, the generic MD_ReferenceSystem element and its reference SystemIdentifier (RS_Identifier) property shall be provided. referenceSystemIdentifier: code:its domain is free text codeSpace: Its domain is free text
Implementing instructions	
Example	referenceSystemIdentifier: code: GregorianCalendar codeSpace: INSPIRE RS registry
Example XML encoding	
Comments	

8.1.3 Encoding

Metadata element name	**Encoding**
Definition	Description of the computer language construct that specifies the representation of data objects in a record, file, message, storage device or transmission channel
ISO 19115 number and name	271. distributionFormat
ISO/TS 19139 path	MD_Metadata/distributionInfo/MD_Distribution/distributionFormat
INSPIRE obligation / condition	Mandatory
INSPIRE multiplicity	1..*
Data type (and ISO 19115 no.)	Association.284.
Domain	MD_Format See B.2.10.4. The following property values shall be used for default encoding specified in section 9.2.1 Default Encoding – name: *Geographical names* GML application schema v 3.0, GML version 3.2.1 – specification: D2.8.I.3 Data Specification on *Geographical names* – Draft Guidelines
Implementing instructions	
Example	name: *Geographical names* GML application schema version: version 3.0, GML, version 3.2.1 specification: D2.8.I.3 Data Specification on *Geographical names* - Draft Guidelines
Example XML encoding	
Comments	

8.1.4 Character Encoding

Metadata element name	**Metadata dataset character set**
Definition	Full name of the character coding standard used for the dataset.
ISO 19115 number and name	4. characterSet
ISO/TS 19139 path	IdentificationInfo/*/characterSet
INSPIRE obligation / condition	Conditional, if is distinct to ISO/IEC 10646-1
INSPIRE multiplicity	0..*
Data type(and ISO 19115 no.)	40. MD_CharacterSetCode
Domain	Codelist (See B.5.10 of ISO 19115)
Implementing instructions	
Example	
Example XML encoding	
Comments	

8.2 Optional metadata elements

Recommendation 7 The metadata describing a spatial data set or a spatial data set series related to the theme *Geographical names* should comprise the theme-specific metadata elements specified in Table 4.

Table 8 – Optional theme-specific metadata for the theme *Geographical names*

INSPIRE Data Specification *Geographical names* Section	**Metadata element**	**Multiplicity**
8.2.1	Maintenance Information	0..1
8.2.2	Data Quality – Completeness – Omission	0..*
8.2.3	Data Quality - Positional accuracy – Absolute or external accuracy	0..*

8.2.1 Maintenance Information

Metadata element name	**Maintenance information**
Definition	information about the scope and frequency of updating
ISO 19115 number and name	30. resourceMaintenance
ISO/TS 19139 path	identificationInfo/MD_Identification/resourceMaintenance
INSPIRE obligation / condition	Optional
INSPIRE multiplicity	0..1
Data type(and ISO 19115 no.)	142. MD_MaintenanceInformation
Domain	This is a complex type (lines 143-148 from ISO 19115). At least the following elements should be used (the multiplicity according to ISO 19115 is shown in parentheses): – maintenanceAndUpdateFrequency [1]: frequency with which changes and additions are made to the resource after the initial resource is completed / domain value: MD_MaintenanceFrequencyCode.(Codelist B 5.18 of ISO 19115) – updateScope [0..*]: scope of data to which maintenance is applied / domain value: MD_ScopeCode (Codelist B 5.25 of ISO 19115) – maintenanceNote [0..*]: information regarding specific requirements for maintaining the resource / domain value: free text
Implementing instructions	
Example	maintenanceAndUpdateFrecuency: annually
Example XML encoding	
Comments	

8.2.2 Data Quality – Completeness – Omission

Metadata element name	**Data Quality – Completeness – Omission**
Definition	DQ Completeness: presence and absence of features, their attributes and their relationships; Omission: data absent from the dataset, as described by the scope
ISO 19115 number and name	18. dataQualityInfo
ISO/TS 19139 path	MD_Metadata/dataQualityInfo/DQ_DataQuality/*/DQ_CompletenessOmission
INSPIRE obligation / condition	optional
INSPIRE multiplicity	0..*
Data type (and ISO 19115 no.)	110. Specified Class (DQ_Completeness)
Domain	Lines 100-107 from ISO 19115. The element number 107 (result) is mandatory the rest of the element are optionals.
Implementing instructions	Its recommended complete the element result with: o value: its domain is record o valueUnit: its domain is Unit Of Measure o explanation: its domain is free text
Example	
Example XML encoding	
Comments	See clause 7.1.2 in Chapter 7 for detailed information.

8.2.3 Data Quality – Positional Accuracy – Absolute or external accuracy

Metadata element name	**Data Quality - Positional accuracy - Absolute or external accuracy**
Definition	Closeness of reported coordinate values to values accepted as or being true
ISO 19115 number and name	18. dataQualityInfo
ISO/TS 19139 path	MD_Metadata/dataQualityInfo/DQ_DataQuality/*/ DQ_AbsoluteExternalPositionalAccuracy
INSPIRE obligation / condition	Optional
INSPIRE multiplicity	0..*
Data type(and ISO 19115 no.)	117. Specifies class (DQ_Positional Accuracy)
Domain	Lines 100-107 from ISO 19115. The element number 107 (result) is mandatory the rest of the element are optionals
Implementing instructions	Its recommended complete the element result with: o value: its domain is record o valueUnit: its domain is Unit Of Measure o explanation: its domain is free text
Example	
Example XML encoding	
Comments	See clause 7.2.1 in Chapter 7 for detailed information.

8.3 Guidelines on using metadata elements defined in Regulation 1205/2008/EC

8.3.1 Conformity

The *Conformity* metadata element defined in Regulation 1205/2008/EC allows to report the conformance with the Implementing Rule for interoperability of spatial data sets and services or another specification. The degree of conformity of the dataset can be *Conformant* (if the dataset is fully conformant with the cited specification), *Not Conformant* (if the dataset does not conform to the cited specification) or *Not evaluated* (if the conformance has not been evaluated).

Recommendation 8 The *Conformity* metadata element should be used to report conceptual consistency with this INSPIRE data specification. The value of *Conformant* should be used for the *Degree* element only if the dataset passes all the requirements described in the abstract test suite presented in Annex A. The *Specification* element should be given as follows:
- title: "INSPIRE Data Specification on *Geographical names* - Guidelines
- date: 07 September 2009
- dateType: publication

8.3.2 Lineage

Following the ISO 19113 Quality principles, if a data provider has a procedure for quality validation of their spatial data sets then the data quality elements listed in the Chapter 8 should be used. If not, the *Lineage* metadata element (defined in Regulation 1205/2008/EC) should be used to describe the overall quality of a spatial data set.

According to Regulation 1205/2008/EC, lineage "is a statement on process history and/or overall quality of the spatial data set. Where appropriate it may include a statement whether the data set has been validated or quality assured, whether it is the official version (if multiple versions exist), and whether it has legal validity. The value domain of this metadata element is free text".

Recommendation 9 Apart from describing the process history, if feasible within a free text, the overall quality of the dataset (series) should be included in the *Lineage* metadata element. This statement should contain any quality information required for interoperability and/or valuable for use and evaluation of the data set (series).

8.3.3 Temporal reference

According to Regulation 1205/2008/EC, at least one of the following temporal reference metadata elements shall be provided: temporal extent, date of publication, date of last revision, date of creation.

Recommendation 10 If feasible, the date of the last revision of a spatial data set should be reported using the *Date of last revision* metadata element.

9 Delivery

9.1 Delivery medium

Requirement 12 Data conformant to this INSPIRE data specification shall be made available through an INSPIRE network service.

Requirement 13 All information that is required by a calling application to be able to retrieve the data through the used network service shall be made available in accordance with the requirements defined in the Implementing Rules on Network Services.

EXAMPLE 1 Through the Get Spatial Objects function, a download service can either download a pre-defined data set or pre-defined part of a data set (non-direct access download service), or give direct access to the spatial objects contained in the data set, and download selections of spatial objects based upon a query (direct access download service). To execute such a request, some of the following information might be required:

– the list of spatial object types and/or predefined data sets that are offered by the download service (to be provided through the Get Download Service Metadata operation),

- and the query capabilities section advertising the types of predicates that may be used to form a query expression (to be provided through the Get Download Service Metadata operation, where applicable),
- a description of spatial object types offered by a download service instance (to be proviced through the Describe Spatial Object Types operation).

EXAMPLE 2 Through the Transform function, a transformation service carries out data content transformations from native data forms to the INSPIRE-compliant form and vice versa. If this operation is directly called by an application to transform source data (e.g. obtained through a download service) that is not yet conformant with this data specification, the following parameters are required:
Input data (mandatory). The data set to be transformed.

- Source model (mandatory, if cannot be determined from the input data). The model in which the input data is provided.
- Target model (mandatory). The model in which the results are expected.
- Model mapping (mandatory, unless a default exists). Detailed description of how the transformation is to be carried out.

9.2 Encodings

9.2.1 Encoding for application schema *Geographical names*

Requirement 14	Data conformant to the application schema *Geographical names* shall be encoded using the encoding specified in section 9.2.1.1.

9.2.1.1 Default Encoding: GML Application Schema

Format name: *Geographical names* GML Application Schema v 3.0
Version of the format: GML, version 3.2.1
Reference to the specification of the format: ISO 19136:2007
Character set: UTF-8

The GML Application Schema is distributed in a zip-file separately from the data specification document.

10 Data Capture

Recommendation 11 Based on actual practices in Europe, the update cycle of geographical name data sets should be from one to three years. Exceptions are acceptable if required, e.g. for consistency with other products such as topographic databases or maps.

11 Portrayal

This clause defines the rules for layers and styles to be used for portrayal of the spatial object types defined for this theme.

In section 11.1, the *types* of layers are defined that are to be used for the portrayal of the spatial object types defined in this specification. A view service may offer several layers of the same type, one for each data set that it offers on a specific topic.

Section 11.2 specifies the default styles to be used for each of these layer types.

11.1 Layer Types

Requirement 15 If an INSPIRE view services supports the portrayal of data related to the theme *Geographical names*, it shall provide layers of the types specified in this section.

Table 9: Layer types for the spatial data theme *Geographical names*

Layer Name	Layer Title	Spatial object type	Keywords
GN.GeographicalNames	Geographical Names	NamedPlace	geographical name, place name, location name, feature name, spatial object name, name, toponym, toponymy, exonym, endonym.

11.2 Default Styles

Requirement 16 If an INSPIRE view network service supports the portrayal of spatial data sets corresponding to the spatial data theme *Geographical names*, it shall support the default styles specified in the tables in this section.
If no user-defined style is specified in a portrayal request for a specific layer to an INSPIRE view service, the default style specified in this section for that layer shall be used.

Requirement 17	The typefaces and fonts used for the portrayal of geographical names shall fully and correctly reproduce all the letters and diacritics present in the spellings of geographical names to be visualised.

Table 10: Default styles for the spatial data theme *Geographical names*

Layer Name	GN.GeographicalNames
Style Name	GN.GeographicalNames.Default
Style Title	Geographical Name Default Style
Style Description	All names (i.e. all spellings of all names of the named place) are displayed in black, with font Arial 10pt, and located in order to touch the geometry of the named place, at its centre if possible. If a named place is referred by different names or different spellings of the same name, all texts are displayed on the same line. The order of displayed names does not indicate any preference order, as this is not possible to define precisely such an order without more information, e.g. on linguistic statuses in administrative units.
Symbology	Displaying the full list of all spellings associated to the same NamedPlace seems to be an issue for the sld standard (style layer description). No sld description is thus provided.
Maximum and minimum scales	Names should only be displayed at the viewing scale range defined by the attributes representing the least/most detailed viewing scale of the associated named place. If those attributes are not filled, then the names should be displayed at all viewing scales.

12 Additional information

12.1 Rationale behind requiring ISO 639-3 and 639-5 language codes

Different lists of language codes exist

a) [ISO 639-1] indicates 2 letters codes for language families/groups and for individual languages. It does not go into sufficient detail to distinguish all the individual European languages.

b) [ISO 639-2] indicates 3-letters codes for language families/groups and for individual languages (number of entries: 400). It still does not go into sufficient detail to distinguish all the individual European languages (even for languages recognised as official in some administrative units of Europe).

c) [ISO 639-3] is the most comprehensive list (number of entries: 7000) with the aim to cover all known natural languages. It has the disadvantage of not providing codes for language families.

e) [ISO 639-5] supplements the coding of language groups and language families in [ISO 639-3]. It introduces a hierarchical relationship between languages, but does not add more detail to [ISO 639-3].

Discussion

It appears that most spatial data sets in Europe use [ISO 639-2] as a reference for language of geographical names. Prominent examples are EuroGeoNames and all EuroGeographics products (EuroRegionalMap, EuroGlobalMap and EuroBoundaryMap). In addition, [ISO 639-2] is mandated in the INSPIRE Implementing Rule on metadata ([Regulation 1205/2008/EC]).

However, [ISO 639-2] does not allow for sufficient detail to distinguish all existing European languages; even some official languages in use in parts of Europe are missing. An example is on Saami languages spoken in Northern Europe: [ISO 639-2] (updated list from 2007) encodes five

Saami languages separately, while the other five are grouped as 'Other Saami languages' (code 'smi').

[ISO 639-3] has the advantage of providing codes for most if not all languages used in Europe. On the Saami example, [ISO 639-3] separates all Saami languages from each other.

However, [ISO 639-3] has the disadvantage of not providing codes for language families. That may cause problems, for instance in Germany where topographic data sets refer to 'Sorbian languages' as a minority language, while [ISO 639-3] only offers codes 'Lower Sorbian' and 'Upper Sorbian'. Therefore it would not be possible to map the current German data with [ISO 639-3], while this is possible for [ISO 639-5].

Conclusion
Language is a major aspect of geographical names and the choice of most appropriate codes received much attention during the preparation of this specification. The only solution enabling to code languages with sufficient details, but also enabling to code languages family as existing in some actual data sets, appeared to be a combination of the non-conflicting codes of [ISO 639-3] and [ISO 639-5].

In addition, we strongly recommend to push ISO for a useful combination of the various versions of ISO 639 language codes.

12.2 Rationale behind codes for transliteration schemes

Different code lists for transliteration schemes exist
It appears that there now exist no sufficiently comprehensive and widely accepted unique code list of transliteration schemes maintained by some organisation like ISO or United Nations.

More, some transliteration schemes not recorded in United Nations code list are in use in Europe. In particular, the Bulgarian current official system is different from the United Nations approved one. For example, different spellings exist for 'the city of Shumen' in Bulgaria:

- "Шумен" (endonym)
    - language: Bulgarian
    - script: Cyrillic
    - transliterationScheme: *void*
- "Šumen"
    - language: Bulgarian
    - script: Roman/Latin
    - transliterationScheme: UN 1977
- "Shumen"
    - language: Bulgarian
    - script: Roman/Latin
    - transliterationScheme: national 2006

Conclusion
For these reasons, this specification does not recommend one unique particular code list for coding transliteration schemes.

Bibliography

[Directive 2007/2/EC] Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE)

[DS-D2.5] INSPIRE DS-D2.5, Generic Conceptual Model, v3.1, http://inspire.jrc.ec.europa.eu/reports/ImplementingRules/DataSpecifications/D2.5_v3.1.pdf

[EGN] EuroGeoNames (2006-2009). European project of the eContentplus program, project identifier ECP 2005 GEO 038026 EGN, http://www.eurogeonames.com

[EGN D4.2e] Deliverable D4.2e from the EuroGeoNames project: Conceptual schema and documentation.

[ISO 15924] EN ISO 15924:2004, Codes for the representation of names of scripts

[ISO 19112] EN ISO 19112:2003, Geographic information – Spatial referencing by geographic identifiers

[ISO 19115] EN ISO 19115:2005, Geographic information – Metadata (ISO 19115:2003)

[ISO 19136] EN ISO 19136:2007, Geographic information - Geography Markup Language (GML)

[ISO 19137] EN ISO 19137:2007, Geographic information -- Core profile of the spatial schema.

[ISO 19139] ISO/TS 19139:2007, Geographic information – Metadata – XML schema implementation

[ISO 639-2] EN ISO 639-2:1998, Codes for the representation of names of languages - Part 2: Alpha-3 Code.

[ISO 639-3] EN ISO 639-3:2007, Codes for the representation of names of languages - Part 3: Alpha-3 code for comprehensive coverage of languages

[ISO 639-5] EN ISO 639-5:2008, Codes for the representation of names of languages - Part 5: Alpha-3 code for language families and groups

[OGC 06-103r3] Implementation Specification for Geographic Information - Simple feature access – Part 1: Common Architecture v1.2.0

[Regulation 1205/2008/EC] Regulation 1205/2008/EC implementing Directive 2007/2/EC of the European Parliament and of the Council as regards metadata

[UNGEGN Manual 2006] Manual for the National Standardization of Geographical Names. United Nations Group of Experts on Geographical Names, 2006, ISBN: 92-1-161490-2

[UNGEGN Manual 2007] Technical reference manual for the standardization of geographical names, United Nations Group of Experts on Geographical Names, 2007, ISBN: 92-1-161500-5

[UNGEGN Glossary 2007] Glossary of Terms for the Standardization of Geographical Names & addendum, United Nations Group of Experts on Geographical Names, ref. ST/ESA/STAT/SER.M/85 and ST/ESA/STAT/SER.M/85/Add.1.

Annex A
(normative)

Abstract Test Suite

Any dataset conforming to this INSPIRE data specification shall meet all requirements specified in this document.

NOTE A common abstract test suite including detailed instructions on how to test each requirement will be added at a later stage.

Annex B
(informative)
Examples

This Annex contains informative examples of typical situations for names.

NOTE: these examples have been validated with Final Draft (2009-08-11) of the GML-Schemas v.3

Estany de Banyoles – 'simple' name

B.1.1 Description

The Estany de Banyoles is one of the big natural lakes of Catalonia. This place name is the origin of the name of the 'comarca' (minor region) 'Pla de l'Estany'. The city of Banyoles is located near the lake and it is the capital of the Pla de l'Estany 'comarca'. The lake was the site of rowing competitions at the Olympic Games of 1992.

B.1.2 Data to be delivered

NamedPlace
identifier: ICC.BTCv4.48701
geometry: UTMX47952582, UTMY466459166 (31-Zone) [referencePoint]
type: 'Lake'
typeLocal: 'hidrografia' [*Hydrography*]
relatedSpatialObject: <null>

GeographicalName
language : cat [Catalan]
nativeValue: endonym
status: Official
sourceOfName: Official Gazetteer of Major Toponymy of Catalonia
Spelling
text: Estany de Banyoles
script: Latin (Roman)
transliterationScheme: <null>

B.1.3 GML encoding

```
<?xml version="1.0" encoding="UTF-8"?>
<wfs:FeatureCollection timeStamp="2009-07-13T07:00:00" numberMatched="1" numberReturned="1"
gml:id="ES.ICC.BTCv4.0"
  xmlns="urn:x-inspire:specification:gmlas:GeographicalNames:3.0"
  xmlns:base="urn:x-inspire:specification:gmlas:BaseTypes:3.2"
  xmlns:gmd="http://www.isotc211.org/2005/gmd"
  xmlns:xlink="http://www.w3.org/1999/xlink" xmlns:wfs="http://www.opengis.net/wfs/2.0"
  xmlns:gml="http://www.opengis.net/gml/3.2" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="urn:x-inspire:specification:gmlas:GeographicalNames:3.0
                                                ../XSD/GeographicalNames.xsd
                http://www.opengis.net/wfs/2.0    ../wfs/2.0.0/wfs.xsd">
  <gml:boundedBy>
    <gml:Envelope srsName="urn:ogc:def:crs:EPSG::4258">
      <gml:lowerCorner>-20.0 30.0</gml:lowerCorner>
      <gml:upperCorner>10.0 45.0</gml:upperCorner>
    </gml:Envelope>
  </gml:boundedBy>

  <wfs:member>
    <NamedPlace gml:id="ES.ICC.BTCv4.48701">
      <beginLifespanVersion>2008-11-05T07:00:00</beginLifespanVersion>
      <geometry>
        <gml:Point gml:id="ES.ICC.BTCv4R.P01" srsName="urn:ogc:def:crs:EPSG::4258">
          <gml:pos>0.03 40.83</gml:pos>
        </gml:Point>
```

```
      </geometry>
      <inspireId>
        <base:Identifier>
          <base:localId>48701</base:localId>
          <base:namespace>ES.ICC.BTCv4R</base:namespace>
        </base:Identifier>
      </inspireId>
      <localType>
        <gmd:LocalisedCharacterString locale="es-ES">hidrografia</gmd:LocalisedCharacterString>
      </localType>
      <localType>
        <gmd:LocalisedCharacterString locale="en-GB">Hydrography</gmd:LocalisedCharacterString>
      </localType>
      <name>
        <GeographicalName>
          <language>cat</language>
          <nativeness>endonym</nativeness>
          <nameStatus>official</nameStatus>
          <sourceOfName>Official Gazetteer of Major Toponymy of Catalonia</sourceOfName>
          <pronunciation>
            <PronunciationOfName/>
          </pronunciation>
          <spelling>
            <SpellingOfName>
              <text>Estany de Banyoles</text>
              <script>Latn</script>
            </SpellingOfName>
          </spelling>
        </GeographicalName>
      </name>
      <type>hydrography</type>
    </NamedPlace>
  </wfs:member>

</wfs:FeatureCollection>
```

B.2 City of Athens - named only in the Greek language and Greek script

B.2.1 Description

English: Athens (IPA: [□æθənz]); Greek: Αθήνα, Athina, (IPA: [a□θina]), the capital and largest city of Greece.

B.2.2 GML encoding

```
<?xml version="1.0" encoding="UTF-8"?>
<wfs:FeatureCollection timeStamp="2008-11-05T07:00:00" numberMatched="1" numberReturned="1"  gml:id="GR.NN.PNR.0"
  xmlns="urn:x-inspire:specification:gmlas:GeographicalNames:3.0"
  xmlns:base="urn:x-inspire:specification:gmlas:BaseTypes:3.2"
  xmlns:gmd="http://www.isotc211.org/2005/gmd"
  xmlns:xlink="http://www.w3.org/1999/xlink"
  xmlns:wfs="http://www.opengis.net/wfs/2.0"
  xmlns:gml="http://www.opengis.net/gml/3.2"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="urn:x-inspire:specification:gmlas:GeographicalNames:3.0
                                        ../XSD/GeographicalNames.xsd
                      http://www.opengis.net/wfs/2.0 ../wfs/2.0.0/wfs.xsd">
  <gml:boundedBy>
    <gml:Envelope srsName="urn:ogc:def:crs:EPSG::4258">
      <gml:lowerCorner>18.0 30.0</gml:lowerCorner>
      <gml:upperCorner>28.0 42.0</gml:upperCorner>
    </gml:Envelope>
  </gml:boundedBy>

  <wfs:member>
    <NamedPlace gml:id="GR.NN.PNR.329546">
      <beginLifespanVersion>2008-11-05T07:00:00</beginLifespanVersion>
      <geometry>
        <gml:Point gml:id="GR.NN.PNR.P329546" srsName="urn:ogc:def:crs:EPSG::4258">
          <gml:pos>23.66 37.96</gml:pos>
```

```
        </gml:Point>
      </geometry>
      <inspireId>
        <base:Identifier>
          <base:localId>329546</base:localId>
          <base:namespace>GR.NN.PNR</base:namespace>
        </base:Identifier>
      </inspireId>
      <localType/>
      <name>
        <GeographicalName>
          <language>gre</language>
          <nativeness>endonym</nativeness>
          <nameStatus>official</nameStatus>
          <sourceOfName/>
          <pronunciation>
            <PronunciationOfName/>
          </pronunciation>
          <spelling>
            <SpellingOfName>
              <text>Αθήνα</text>
              <script>Grek</script>
            </SpellingOfName>
          </spelling>
        </GeographicalName>
      </name>
      <type>populatedPlace</type>
    </NamedPlace>
  </wfs:member>

</wfs:FeatureCollection>
```

B.3 City of Athens – Greek endonym in two scripts, and English exonym

B.3.1 GML encoding

```
<?xml version="1.0" encoding="UTF-8"?>
<wfs:FeatureCollection timeStamp="2008-11-05T07:00:00" numberMatched="1" numberReturned="1"  gml:id="GR.NN.PNR.0"
  xmlns="urn:x-inspire:specification:gmlas:GeographicalNames:3.0"
  xmlns:base="urn:x-inspire:specification:gmlas:BaseTypes:3.2"
  xmlns:gmd="http://www.isotc211.org/2005/gmd"
  xmlns:xlink="http://www.w3.org/1999/xlink"
  xmlns:wfs="http://www.opengis.net/wfs/2.0"
  xmlns:gml="http://www.opengis.net/gml/3.2"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="urn:x-inspire:specification:gmlas:GeographicalNames:3.0
                                        ../XSD/GeographicalNames.xsd
                      http://www.opengis.net/wfs/2.0 ../wfs/2.0.0/wfs.xsd">
  <gml:boundedBy>
    <gml:Envelope srsName="urn:ogc:def:crs:EPSG::4258">
      <gml:lowerCorner>18.0 30.0</gml:lowerCorner>
      <gml:upperCorner>28.0 42.0</gml:upperCorner>
    </gml:Envelope>
  </gml:boundedBy>

  <wfs:member>
    <NamedPlace gml:id="GR.NN.PNR.329546">
      <beginLifespanVersion>2008-11-05T07:00:00</beginLifespanVersion>
      <geometry>
        <gml:Point gml:id="GR.NN.PNR.P329546" srsName="urn:ogc:def:crs:EPSG::4258">
          <gml:pos>23.66 37.96</gml:pos>
        </gml:Point>
      </geometry>
      <inspireId>
        <base:Identifier>
          <base:localId>329546</base:localId>
          <base:namespace>GR.NN.PNR</base:namespace>
        </base:Identifier>
      </inspireId>
      <localType/>
      <name>
        <GeographicalName>
```

```
          <language>gre</language>
          <nativeness>endonym</nativeness>
          <nameStatus>official</nameStatus>
          <sourceOfName/>
          <pronunciation>
            <PronunciationOfName/>
          </pronunciation>
          <spelling>
            <SpellingOfName>
              <text>Αθήνα</text>
              <script>Grek</script>
            </SpellingOfName>
          </spelling>
          <spelling>
            <SpellingOfName>
              <text>Athina</text>
              <script>Latn</script>
              <transliterationScheme>standard Greek romanisation</transliterationScheme>
            </SpellingOfName>
          </spelling>
        </GeographicalName>
      </name>
      <name>
        <GeographicalName>
          <language>eng</language>
          <nativeness>exonym</nativeness>
          <nameStatus>other</nameStatus>
          <sourceOfName/>
          <pronunciation>
            <PronunciationOfName/>
          </pronunciation>
          <spelling>
            <SpellingOfName>
              <text>Athens</text>
              <script>Latn</script>
            </SpellingOfName>
          </spelling>
        </GeographicalName>
      </name>
      <type>populatedPlace</type>
    </NamedPlace>
  </wfs:member>

</wfs:FeatureCollection>
```

B.4 Finland - several names in different languages (Helsinki, Helsingfors)

B.4.1 Description

Helsinki is the capital of Finland and officially bilingual (Finnish–Swedish) municipality with a Finnish-speaking majority. Since municipality names have official status in Finland, both Helsinki (Finnish) and Helsingfors (Swedish) are official names of the capital.

B.4.2 Data to be delivered

NamedPlace
identifier: FI.NLS.GNR.10342733
geometry: N 60.16648, E 24.94344 [referencePoint]
type: 'Populated place'
typeLocal: 'Kaupunki' [*Populated place/City*]
relatedSpatialObject: <null>

GeographicalName
language: fin [Finnish]
nativeValue: endonym
status: Official
sourceOfName: Geographical Names Register of the National Land Survey of Finland
beginLifespanVersion: 2001-01-01
endLifespanVersion: <null>

Spelling
text: Helsinki
script: Latin (Roman)
transliterationScheme: <null>

GeographicalName
language: swe [Swedish]
nativeValue: endonym
status: Official
sourceOfName: Geographical Names Register of the National Land Survey of Finland
beginLifespanVersion: 2001-01-01
endLifespanVersion: <null>
Spelling
text: Helsingfors
script: Latin (Roman)
transliterationScheme: <null>

B.4.3 GML encoding

```
<?xml version="1.0" encoding="UTF-8"?>
<wfs:FeatureCollection timeStamp="2008-11-05T07:00:00" numberMatched="1" numberReturned="1" gml:id="FI.NLS.GNR.0"
  xmlns="urn:x-inspire:specification:gmlas:GeographicalNames:3.0"
  xmlns:base="urn:x-inspire:specification:gmlas:BaseTypes:3.2"
  xmlns:gmd="http://www.isotc211.org/2005/gmd"
  xmlns:xlink="http://www.w3.org/1999/xlink" xmlns:wfs="http://www.opengis.net/wfs/2.0"
  xmlns:gml="http://www.opengis.net/gml/3.2" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="urn:x-inspire:specification:gmlas:GeographicalNames:3.0
                                        ../XSD/GeographicalNames.xsd
                http://www.opengis.net/wfs/2.0 ../wfs/2.0.0/wfs.xsd">
  <gml:boundedBy>
    <gml:Envelope srsName="urn:ogc:def:crs:EPSG::4258">
      <gml:lowerCorner>20.0 55.0</gml:lowerCorner>
      <gml:upperCorner>35.0 75.0</gml:upperCorner>
    </gml:Envelope>
  </gml:boundedBy>

  <wfs:member>
    <NamedPlace gml:id="FI.NLS.GNR.10342733">
      <beginLifespanVersion>2001-01-01T12:00:00</beginLifespanVersion>
      <geometry>
        <gml:Point gml:id="FI.NLS.GNR.P10342733" srsName="urn:ogc:def:crs:EPSG::4258">
          <gml:pos>24.94344 60.16648</gml:pos>
        </gml:Point>
      </geometry>
      <inspireId>
        <base:Identifier>
          <base:localId>10342733</base:localId>
          <base:namespace>FI.NLS.GNR</base:namespace>
        </base:Identifier>
      </inspireId>
      <localType>
        <gmd:LocalisedCharacterString locale="fi-FI">Kaupunki</gmd:LocalisedCharacterString>
      </localType>
      <localType>
        <gmd:LocalisedCharacterString locale="en-GB">Populated place/City</gmd:LocalisedCharacterString>
      </localType>
      <name>
        <GeographicalName>
          <language>fin</language>
          <nativeness>endonym</nativeness>
          <nameStatus>standardised</nameStatus>
          <sourceOfName/>
          <pronunciation>
            <PronunciationOfName/>
          </pronunciation>
          <spelling>
            <SpellingOfName>
              <text>Helsinki</text>
              <script>Latn</script>
            </SpellingOfName>
          </spelling>
```

```
        </GeographicalName>
      </name>
      <name>
        <GeographicalName>
          <language>swe</language>
          <nativeness>endonym</nativeness>
          <nameStatus>standardised</nameStatus>
          <sourceOfName/>
          <pronunciation>
            <PronunciationOfName/>
          </pronunciation>
          <spelling>
            <SpellingOfName>
              <text>Helsingfors</text>
              <script>Latn</script>
            </SpellingOfName>
          </spelling>
        </GeographicalName>
      </name>
      <type>Administrative unit</type>
    </NamedPlace>
  </wfs:member>

</wfs:FeatureCollection>
```

B.5 Finland - several names in different languages (Ivalojoki, Avviljohka, Avveeljuuhâ)

B.5.1 Description

Ivalojoki (Finnish), Avviljohka (North Saami) and Avveeljuuhâ (Inari Saami) are the names of a major river in Inari municipality, Finnish Lapland. While Finnish and Swedish are the official state languages, North Saami, Inari Saami and Skolt Saami are officially recognized minority languages in Inari municipality. The names of rivers are not official in Finland but their spellings have been standardised by a national body assigned advisory function in matters of toponymy.

B.5.2 Data to be delivered

NamedPlace
identifier: FI.NLS.GNR.10889831
geometry: N 68.704911, E 27.610181 [referencePoint]
type: 'Flowing water'/'River'
typeLocal: 'Joki' [*River*]
relatedSpatialObject: <null>

GeographicalName
language: fin [Finnish]
nativeValue: endonym
status: Standardised
sourceOfName: Geographic Names Register of the National Land Survey of Finland
beginLifespanVersion: 2001-01-01
endLifespanVersion: <null>
Spelling
text: Ivalojoki
script: Latin (Roman)
transliterationScheme: <null>

GeographicalName
language: sme ['Northern Sami']
nativeValue: endonym
status: Standardised
sourceOfName: Geographical Names Register of the National Land Survey of Finland
beginLifespanVersion: 2001-01-01
endLifespanVersion: <null>
Spelling

text: Avviljohka
script: Latin (Roman)
transliterationScheme: <null>

GeographicalName
language: smn [‘Inari Sami’]
nativeValue: endonym
status: Standardised
sourceOfName: Geographical Names Register of the National Land Survey of Finland
beginLifespanVersion: 2001-01-01
endLifespanVersion: <null>
Spelling
text: Avveeljuuhâ
script: Latin (Roman)
transliterationScheme: <null>

B.5.3 GML encoding

```
<?xml version="1.0" encoding="UTF-8"?>
<wfs:FeatureCollection timeStamp="2008-11-05T07:00:00" numberMatched="1" numberReturned="1"  gml:id="FI.NLS.GNR.0"
  xmlns="urn:x-inspire:specification:gmlas:GeographicalNames:3.0"
  xmlns:base="urn:x-inspire:specification:gmlas:BaseTypes:3.2"
  xmlns:gmd="http://www.isotc211.org/2005/gmd"
  xmlns:gco="http://www.isotc211.org/2005/gco"
  xmlns:xlink="http://www.w3.org/1999/xlink"
  xmlns:wfs="http://www.opengis.net/wfs/2.0"
  xmlns:gml="http://www.opengis.net/gml/3.2"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="urn:x-inspire:specification:gmlas:GeographicalNames:3.0
                                        ../XSD/GeographicalNames.xsd
                http://www.opengis.net/wfs/2.0 ../wfs/2.0.0/wfs.xsd">
  <gml:boundedBy>
    <gml:Envelope srsName="urn:ogc:def:crs:EPSG::4258">
      <gml:lowerCorner>20.0 55.0</gml:lowerCorner>
      <gml:upperCorner>35.0 75.0</gml:upperCorner>
    </gml:Envelope>
  </gml:boundedBy>

  <wfs:member>
    <NamedPlace gml:id="FI.NLS.GNR.10889831">
      <beginLifespanVersion>2008-11-05T07:00:00</beginLifespanVersion>
      <geometry>
        <gml:Point gml:id="FI.NLS.GNR.P10889831" srsName="urn:ogc:def:crs:EPSG::4258">
          <gml:pos>27.610181 68.704911</gml:pos>
        </gml:Point>
      </geometry>
      <inspireId>
        <base:Identifier>
          <base:localId>10889831</base:localId>
          <base:namespace>FI.NLS.GNR</base:namespace>
        </base:Identifier>
      </inspireId>
      <leastDetailedViewingResolution>
        <gmd:MD_Resolution>
          <gmd:equivalentScale>
              <gmd:MD_RepresentativeFraction>
                  <gmd:denominator>
                      <gco:Integer>50000</gco:Integer>
                  </gmd:denominator>
              </gmd:MD_RepresentativeFraction>
          </gmd:equivalentScale>
        </gmd:MD_Resolution>
      </leastDetailedViewingResolution>
      <localType>
        <gmd:LocalisedCharacterString locale="en-GB">Flowing water/River</gmd:LocalisedCharacterString>
      </localType>
      <name>
        <GeographicalName>
          <language>fin</language>
          <nativeness>endonym</nativeness>
          <nameStatus>standardised</nameStatus>
          <sourceOfName/>
```

```
        <pronunciation>
          <PronunciationOfName/>
        </pronunciation>
        <spelling>
          <SpellingOfName>
            <text>Ivalojoki</text>
            <script>Latn</script>
          </SpellingOfName>
        </spelling>
      </GeographicalName>
    </name>
    <name>
      <GeographicalName>
        <language>sme</language>
        <nativeness>endonym</nativeness>
        <nameStatus>standardised</nameStatus>
        <sourceOfName/>
        <pronunciation>
          <PronunciationOfName/>
        </pronunciation>
        <spelling>
          <SpellingOfName>
            <text>Avviljohka</text>
            <script>Latn</script>
          </SpellingOfName>
        </spelling>
      </GeographicalName>
    </name>
    <name>
      <GeographicalName>
        <language>smn</language>
        <nativeness>endonym</nativeness>
        <nameStatus>standardised</nameStatus>
        <sourceOfName/>
        <pronunciation>
          <PronunciationOfName/>
        </pronunciation>
        <spelling>
          <SpellingOfName>
            <text>Avveeljuuhâ</text>
            <script>Latn</script>
          </SpellingOfName>
        </spelling>
      </GeographicalName>
    </name>
    <type>hydrography</type>
  </NamedPlace>
</wfs:member>

</wfs:FeatureCollection>
```

B.6 Oslo - several names with different status, and with multipoint geometry

B.6.1 Description

Oslo (called **Christiania** from 1624 to 1878, and **Kristiania** from 1878 to 1924) is the capital and largest city of Norway.

B.6.2 GML encoding

```
<?xml version="1.0" encoding="UTF-8"?>
<wfs:FeatureCollection timeStamp="2008-11-05T07:00:00" numberMatched="1" numberReturned="1"
gml:id="NO.SK.SSR.FC000000"
  xmlns="urn:x-inspire:specification:gmlas:GeographicalNames:3.0"
  xmlns:base="urn:x-inspire:specification:gmlas:BaseTypes:3.2"
  xmlns:gmd="http://www.isotc211.org/2005/gmd"
  xmlns:xlink="http://www.w3.org/1999/xlink" xmlns:wfs="http://www.opengis.net/wfs/2.0"
  xmlns:gml="http://www.opengis.net/gml/3.2" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="urn:x-inspire:specification:gmlas:GeographicalNames:3.0
                                        ../XSD/GeographicalNames.xsd
                      http://www.opengis.net/wfs/2.0 ../wfs/2.0.0/wfs.xsd">
  <gml:boundedBy>
    <gml:Envelope srsName="urn:ogc:def:crs:EPSG::4258">
```

```
      <gml:lowerCorner>5.0 58.0</gml:lowerCorner>
      <gml:upperCorner>35.0 85.0</gml:upperCorner>
    </gml:Envelope>
  </gml:boundedBy>

  <wfs:member>
    <NamedPlace gml:id="NO.SK.SSR.111111">
      <beginLifespanVersion>1989-01-01T11:00:00Z</beginLifespanVersion>
      <geometry>
        <gml:MultiPoint gml:id="NO.SK.SSR.P01" srsName="urn:ogc:def:crs:EPSG::4258">
          <gml:pointMember>
            <gml:Point gml:id="NO.SK.SSR.P02">
              <gml:pos>10.51 59.55</gml:pos>
            </gml:Point>
          </gml:pointMember>
          <gml:pointMember>
            <gml:Point gml:id="NO.SK.SSR.P03">
              <gml:pos>10.52 59.54</gml:pos>
            </gml:Point>
          </gml:pointMember>
          <gml:pointMember>
            <gml:Point gml:id="NO.SK.SSR.P04">
              <gml:pos>10.53 59.56</gml:pos>
            </gml:Point>
          </gml:pointMember>
        </gml:MultiPoint>
      </geometry>
      <inspireId>
        <base:Identifier>
          <base:localId>111111</base:localId>
          <base:namespace>NO.SK.SSR</base:namespace>
        </base:Identifier>
      </inspireId>
      <localType>
        <gmd:LocalisedCharacterString locale="no-NO">Hovedstad</gmd:LocalisedCharacterString>
      </localType>
      <localType>
        <gmd:LocalisedCharacterString locale="en-GB">Capital</gmd:LocalisedCharacterString>
      </localType>
      <name>
        <GeographicalName>
          <language>nor</language>
          <nativeness>endonym</nativeness>
          <nameStatus>official</nameStatus>
          <sourceOfName>Town council decree 1925-01-01</sourceOfName>
          <pronunciation>
            <PronunciationOfName/>
          </pronunciation>
          <spelling>
            <SpellingOfName>
              <text>Oslo</text>
              <script>Latn</script>
            </SpellingOfName>
          </spelling>
          <grammaticalGender>masculine</grammaticalGender>
          <grammaticalNumber>singular</grammaticalNumber>
        </GeographicalName>
      </name>
      <name>
        <GeographicalName>
          <language>nor</language>
          <nativeness>endonym</nativeness>
          <nameStatus>historical</nameStatus>
          <sourceOfName/>
          <pronunciation>
            <PronunciationOfName/>
          </pronunciation>
          <spelling>
            <SpellingOfName>
              <text>Kristiania</text>
              <script>Latn</script>
            </SpellingOfName>
          </spelling>
        </GeographicalName>
      </name>
```

```
      <name>
        <GeographicalName>
          <language>nor</language>
          <nativeness>endonym</nativeness>
          <nameStatus>historical</nameStatus>
          <sourceOfName/>
          <pronunciation>
            <PronunciationOfName/>
          </pronunciation>
          <spelling>
            <SpellingOfName>
              <text>Christiania</text>
              <script>Latn</script>
            </SpellingOfName>
          </spelling>
        </GeographicalName>
      </name>
      <relatedSpatialObject>
        <base:Identifier>
          <base:localId>222222</base:localId>
          <base:namespace>NO.SK.CITY</base:namespace>
        </base:Identifier>
      </relatedSpatialObject>
      <type>populatedPlace</type>
    </NamedPlace>
  </wfs:member>

</wfs:FeatureCollection>
```

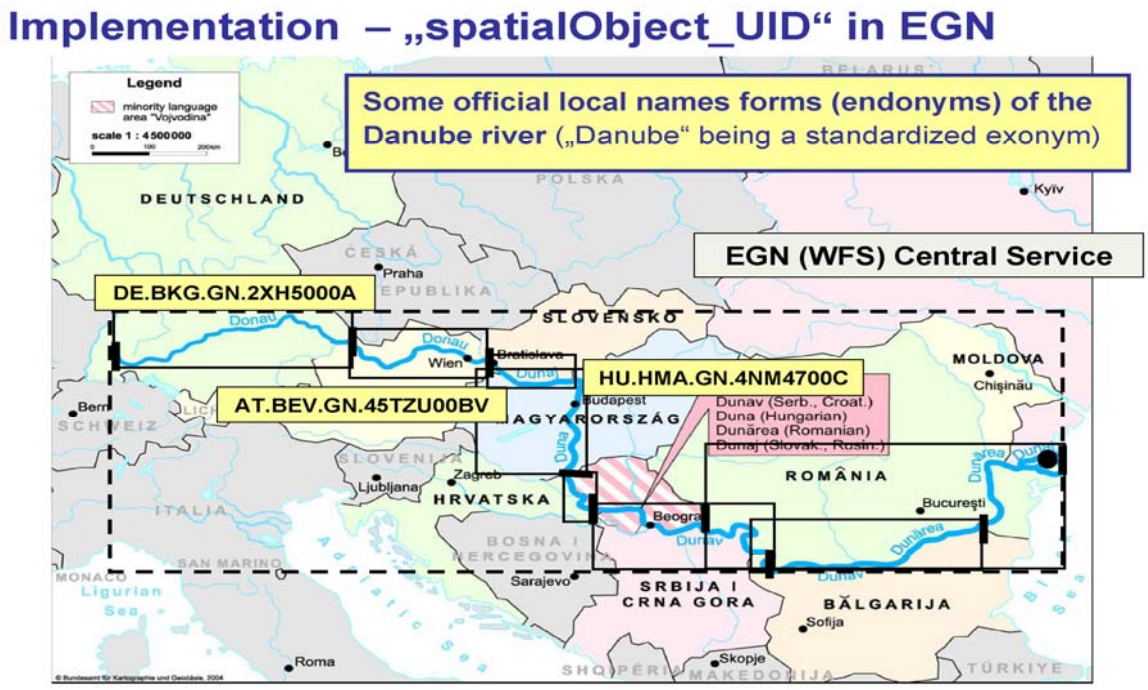
B.7 Management of Danube in EuroGeoNames, illustrating the benefit of establishing cross border capabilities

B.7.1 Description

This example describe the EuroGeoNames solution for the Danube river, crossing several countries and with several names [EGN D4.2e], through a link between “EuroGeonames Central Service” (EGN Service) and “Exonyms and other Variant Names database” (EVN-DB)

1) Typical use case in EuroGeoNames

Typical usage of the EGN service: a German user wants to get the information about the Danube river and starts his single inquiry with “Donau”. He aims at getting information (all names and the geographic extent) about the complete spatial object (which may be a combination of 9 spatial objects from 9 national data sets).



2) EGN Local Services
Assuming that all EGN Local Services needed are running, the EGN Local Services do provide the following information:

Country	SpatialObject_UID	Endonyms	geographicIdentifier	GeographicExtent
Germany	DE.BKG.GN.2XH5000A	**Donau**	Donau;DE.98673ABC	BoundingBoxDE
Austria	AT.BEV.GN.45TZU00BV	**Donau**	Donau;AT.786543C	BoundingBoxAT
Slovakia	SK.SMA.GN.87958377	**Dunaj**	Dunaj;SI.72468764	BoundingBoxSI
Hungary	HU.HMA.GN.4NM4700C	**Duna**	Duna;HU.21342315	BoundingBoxHU
Croatia	HR.HMA.GN.985463	**Dunav**	Dunav;HR.564838	BoundingBoxHR
Serbia	SZ.SMA.GN.9945344	**Dunav**	Dunav;SZ.ATRG778	BoundingBoxSZ
Bulgaria	BG.BMA.GN.33578788	**Дунав**	Dunav;BG.4238745	BoundingBoxBG
Bulgaria	BG.BMA.GN.33578788	**Dunav**	Dunav;BG.4238745	BoundingBoxBG
Romania	RO.RMA.GN.56TZHN8	**Dunărea**	Dunărea;RO.6364287	BoundingBoxRO
Moldava	MD.MMA.GN.85867987	**Dunărea**	Dunărea;MD.76ZZTH9	BoundingBoxMD
Ukraine	UA.xy	**Dunaj**	Dunay;UA.xy	BoundingBoxUA
Ukraine	UA.xy	**Дунай**	Dunay;UA.xy	BoundingBoxUA

One country/NMCA may provide more than one geographical name associated to the respective spatialObject_UID (which are unique identifiers for the respective spatial objects). The generic requirements from the Generic Conceptual Model [DS-D2.5] apply for these identifiers.

The linkage between the “national” pieces of the whole spatial object (border-crossing spatial objects) is done within the Exonyms and other Variant Names database (EVN-DB).
The EGN Central Service does provide the respective national pieces from the EGN Local Services together with the information stored and maintained in the EVN-DB.

3) Relation to the Exonyms and other variant names database – EVN-DB

SpatialObject_UID	Endon.	eng	geog.Identifier1	Fre	geog.Identifier2	[…]
DE.BKG.GN.2XH5000A	Donau	Danube	Danube;EU.567493	Danube	Danube;EU.45637	dito
AT.BEV.GN.45TZU00BV	Donau	Danube	dito	Ditto	dito	dito
SK.SMA.GN.87958377	Dunaj	Danube	dito	Ditto	dito	dito
HU.HMA.GN.4NM4700C	Duna	Danube	dito	Ditto	dito	dito
HR.HMA.GN.985463	Dunav	Danube	dito	Ditto	dito	dito
SZ.SMA.GN.9945344	Dunav	Danube	dito	Ditto	dito	dito
BG.BMA.GN.33578788	Dunav	Danube	dito	Ditto	dito	dito
RO.RMA.GN.56TZHN8	Dunărea	Danube	dito	Ditto	dito	dito
MD.MMA.GN.85867987	Dunărea	Danube	dito	Ditto	dito	dito
UA.xy	Dunav	Danube	dito	Ditto	dito	dito

The EVN_DB stores one set of exonyms and variant names [1..*] which will be associated to all (national) spatialObject_UIDs with cardinality [1..*].
As for the Danube river, one set of exonyms and variants are stored for 9 spatial objects – which will be linked together through the EVN-DB only.
The English exonym or variant name is always introduced if available.
Border-crossing spatial objects without associated exonyms are not linked within the EU-funded period of EuroGeoNames.

4) Results provided through the EGN Central Service in combination with the EGN Reference Application (according to the EGN data model):

Endonym	geographicIdentifier	alternativeGeographicIdentifier
Donau	Donau;DE.98673ABC	Donau;AT.786543C, Dunaj;SK.72468764 Duna;HU.21342315 Dunav;HR.564838 Dunav;SZ.ATRG778 Dunav;BG.4238745 Dunărea;RO.6364287 Dunărea;MD.76ZZTH9 Dunaj; UA.xy Danube;EU.567493 Dunava;EU.45637 […]

The example may be extracted from a cascading WFS-server who has routed the WFS request to all participating nationally managed WFS-servers, and then gathered all the responses into the same feature collection in a combined GML data set.

B.7.2 GML encoding

```
<?xml version="1.0" encoding="UTF-8"?>
<wfs:FeatureCollection timeStamp="2008-11-05T07:00:00" numberMatched="1" numberReturned="1" gml:id="EG.EGN.0"
  xmlns="urn:x-inspire:specification:gmlas:GeographicalNames:3.0"
  xmlns:base="urn:x-inspire:specification:gmlas:BaseTypes:3.2"
  xmlns:gmd="http://www.isotc211.org/2005/gmd"
  xmlns:xlink="http://www.w3.org/1999/xlink"
  xmlns:wfs="http://www.opengis.net/wfs/2.0"
  xmlns:gml="http://www.opengis.net/gml/3.2"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="urn:x-inspire:specification:gmlas:GeographicalNames:3.0
                                    ../XSD/GeographicalNames.xsd
              http://www.opengis.net/wfs/2.0 ../wfs/2.0.0/wfs.xsd">
  <gml:boundedBy>
    <gml:Envelope srsName="urn:ogc:def:crs:EPSG::4258">
      <gml:lowerCorner>5.00008 40.001026</gml:lowerCorner>
      <gml:upperCorner>35.198694 55.099392</gml:upperCorner>
```

```
    </gml:Envelope>
  </gml:boundedBy>

  <wfs:member>
    <NamedPlace gml:id="DE.98673ABC">
      <beginLifespanVersion>2008-11-05T07:00:00</beginLifespanVersion>
      <geometry>
        <gml:Point gml:id="DE.P01" srsName="urn:ogc:def:crs:EPSG::4258">
          <gml:pos>13.4 48.5</gml:pos>
        </gml:Point>
      </geometry>
      <inspireId>
        <base:Identifier>
          <base:localId>98673ABC</base:localId>
          <base:namespace>DE</base:namespace>
        </base:Identifier>
      </inspireId>
      <localType>
        <gmd:LocalisedCharacterString locale="de-DE">Fluss</gmd:LocalisedCharacterString>
      </localType>
      <localType>
        <gmd:LocalisedCharacterString locale="en-GB">River</gmd:LocalisedCharacterString>
      </localType>
      <name>
        <GeographicalName>
          <language>deu</language>
          <nativeness>endonym</nativeness>
          <nameStatus>official</nameStatus>
          <sourceOfName/>
          <pronunciation>
            <PronunciationOfName>
              <pronunciationIPA>[□do□na□]</pronunciationIPA>
            </PronunciationOfName>
          </pronunciation>
          <spelling>
            <SpellingOfName>
              <text>Donau</text>
              <script>Latn</script>
            </SpellingOfName>
          </spelling>
        </GeographicalName>
      </name>
      <relatedSpatialObject>
        <base:Identifier>
          <base:localId>2XH5000A</base:localId>
          <base:namespace>DE.BKG.GN</base:namespace>
        </base:Identifier>
      </relatedSpatialObject>
      <type>hydrography</type>
    </NamedPlace>
  </wfs:member>

  <wfs:member>
    <NamedPlace gml:id="AT.786543C">
      <beginLifespanVersion>2008-11-05T07:00:00</beginLifespanVersion>
      <geometry>
        <gml:Point gml:id="AT.P01" srsName="urn:ogc:def:crs:EPSG::4258">
          <gml:pos>13.4 48.5</gml:pos>
        </gml:Point>
      </geometry>
      <inspireId>
        <base:Identifier>
          <base:localId>786543C</base:localId>
          <base:namespace>AT</base:namespace>
        </base:Identifier>
      </inspireId>
      <localType>
        <gmd:LocalisedCharacterString locale="de-AT">Fluss</gmd:LocalisedCharacterString>
      </localType>
      <localType>
        <gmd:LocalisedCharacterString locale="en-GB">River</gmd:LocalisedCharacterString>
      </localType>
      <name>
        <GeographicalName>
          <language>deu</language>
```

```
          <nativeness>endonym</nativeness>
          <nameStatus>official</nameStatus>
          <sourceOfName/>
          <pronunciation>
            <PronunciationOfName/>
          </pronunciation>
          <spelling>
            <SpellingOfName>
              <text>Donau</text>
              <script>Latn</script>
            </SpellingOfName>
          </spelling>
        </GeographicalName>
      </name>
      <relatedSpatialObject>
        <base:Identifier>
          <base:localId>45TZU00BV</base:localId>
          <base:namespace>AT.BEV.GN</base:namespace>
        </base:Identifier>
      </relatedSpatialObject>
      <type>hydrography</type>
    </NamedPlace>
  </wfs:member>

  <wfs:member>
    <NamedPlace gml:id="SI.72468764">
      <beginLifespanVersion>2008-11-05T07:00:00</beginLifespanVersion>
      <geometry>
        <gml:Point gml:id="SI.P01" srsName="urn:ogc:def:crs:EPSG::4258">
          <gml:pos>18.8 47.9</gml:pos>
        </gml:Point>
      </geometry>
      <inspireId>
        <base:Identifier>
          <base:localId>72468764</base:localId>
          <base:namespace>SI</base:namespace>
        </base:Identifier>
      </inspireId>
      <localType>
        <gmd:LocalisedCharacterString locale="en-GB">River</gmd:LocalisedCharacterString>
      </localType>
      <name>
        <GeographicalName>
          <language>slo</language>
          <nativeness>endonym</nativeness>
          <nameStatus>official</nameStatus>
          <sourceOfName/>
          <pronunciation>
            <PronunciationOfName/>
          </pronunciation>
          <spelling>
            <SpellingOfName>
              <text>Dunaj</text>
              <script>Latn</script>
            </SpellingOfName>
          </spelling>
        </GeographicalName>
      </name>
      <relatedSpatialObject>
        <base:Identifier>
          <base:localId>87958377</base:localId>
          <base:namespace>SK.SMA.GN</base:namespace>
        </base:Identifier>
      </relatedSpatialObject>
      <type>hydrography</type>
    </NamedPlace>
  </wfs:member>

  <wfs:member>
    <NamedPlace gml:id="HU.21342315">
      <beginLifespanVersion>2008-11-05T07:00:00</beginLifespanVersion>
      <geometry>
        <gml:Point gml:id="HU.P01" srsName="urn:ogc:def:crs:EPSG::4258">
          <gml:pos>18.8 45.9</gml:pos>
        </gml:Point>
```

```
      </geometry>
      <inspireId>
        <base:Identifier>
          <base:localId>21342315</base:localId>
          <base:namespace>HU</base:namespace>
        </base:Identifier>
      </inspireId>
      <localType>
        <gmd:LocalisedCharacterString locale="en-GB">River</gmd:LocalisedCharacterString>
      </localType>
      <name>
        <GeographicalName>
          <language>hun</language>
          <nativeness>endonym</nativeness>
          <nameStatus>official</nameStatus>
          <sourceOfName/>
          <pronunciation>
            <PronunciationOfName/>
          </pronunciation>
          <spelling>
            <SpellingOfName>
              <text>Duna</text>
              <script>Latn</script>
            </SpellingOfName>
          </spelling>
        </GeographicalName>
      </name>
      <relatedSpatialObject>
        <base:Identifier>
          <base:localId>4NM4700C</base:localId>
          <base:namespace>HU.HMA.GN</base:namespace>
        </base:Identifier>
      </relatedSpatialObject>
      <type>hydrography</type>
    </NamedPlace>
  </wfs:member>

  <wfs:member>
    <NamedPlace gml:id="HR.564838">
      <beginLifespanVersion>2008-11-05T07:00:00</beginLifespanVersion>
      <geometry>
        <gml:Point gml:id="HR.P01" srsName="urn:ogc:def:crs:EPSG::4258">
          <gml:pos>19.3 45.2</gml:pos>
        </gml:Point>
      </geometry>
      <inspireId>
        <base:Identifier>
          <base:localId>564838</base:localId>
          <base:namespace>HR</base:namespace>
        </base:Identifier>
      </inspireId>
      <localType>
        <gmd:LocalisedCharacterString locale="en-GB">River</gmd:LocalisedCharacterString>
      </localType>
      <name>
        <GeographicalName>
          <language>hrv</language>
          <nativeness>endonym</nativeness>
          <nameStatus>official</nameStatus>
          <sourceOfName/>
          <pronunciation>
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          </pronunciation>
          <spelling>
            <SpellingOfName>
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              <script>Latn</script>
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          </spelling>
        </GeographicalName>
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```

```
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  <wfs:member>
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          <gml:pos>22.7 44.2</gml:pos>
        </gml:Point>
      </geometry>
      <inspireId>
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          <base:namespace>SZ</base:namespace>
        </base:Identifier>
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          <sourceOfName/>
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          </pronunciation>
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              <text>Dunav</text>
              <script>Latn</script>
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          </spelling>
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  </wfs:member>

  <wfs:member>
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      </geometry>
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          <nativeness>endonym</nativeness>
          <nameStatus>official</nameStatus>
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```

```
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              <script>Cyrl</script>
            </SpellingOfName>
          </spelling>
          <spelling>
            <SpellingOfName>
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              <script>Latn</script>
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            </SpellingOfName>
          </spelling>
        </GeographicalName>
      </name>
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          <base:localId>33578788</base:localId>
          <base:namespace>BG.BMA.GN</base:namespace>
        </base:Identifier>
      </relatedSpatialObject>
      <type>hydrography</type>
    </NamedPlace>
  </wfs:member>

  <wfs:member>
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        </gml:Point>
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        </base:Identifier>
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              <script>Latn</script>
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          </spelling>
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        <base:Identifier>
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          <base:namespace>RO.RMA.GN</base:namespace>
        </base:Identifier>
      </relatedSpatialObject>
      <type>hydrography</type>
    </NamedPlace>
  </wfs:member>

  <wfs:member>
    <NamedPlace gml:id="MD.76ZZTH9">
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      <geometry>
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```

```
          <gml:pos>28.2 45.5</gml:pos>
        </gml:Point>
      </geometry>
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        <base:Identifier>
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        </base:Identifier>
      </inspireId>
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      </localType>
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          <nativeness>endonym</nativeness>
          <nameStatus>official</nameStatus>
          <sourceOfName/>
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          </pronunciation>
          <spelling>
            <SpellingOfName>
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              <script>Latn</script>
            </SpellingOfName>
          </spelling>
        </GeographicalName>
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      <relatedSpatialObject>
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        </base:Identifier>
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      <type>hydrography</type>
    </NamedPlace>
  </wfs:member>

  <wfs:member>
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          <base:namespace>UA</base:namespace>
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      </localType>
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              <script>Latn</script>
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```

```
            <transliterationScheme>standard romanisation ....?</transliterationScheme>
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        </spelling>
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    <type>hydrography</type>
  </NamedPlace>
</wfs:member>

<wfs:member>
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      </base:Identifier>
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            <script>Latn</script>
          </SpellingOfName>
        </spelling>
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    </name>
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        <base:namespace>UK</base:namespace>
      </base:Identifier>
    </relatedSpatialObject>
    <type>hydrography</type>
  </NamedPlace>
</wfs:member>

</wfs:FeatureCollection>
```

B.8 Vitoria-Gasteiz - multilingual name

B.8.1 Description

“Vitoria-Gasteiz” is a multilingual official name, Vitoria is in the Spanish language and Gasteiz is in the Basque language. The placenames like this example have two geographical names in different languages and these have the same importance, they are thus used together to build the official name. These geographic names are due to by politic agreements. It can be noticed that the signs “-“ and “/” do not have the same meaning in all of the placenames of Spain: when a geographical name use the sign "/" like for example in “Arrasate/Mondragón”, the place has two officials names and both can be used.

B.8.2 Data to be delivered

NamedPlace
identifier: SPA.IGN.NG.EN.GE2TANRXGA3A
geometry: W2.6696057, N42.8421121 [referencePoint]
typeLocal: 'Capital de Provincia' [*Populated place/City*]
type: 'Administrative units'
relatedSpatialObject: <null>

GeographicalName
language: mul [Multiple Languages]
nativeValue: endonym
status: Official
sourceOfName: Data Base of Geographical Names of National Geographic Institute (Spain)
beginLifespanVersion: 2000-01-01
endLifespanVersion: <null>

Spelling
text: Vitoria-Gasteiz
script: Latin (Roman)
transliterationScheme: <null>

B.8.3 GML encoding

```
<?xml version="1.0" encoding="UTF-8"?>
<wfs:FeatureCollection  timeStamp="2008-11-05T07:00:00" numberMatched="1" numberReturned="1"
gml:id="SPA.IGN.NG.EN.0"
  xmlns="urn:x-inspire:specification:gmlas:GeographicalNames:3.0"
  xmlns:base="urn:x-inspire:specification:gmlas:BaseTypes:3.2"
  xmlns:gmd="http://www.isotc211.org/2005/gmd"
  xmlns:xlink="http://www.w3.org/1999/xlink"
  xmlns:wfs="http://www.opengis.net/wfs/2.0"
  xmlns:gml="http://www.opengis.net/gml/3.2"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="urn:x-inspire:specification:gmlas:GeographicalNames:3.0
                                        ../XSD/GeographicalNames.xsd
                      http://www.opengis.net/wfs/2.0 ../wfs/2.0.0/wfs.xsd">
  <gml:boundedBy>
    <gml:Envelope srsName="urn:ogc:def:crs:EPSG::4258">
      <gml:lowerCorner>-20.0 30.0</gml:lowerCorner>
      <gml:upperCorner>10.0 45.0</gml:upperCorner>
    </gml:Envelope>
  </gml:boundedBy>

  <wfs:member>
    <NamedPlace gml:id="SPA.IGN.NG.EN.GE2TANRXGA3A">
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        </gml:Point>
      </geometry>
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        </base:Identifier>
      </inspireId>
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          <nameStatus>official</nameStatus>
          <sourceOfName/>
          <pronunciation>
            <PronunciationOfName/>
          </pronunciation>
          <spelling>
            <SpellingOfName>
              <text>Vitoria-Gasteiz</text>
```

```
                <script>Latn</script>
              </SpellingOfName>
            </spelling>
          </GeographicalName>
        </name>
        <type>administrativeUnit</type>
      </NamedPlace>
    </wfs:member>

</wfs:FeatureCollection>
```

Annex C
(informative)
Using the datatype GeographicalName in other INSPIRE themes

C.1 Importance of names and multilingual aspects in European products

This rationale is adapted from documents of the EuroGeoNames project [EGN]

Primary access to multilingual geographic information (GI) is frequently done via an indirect form of geographical reference such as a geographical name, e.g. 'Bruxelles' or 'Brussel' or 'Brüssel' or 'Brussels', rather than through more direct referencing such as co-ordinate information e.g. latitude/longitude. The significance of the distinction between direct and indirect geographical referencing ('geo-referencing') lies in that the latter approach is more popular amongst non GI professionals but is less precise and fraught with ambiguity.

Geographical names are much more than just 'names on a map' and are not only used for the search and overview of maps but in other spatially related products as well, such as administrative reports, statistical summary tables etc. Indeed, geographical names are arguably the primary geographic referencing system used throughout Europe and thus have vast potential to inter-relate and cross-reference disparate data sources. They are therefore a critical component for the indexing, discovery and use of a broad superset of information. Their clear, unambiguous and consistent use is thus important for a wide range of administrative and decision-making tasks not only in the European Union itself, but also in the administration of all member States as well as in more specialised domain of spatially based applications.

There is no doubt, that correctly spelled multilingual geographical names are indispensable for, *inter alia*, postal services, telecommunication, health and risk management, safety and rescue services, transportation and navigation, translation services, tourism, for the purpose of popular education or for use in the mass media. Additionally, geoportals and Location Based Services (LBS) do not only need multilingual geographical names as a means for access, but also for enhancing the attractiveness of their services in general. It is also worth noting that cartographic map producers, atlas and dictionary publishers, museums, archives and libraries would also benefit from the provision of consistent and comprehensive multilingual geographical names data.

Finally, multilingual data are important to allow services based on these data to be equally accessible by all languages officially spoken in the participating European countries, including the officially recognized minority languages. In doing so, the services will help to promote cultural diversity and multilingualism in Europe and will provide a means by which users can search for geographical names spelt in their native language.

C.2 Modelling principles for names in INSPIRE themes

Within the context of INSPIRE, a data model for geographical names is of course defined in this *Geogrpahical names* specification. In addition, many other INSPIRE themes did/will define spatial objects associated with names as attributes.

In this document, it is argued that a harmonised approach for modelling attributes related to names should be followed in all the INPSIRE themes. Globally, this is important to increase the readability of INSPIRE data specifications. From the data users' point of view, this is also important to increase the ease of use of INSPIRE data sets by various applications relying on data from different themes. From the data producers' point of view, this important to minimise the efforts for transforming data from their own data model of various INSPIRE data models. The latter argument is particularly true when data providers transform one single data set into several INSPIRE data sets (e.g. a single rivers database used to populate the models specified in the *Geographical names*, *Hydrography* and *Transport networks* themes).

In addition, it is argued that data models defined within the context of INSPIRE should offer the possibility to provide names of related spatial objects in different languages and in different scripts, as this diversity is doubtlessly the situation in Europe.

Therefore, as this specification defines a dataType 'GeographicalName'. It is recommended to use this dataType for modelling names associated to any spatial object defined in INSPIRE and holding names, as explained below and in Figure C.1:

- the spatial object should use one attribute to model names (named for example 'name');
- this attribute should be typed by the dataType 'GeographicalName';
- this attribute should have the cardinality of [0..*] or [1..*], because of the importance of multilingual issues as explained above.

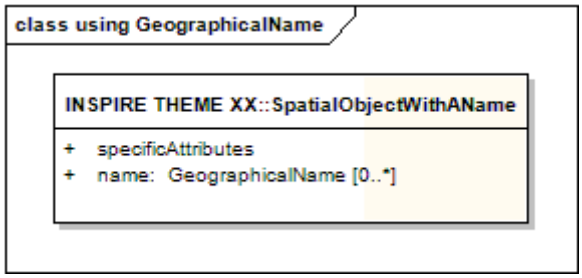

Figure C.1 – UML class diagram: recommended use of the dataType GeographicalName in INSPIRE thematic specifications

It should be noticed that the dataType 'GeographicalName' may look complex at first sight. However, when restricted to its non-voidable elements, this type is relatively simple in a context requiring managing names in multiple languages and in multiple scripts. More, this relative complexity is the necessary counterpart of harmonisation between all INSPIRE themes and thus should not prevent using this dataType. For the sake of simplicity, specifications of INSPIRE theme can however make some recommendations in their specification on how to fill the voidable elements of the dataType 'GeographicalName'. By this way, each specification may choose the adapted level of simplicity/richness of the model, between the ones proposed in figures C.2 and C.3.

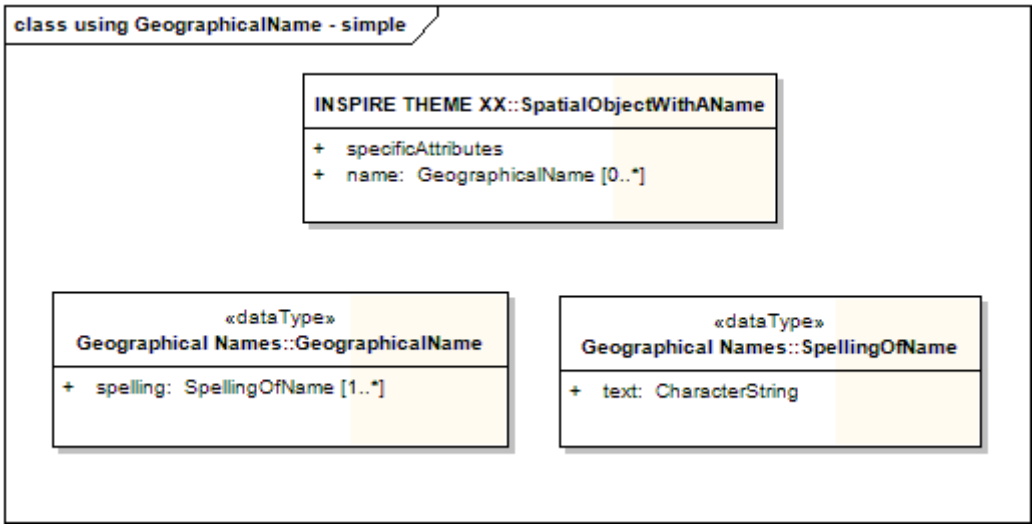

Figure C.2 – UML class diagram: simplest use of the dataType GeographicalName

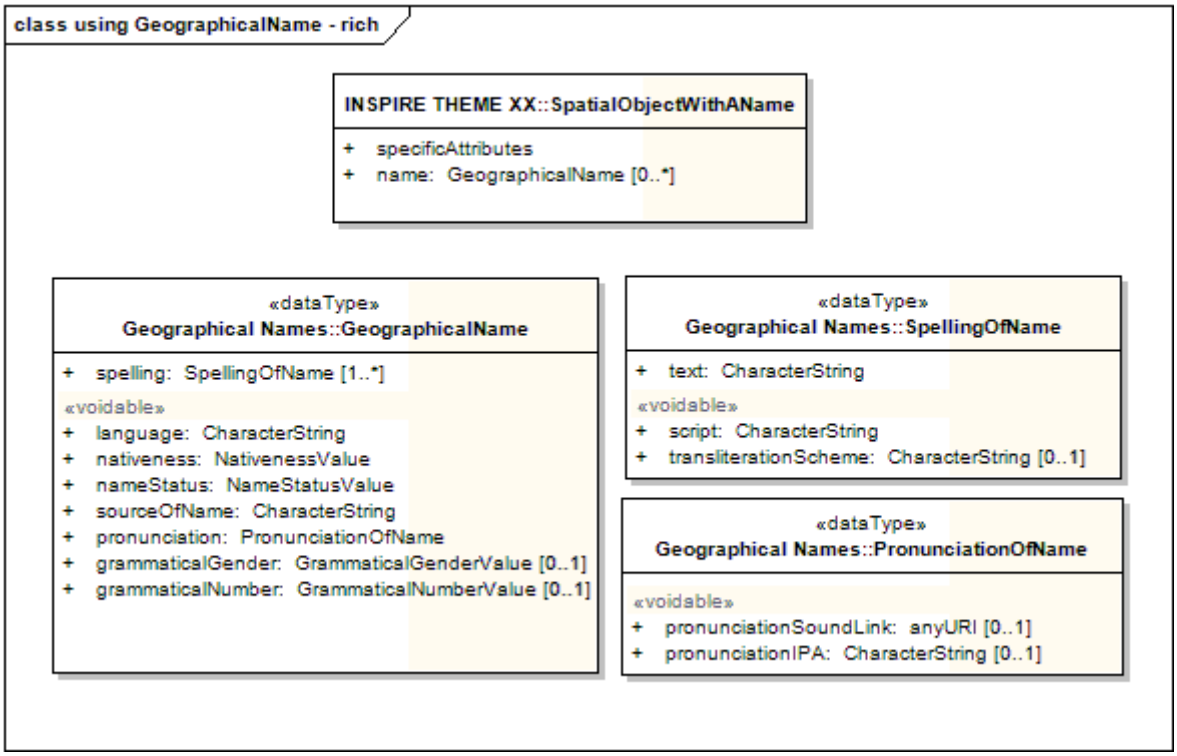

Figure C.3 – UML class diagram: richest use of the dataType GeographicalName

Annex D
(informative)
Mapping INSPIRE *Geographical names* and INSPIRE Gazetteer

The INSPIRE Generic Conceptual Model provides a schema for the INSPIRE Gazetteer shown in the following figure. This annex explains how geographical names modelled in this specification could be mapped to the main elements of the gazetteer. It does not put any requirement on geographical names, and is there for information only.

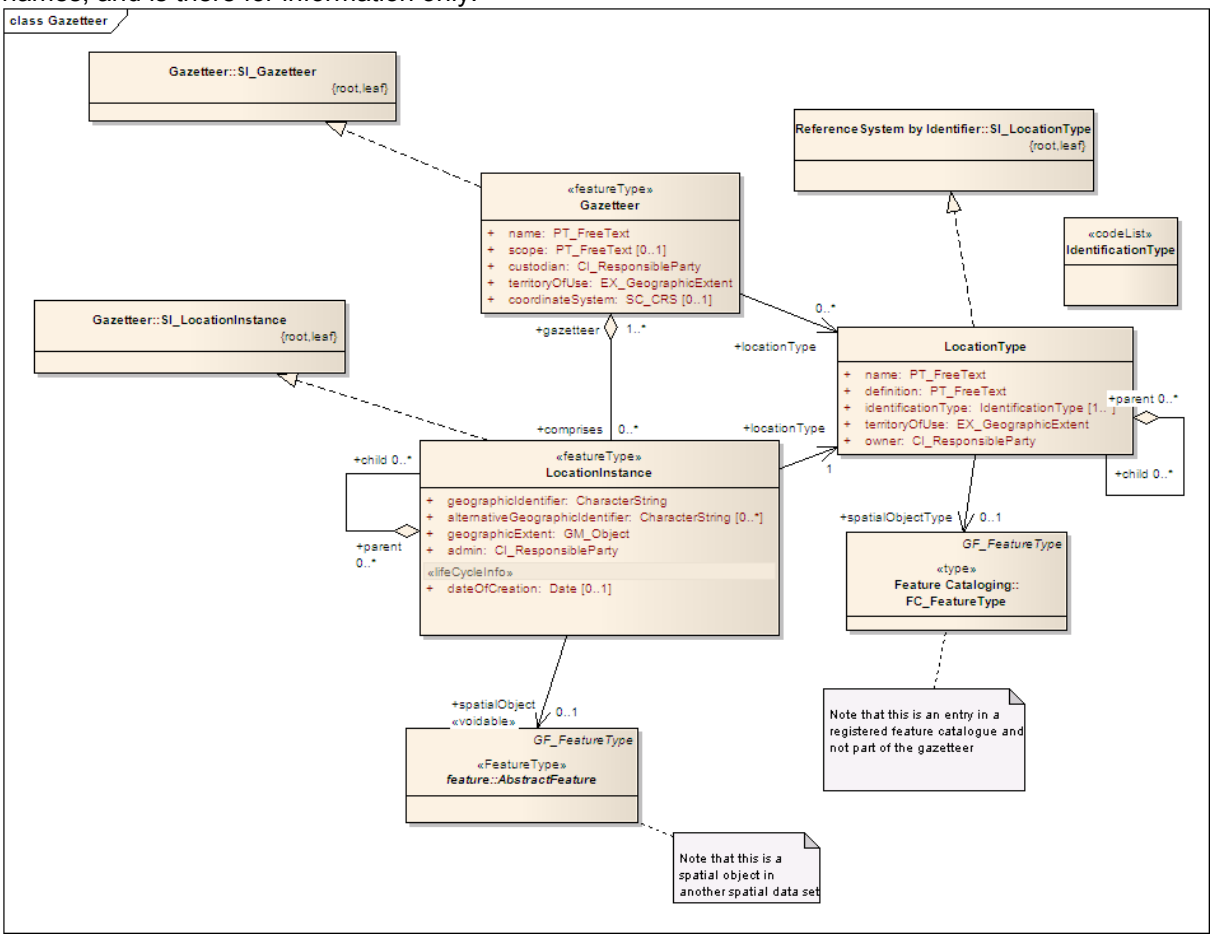

Figure D.1 – Schema for INSPIRE Gazetteer [INSPIRE DS-D2.5]

Table D.1 – Mapping INSPIRE gazetteer to INSPIRE *Geographical names*

Element of the gazetteer schema	Element of the *Geographical names* schema	Comment
<<FeatureType>> Gazetteer	*None*	The full INSPIRE gazetteer will be build from the different data sets of INSPIRE *Geographical names* and/or the data elements of spatial objects in different INSPIRE themes.
<<FeatureType>> LocationInstance	<<DataType>> Spelling	Following ISO 19112 principles, if a multi-names and multi-lingual geographical names gazetteer shall be established, then for each Spelling, a LocationInstance is built, and the Spelling.text is the geographicIdentifier. The links between the different spellings are not lost because they are related with each other via the same abstract feature / named place. All spellings can also be cross-related with each other through alternativeGeographicIdentifier.
<<FeatureType>> LocationInstance	<<FeatureType>> NamedPlace or <<DataType>> Spelling	Different strategies can be followed, each one raising an issue: - For each NamedPlace, one LocationInstance is built, and one among its multiple spellings is chosen as the geographicIdentifier, while the other spellings will be alternativeGeographicIdentifiers. In this case one spelling has to be chosen as a reference which may be problematic and theoretically incorrect. - For each Spelling, a LocationInstance is built, and the Spelling.text is the geographicIdentifier. In this case, links between spellings is lost. - For each Spelling, a LocationInstance is built, and the Spelling.text is the geographicIdentifier; while all other related spellings are its alternativeGeographicIdentifiers. In this case, the gazetteer is very redundant.
LocationInstance. geographicIdentifier LocationInstance. alternativeGeographicIdentifier	Spelling.text + other info (metadata, NamedPlace.geometry...)	Building identifier will not be straightforward: geographicIdentifier should be unique, while spellings are not. The identifiers should then be build from the spelling plus other info, among which the country of the NamedPlace that can be derived from the data set metadata (at the country level) or through geometric queries.
LocationInstance. geographicExtent	NamedPlace.geometry	Building a geographicExtent from referencePoint may only be very approximate as the size of the object is not known in this case.
LocationInstance. admin	CI_ResponsibleParty in data set metadata	
LocationInstance. dateOfCreation	NamedPlace. beginLifespanVersion	

LocationInstance. spatialObject	NamedPlace or relatedSpatialObject	If the NamedPlace has a related spatial object in other INSPIRE themes, the gazetteer should refer to this object; otherwise the gazetteer can refer to the NamedPlace itself.
LocationInstance. locationType	NamedPlace.type	Both the geographical names schema and the gazetteer will refer to the INSPIRE feature concept dictionary.
LocationInstance. parent/child	NamedPlace. relatedSpatialObject	The hierarchical organisation of LocationInstance can only be derived from the hierarchical organisation of related objects in other INSPIRE themes, if any.