



INSPIRE

Infrastructure for Spatial Information in Europe

D2.8.1.4 Data Specification on Administrative units - Draft Guidelines

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Foreword

How to read the document?

This document describes the INSPIRE draft data specification on *Administrative units* as developed by the Thematic Working Group using both natural and conceptual schema language.

This document includes two executive summaries that provide a quick overview of the INSPIRE data specification process in general, and the content of the data specification on *Administrative units* 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 in the first place.

The UML diagrams given in 5.1.1 offer a rapid way to see the main elements of the specifications and their relationships. The definition of the spatial objects, attributes, and relationships are included in the Feature Catalogue in 5.1.2. 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 technical details are expected to be of prime interest to those organisations that are/will be responsible for implementing INSPIRE within the field of *Administrative units*.

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.

In order to distinguish the INSPIRE spatial data themes from the spatial object types, the INSPIRE spatial data themes are written in *italics* and with capital letter, like *Administrative units*.

Spatial Data Interest Communities and Legally Mandated Organisations are invited to comment on the proposed structure and content of the forthcoming Implementing Rule on Interoperability of Spatial Data Sets and Services. In order to do so we recommend that they read this draft data specification and the questions of the consultation document in parallel.

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.

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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 Directive¹ 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 technical³ surveys, proposed experts for the Data Specification Drafting Team⁴ and Thematic Working Groups⁵, expressed their views on the drafts of the technical documents of the data specification development framework⁶ and are invited to comment the draft 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 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 Scope⁷ 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.

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 5 years for other data in electronic format still in use

² Number of SDICs and LMOs on 21/11/2008 was 276 and 162 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, France, Finland, Germany, Hungary, Italy, Netherlands, 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.

⁷ http://inspire.jrc.ec.europa.eu/reports/ImplementingRules/DataSpecifications/D2.3_Definition_of_Annex_Themes_and_scope_v3.0.pdf

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- The Generic Conceptual Model⁸ 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 Specifications⁹ defines a repeatable methodology. It describes how 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 language¹¹.

A consolidated model repository, feature concept dictionary, and glossary are being maintained to support the consistent specification development 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 schemas¹² 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 short and medium term 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 local, regional, national and global level contributing to improvements in the coherence and interoperability of data in spatial data infrastructures.

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)

Administrative units

Executive Summary

Administrative units are included in Annex I, which means that they are considered as reference data, i.e. data that constitute the spatial frame for linking to and/or pointing at other information that belong to specific thematic fields such as the environment and socio-economic statistics, alongside many others.

INSPIRE data specification on administrative units 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's development, and to participate in the review of the data specifications. The Thematic Working Group responsible for the specification development was composed of experts from Belgium, Germany, Norway, Poland and Sweden.

The specification process took place according to the methodology elaborated for INSPIRE respecting the requirements and the recommendation of the INSPIRE Generic Conceptual Model, which is one of the elements that ensures a coherent approach and cross-theme consistency with other themes in the Directive.

During the specification development, special attention has been paid to the requirements of the Statistical Office of the European Community, which is one of the principal users the administrative unit data at European level. Similarly, the Thematic Working Group has considered widely the achievements of the EuroBoundaryMap product, which already achieved considerable results in harmonising administrative unit data held by the National Mapping and Cadastral Agencies of Europe.

According to the definition of the Directive, administrative units are "units of administration dividing areas where Member States have and/or exercise jurisdictional rights for local, regional and national governance, separated by administrative boundaries". Based on the reference materials and the user requirements, the Thematic Working Group has added some other fundamental aspects like the hierarchical structure of administrative units and the relations with statistical units that have already been defined and in use within the EU-administration.

Administrative units in INSPIRE play the role of generic information locators. Their main uses include

- searching/filtering other spatial data based on a name or code,
- linking/publishing spatial information in a rapid and comparable way
- finding competent authorities e.g. in case of disasters, for environmental protection , etc.

In addition administrative units may provide the frame for a boundary-based analysis of consistency of spatial objects (similar classification, geometrical matching) as required in Art. 8(4) and 10(2) of the Directive.

The core element of the model is the administrative unit represented by a surface geometry. In accordance with the Directive, each administrative unit carries a unique identifier. In order to re-use existing European arrangements the so-called SHN¹³ codes have been selected for this purpose. Administrative units are further described by the country of their location and the hierarchical level within the administrative structure of the country. This information is completed, if available, with the life cycle information (when the administrative unit has been inserted or changed in the dataset, and when it has been (if ever) superseded or retired in the spatial data set) and the corresponding geographical name.

In order to support specific user requirements, administrative units also carry an attribute describing temporal validity of the corresponding real world entities, i.e. when an administrative unit has been created/modified or ceased to exist in the administrative system of a country. The properties of the administrative units are completed by the seat (location) of the corresponding administrative authority and an attribute showing which parts of the administrative unit name are relevant as a component of addresses.

The administrative division of the Members States follows a hierarchical structure where the lowest level units (often communes) are united in higher level units (like provinces, counties, etc) that compose other units at a higher level. It must be ensured that an administrative unit of an upper level is composed of one or more administrative units of a lower level. Lowest level administrative units are further characterised by their geometry and, where available, by the corresponding local administrative unit code.

¹³ SHN codes composed by the ISO 3166 country code and the national code of the administrative units are maintained for the EuroBoundaryMap product

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Each administrative unit is composed of one or more administrative areas. This reflects the diversity in administrative units across Member States. Besides the main area, it is possible to include also branch areas (like exclaves), areas with specific status (condominiums) and coastal and inland waters that, in the case of some Member States, can form a part of administrative units. Administrative areas are presented as surfaces together with their type and identifier. In addition, when available, life cycle and validity information should be equally supplied.

Both administrative areas and administrative units are separated by administrative boundaries that are specified as lines. As a mandatory property they carry an identifier, information on the country, the typification of the line (boundary line on land, on water or between land and water), and the type of the boundary level that corresponds to the administrative hierarchy level. When available the boundary status (definite, indefinite, in dispute) and life cycle and validity information have to be given.

One of the most important fields where administrative units are extensively used at the European level is statistics. In order to show the link between these fields, lower level administrative units are linked to the established regions according to the Nomenclature of Territorial Units for Statistics (NUTS) and approved by the Statistical Office of the European Community.

In the INSPIRE administrative unit data specification, there are no mandatory quality requirements. However, Member States should use the best available quality data set as a source when they deliver data for INSPIRE. The actual values of quality elements (omission, topological and conceptual consistency, positional, thematic, and temporal accuracy) of data delivered for INSPIRE has to be published as metadata, if available.

Interoperability is further supported by a common reference system¹⁴ and provisions for visualisation. For the latter, simple rules for default portrayal are given in specifying the colour and the line-width of the borders of the administrative units and administrative boundaries, as well as the font and size of the labels. Moreover, all the portrayal elements reflect the hierarchy of the objects.

The main value of the INSPIRE administrative units model is it is a simple, yet flexible structure that allows data providers to publish their existing data in the most convenient way. It is also expected that the specification will give a solid base for information referencing for a number of Annex III themes of INSPIRE.

As the specification of INSPIRE administrative units is the result of a detailed analysis of user requirements and strong consideration of existing initiatives, that went beyond the strictly environmental scope, it is expected that it will also be a solid element of a multi-purpose European spatial data infrastructure.

¹⁴ ETRS89 or (when applicable) ITRS

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1 Scope

This document specifies a harmonised data specification for the spatial data theme *Administrative units* 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 *Administrative units*

2.2 Informal description

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:

Each national territory is divided into administrative units at different administrative levels as defined by the national administrative hierarchy. Administrative units are separated by administrative boundaries, whereas according to user requirements a distinction between land and (coastal) water parts of administrative units will be considered.

The administrative division forms an indirect spatial reference system. The reference to an administrative unit provides a spatial dimension to data without using coordinates. (INSPIRE IMS, 2003)

Administrative units may correspond to the items identified in frame of other territory division systems. The examples of such relationships include, among others, the cadastral parcels, census districts, postal regions, sea regions, statistical units, or sector-specific regions. These items are not considered to constitute a part of the definition of administrative units; they are within the scope of other INSPIRE themes.

The Administrative units theme will contain reference to the Nomenclature of Territorial Units for Statistics (NUTS), established by the European Office for Statistics (Eurostat) in order to provide a single uniform breakdown of territorial units for the production of regional statistics for the European Union, and to national, specific territorial Local Administrative units (LAU), i.e. districts and municipalities. The NUTS and LAU nomenclature is defined for all Member States and relations to this nomenclature could be considered also at lower administrative levels in the context of INSPIRE. On top of the hierarchy are the NUTS levels 1 to 3, then the LAU levels 1 and 2. LAU are not subject of the NUTS Regulation and NUTS regions do not necessarily match with the national administrative units (see Annex B).

Administrative boundaries are the key to horizontal interoperability between the products of national data custodians. Neighbours should agree on international boundaries with shared geometry at the best possible resolution (INSPIRE RDM, 2002).

The reference date of the administrative units has to be considered for purpose of linkage to statistical information as for instance population figures. Therefore, the aspect of temporal reference and update has to be considered carefully for administrative units.

2.3 Normative References

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)

EN ISO 19113:2005, Geographic Information – Quality principles

ISO 19115:2003, Geographic Information - Metadata

ISO 19115:2003/Cor.1:2006, Geographic Information - Metadata - Technical Corrigendum 1

ISO/TS 19138:2006, Geographic Information – Data quality measures

ISO/TS 19139:2006, Geographic Information – Metadata – XML Schema Implementation

ISO 3166-1993, Codes for the Representation of Names of Countries

COMMISSION REGULATION (EC) No 1205/2008 of 3 December 2008 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 *Administrative units*
Reference date: 2008-11-28
Responsible party: INSPIRE TWG Administrative Units
Language: English

2.5 Terms and definitions

Terms and definitions necessary for understanding this document are defined in the INSPIRE Glossary on <https://inspire-registry.jrc.ec.europa.eu>

2.6 Symbols and abbreviations

BKG	Federal Agency for Cartography and Geodesy (Germany)
EuroGeographics	Association representing nearly all European National Mapping and Cadastral Agencies (NMCAs)
Eurostat	Statistical Office of the European Communities
GISCO	Geographic Information System of the European Commission
EBM	EuroBoundaryMap (product of EuroGeographics)
EEA	European Environment Agency
FADN	Farm Accountancy Data Network (See Council Regulation 79/65/EEC)
LAU	Local administrative units
NUTS	Nomenclature of Territorial Units for Statistics
OCL	Object Constraint Language
SABE	Seamless Administrative Boundaries of Europe
SHN	strictly hierarchical built codes (defined by BKG/EuroGeographics) being European-wide unique identifiers for administrative units

UML Unified Modelling Language

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 1 Requirements are shown using this style.

Recommendation 1 Recommendations are shown using this style.

3 Specification scopes

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

4 Identification information

Table 1 – Information identifying the INSPIRE data specification <Theme Name>

Title	INSPIRE data specification <i>Administrative units</i>
Abstract	<p>The INSPIRE theme 'Administrative units' refers to the division of areas where Member States have and/or exercise jurisdictional rights, for local, regional and national governance, i.e. units at the cadastral parcel level are excluded as well as territorial waters, which are in fact assigned to the INSPIRE themes 'Cadastral parcels', 'Hydrography' (Annex I) and/or 'Sea regions' (Annex III). It does not include related systems such as census districts, post office regions and other sector-specific regions, but it will contain a reference to national statistical units at local level (LAU) and to the Nomenclature of Territorial Units for Statistics (NUTS) approved by Eurostat.</p> <p>This data specification establishes a framework for harmonization of spatial data on Administrative units, as defined in Annex I of the INSPIRE Directive.</p> <p>The product specified in compliance to this specification shall contain geometry and attributes of administrative units and boundaries at all levels of national administrative hierarchies of European countries referring to a defined (reference-) date.</p>
Topic categories	boundaries
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	<p>The purpose of this document is to specify a harmonised data specification for the spatial data theme Administrative units as defined in Annex I of the INSPIRE Directive.</p> <p>Provision of national datasets on administrative units, harmonised according to this data specification and to defined reference dates, is required to facilitate interoperable data exchange of all official administrative units according to the administrative levels used within each Member State.</p> <p>The EU-wide harmonized data of all these administrative units can be seen as a key dataset for any kind of (cross-border) spatial handling, important in operations and management and in geo-referencing of thematic/statistical information, based on linkages to national LAU- and NUTS-codes as published by EC/Eurostat.</p>

	<p>This data specification has been derived from the specification of EuroGeographics EBM product which is already used for the Administrative Unit Theme of European Commission's GISCO reference database, co-leading the INSPIRE initiative on the introduction of a European Spatial Data Infrastructure and for derivation of datasets, publishing maps and for webservice as NUTS, Communes, Sub-communes, Structural Funds, Interreg, Urban Audit and FADN. The European Environment Agency (EEA) is using this dataset to relate their environmental information and indicators to the official defined administrative areas in Europe.</p> <p>This INSPIRE data specification on Administrative units theme is to support the following high level use cases:</p> <p>Filtering data. A user selects regions (e.g. by clicking or entering a name or code). The geometry of the selected administrative units is used in a query filter when retrieving geographic information (using a download service) or metadata (using a discovery service). This could e.g. be used in verification to identify features located at the border between two administrative units.</p> <p>Linking thematic information. To provide users with easy and rapid access to comparable thematic information, data providers link their information to the administrative units.</p> <p>Disaster management. The administrative units that are affected by an environmental phenomenon or disaster are selected.</p> <p>Boundary based analysis Verification of data of thematic features located at the boundaries of administrative units. This covers the aspect of edge-matching.</p> <p>Discovery of unit related data Search catalogues to discover available data sets with respect to administrative unit geometry or name (or code).</p>
Spatial representation type	vector
Spatial resolution	From local level to European level

5 Data content and structure

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.
dataType	Class	A structured data type without identity.
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.

voidable	Attribute, association role	<p>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 which shall imply that the characteristic is not present in the spatial data set, but 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.</p> <p>The VoidValueReason type is a code list, which includes the following pre-defined values:</p> <p>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.</p> <p>Unpopulated: Same as ‘Unknown’ with the difference that the property is unknown for all spatial objects of that spatial object type within the spatial data set.</p> <p>NOTE It is expected that additional reasons will be identified in the future, in particular to support reasons / special values in coverage ranges.</p>
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, 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.

Requirement 1 Spatial data related to the theme *Administrative units* shall be provided using the spatial object types and data types, as specified in the application schema in section 5.1.

Requirement 2 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 1 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 Application schema *Administrative units*

5.1.1 Description

5.1.1.1 Narrative description

This application schema defines the spatial object type *AdministrativeUnit* as an aggregation of areas covered by an administrative authority. *Administrative units* may be composed of several different areas like islands, coastal waters and exclaves etc. which are represented by spatial object type *AdministrativeUnitArea*. *Administrative units* are defined at different levels (number of administrative levels

differs from country to country). Boundaries of administrative units are defined by the spatial object type AdministrativeBoundary (see Annex C and Annex D)

5.1.1.2 UML Overview

Overview of package AdministrativeUnits and dependent packages is depicted in Figure 1. AdministrativeUnits use the common type GeographicalName from package TWG-GN and refers to package Base Types for Identifier, SpatialDataSet and VoidValueReason.

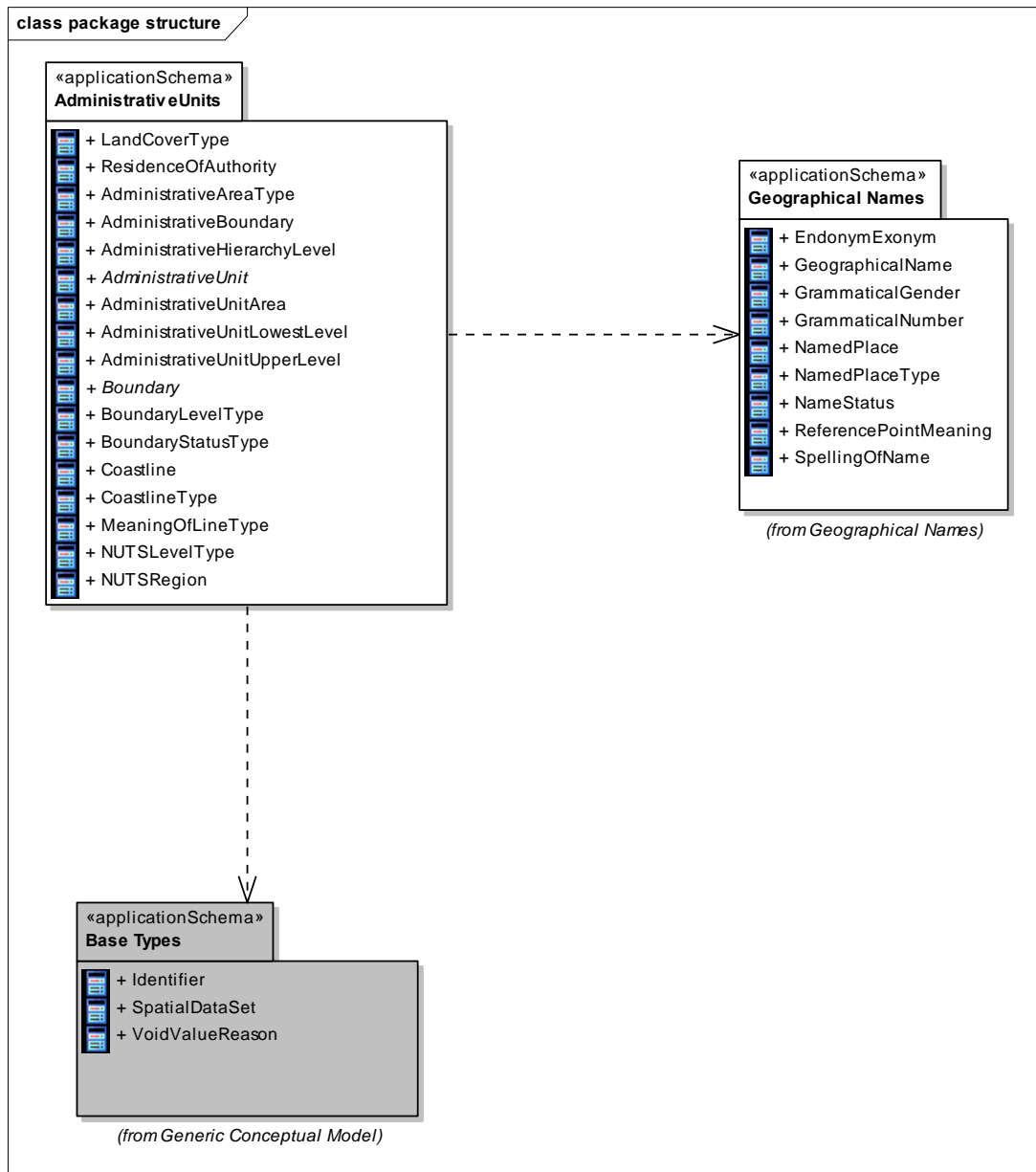
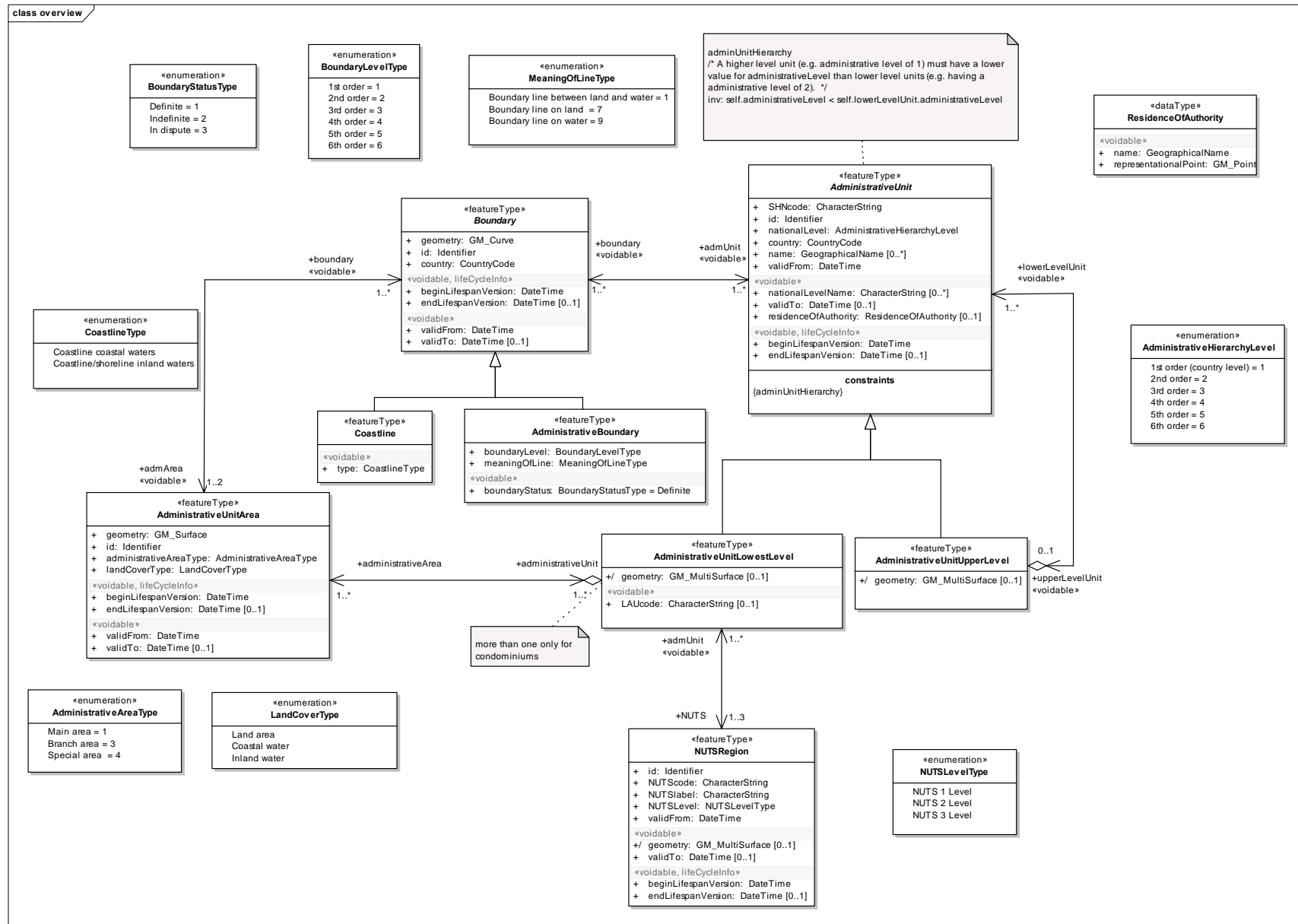


Figure 1 Package overview

The administrative units application schema is shown in Figure 2 and described in detail below. Spatial object type AdministrativeUnit is the main type in the diagram and represents administrative units at different levels in the administrative hierarchy. This is an abstract object type and as such may not be directly instantiated. The instantiable specialized spatial object types provide the means for description of lowest level units (AdministrativeUnitLowestLevel) and upper level units (AdministrativeUnitUpperLevel). Administrative units at higher level aggregate lower level units which is expressed by the association role lowerLevelUnit of AdministrativeUnitUpperLevel. AdministrativeUnitLowestLevel and AdministrativeUnitUpperLevel are specializations of AdministrativeUnit and inherit all attributes from the latter.



A unit at lowest level consists of one or more administrative areas represented by spatial object type AdministrativeUnitArea. The relationship between administrative units and administrative areas is shown in Figure 3. If the administrative unit consists of a main area only, the unit will associate a single administrative area object where attribute administrativeAreaType will have value of 1 which equals "Main area". On the other hand complex administrative units may contain additional administrative areas representing exclaves, islands, inland water or coastal water areas (see Annex D). The extent of administrative units is defined by the aggregated geometry of the AdministrativeUnitAreas. All AdministrativeUnits have an optional spatial representation which is derived from the aggregated lower level units or areas.

All administrative units have a name represented by type GeographicalName which supports names in different languages and spellings.

Recommendation 2 The language of the name (GeographicalName) should be filled in most cases, except if the data producer does not know in which language the names are.

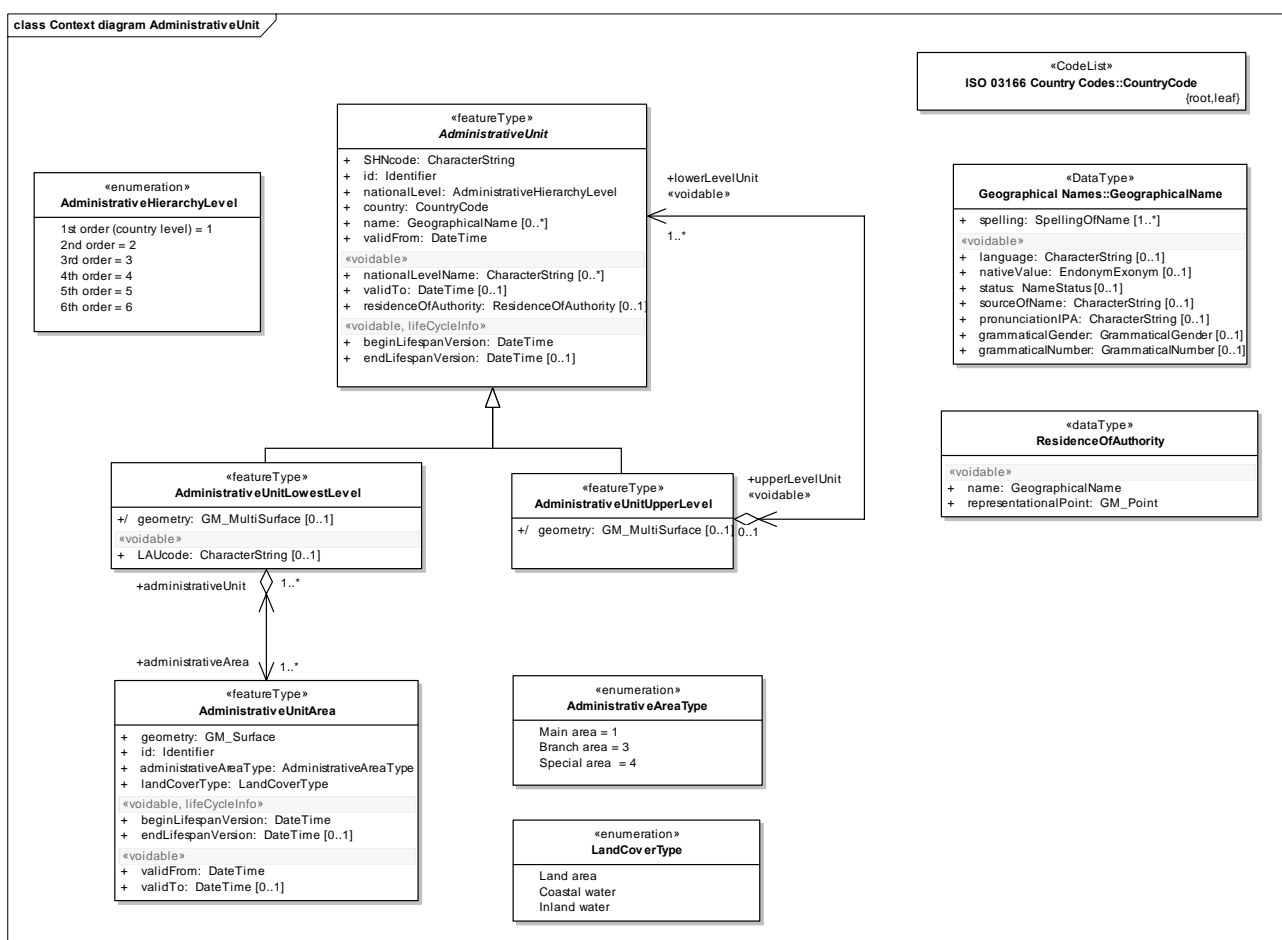


Figure 3 Administrative units and relation to AdministrativeArea

Spatial object type Boundary is an abstract type representing boundaries in the application schemas. Coastline is a specialization of Boundary which represent boundaries between administrative areas having no administrative meaning. It is used to divide different administrative areas, in special administrative areas at land and administrative areas at sea that are part of the same administrative unit. AdministrativeBoundary on the other hand represent boundaries that are part of the administrative hierarchy. For each administrative boundary the administrative level, its status and type (meaning) should be stated. The attribute meaningOfLine is important in specifying what kind of boundary we are dealing with. Administrative boundaries differ from country to country and the enumeration MeaningOfLine describes the different possible kinds of lines that can occur. Boundary and its subtypes along with related value domains are shown in Figure 4.

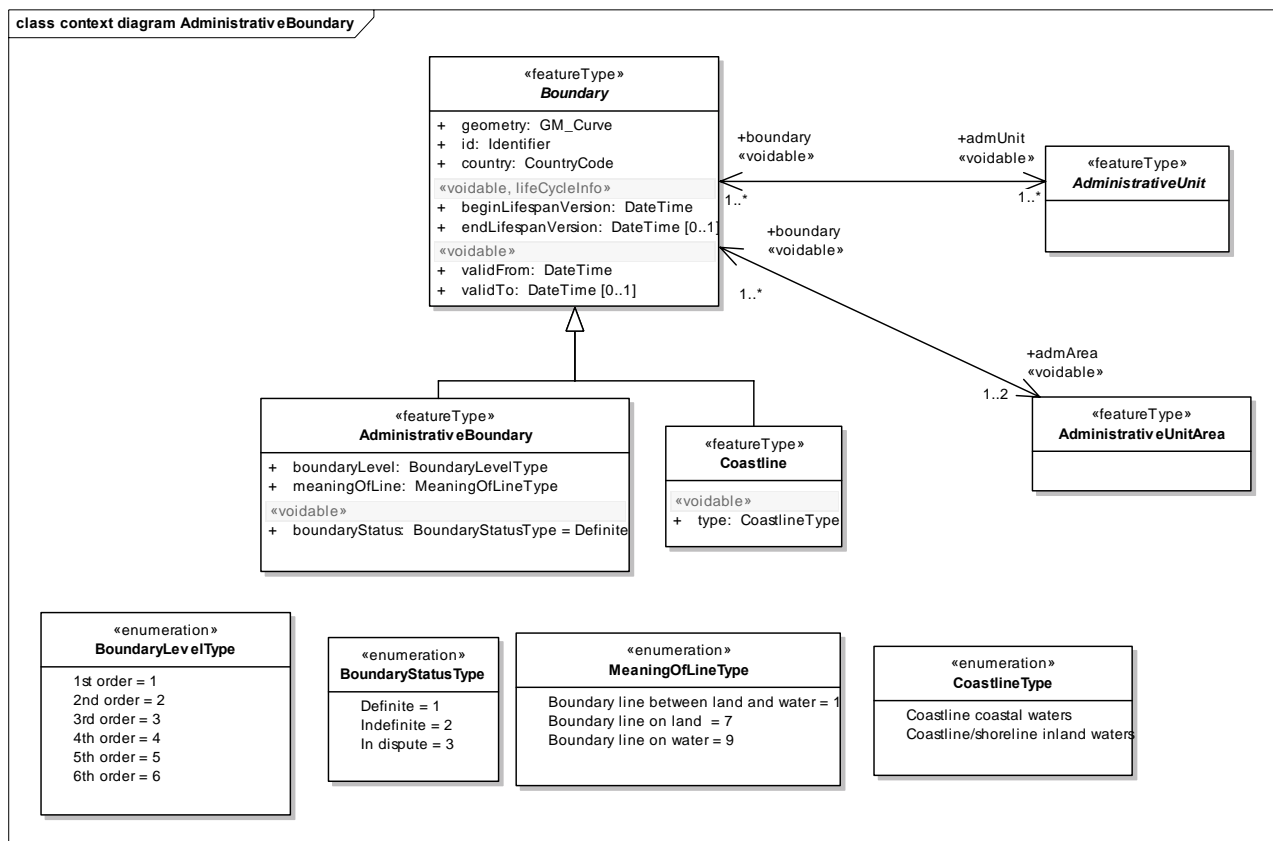


Figure 4 - Administrative boundary

There exist topological relationships between the administrative units (AdministrativeUnitLowestLevel and AdministrativeArea) and AdministrativeBoundary.

Recommendation 1 The following topological relations are recommendations for this data specification

- Administrative units at the same level of hierarchy must not overlap, i.e. their boundaries must not intersect with boundaries of the same and with other administrative units
- Gaps between administrative units are in principle not allowed. Boundaries of neighboring administrative units have the same set of coordinates, within the specified resolution.
- The border line that limits the administrative units shall correspond to the geometries representing the boundaries of this administrative unit.
- The area boundaries must not have dangles, boundaries always divide different administrative units.
- The geometry of an administrative unit shall be equivalent to the aggregation of geometries representing administrative areas which belong to this unit.
- The border ring for aggregated administrative areas is equivalent to the boundaries of administrative units to which these areas belong.

The geometric structure of the boundary spatial objects is explained in 5.1.1.6. Each AdministrativeUnitLowestLevel can belong to zero or up to three NUTS-regions where a NUTSregion is a separate spatial object with a NUTS-code, a label (name), a NUTS level (1,2 or 3) and a country-code. A lowest level administrative unit can then belong to up to 3 NUTS regions of different levels and the NUTS-regions consist of 1 or more lowest level administrative units. The spatial extent of a NUTS-region consists therefore of a set of administrative units which is defined in the model as a derived attribute region with spatial type GM_MultiSurface. The LAU (code of local administrative unit) is an optional attribute of AdministrativeUnitLowestLevel. The relation to NUTS-regions is shown in Figure 5.

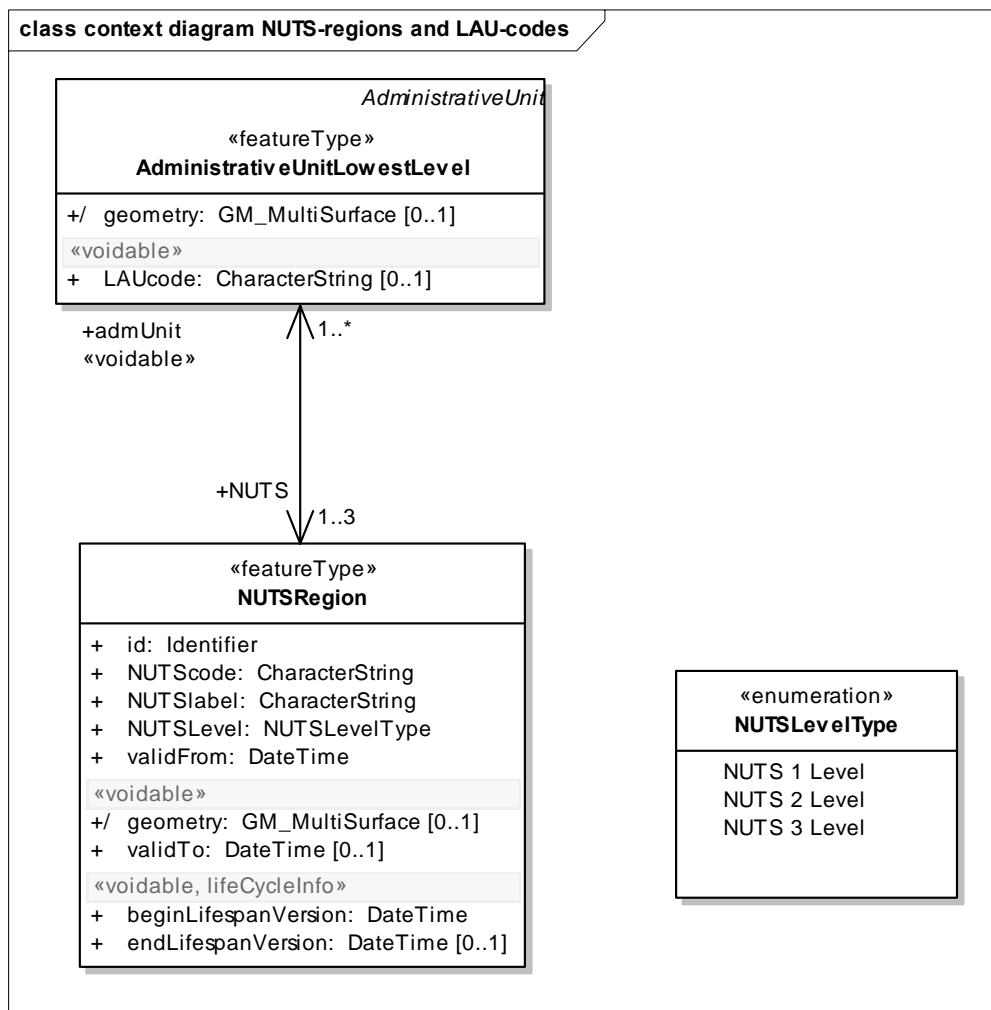


Figure 5 Linkage to NUTS-regions and LAU-codes

5.1.1.3 Consistency between spatial data sets

A national administrative hierarchy ensures (in general) that upper level units consist of lower level units, whereas units of each level (no gaps) and units of different levels have to be topologically consistent (country level is defined to be 1st order level, definition up to 6th order level is known, so for instance for France and Germany).

See topological recommendations in 5.1.1.2.

5.1.1.4 Identifier management

Each spatial object type has a mandatory identifier attribute specified and as such each spatial object needs to provide a unique identifier. This identifier will be allocated by the national or regional authority and consists of a namespace and a local id. The pragmatic approach to making it internationally unique is to add a prefix of the Member State identifier. How member states maintain their database is up to them, as INSPIRE is only about exchanging data not its management.

In addition, it is recommended to use the European-wide unique SHN-code for administrative units. The SHN-code is: a spatial reference in form of a code that identifies a location, being a unique object identifier already established by EuroGeographics EBM (formerly SABE) and also used for all other products of EuroGeographics. It was derived from identifiers under national systems and has improved oneself for purposes of interoperability.

The structure of this identifier is based on the ISO 3166 code of the country to which the administrative unit belongs to and on the corresponding upper/lower level units of national hierarchy for this administrative unit (showing for instance to which upper level unit the administrative unit at lowest level belongs to, e.g.

Kommune (municipality) Lørenskog with SHN=NO0230 belongs to Fylke (county) Akershus with SHN=NO0200 in Norway).

This could be also important for any queries ref. disaster management to answer such questions as to which upper administrative units the affected communes belong to and vice versa.

Additionally it is recommended for Member States to link the national (LAU) codes and the NUTS codes (thematic identifier) for each local administrative unit to ensure interoperability with national and European statistical/thematic information.

5.1.1.5 Modelling of object references

Internal references: each upper level administrative unit is composed of lower level units, each administrative unit at lowest level is composed of one or more administrative areas and has a reference to the NUTS-regions. Administrative areas are limited by boundaries.

External references: In most of European countries the local administrative units (communes) refer to borders of cadastral parcels. These references are not modelled in this application schema.

5.1.1.6 Geometry representation

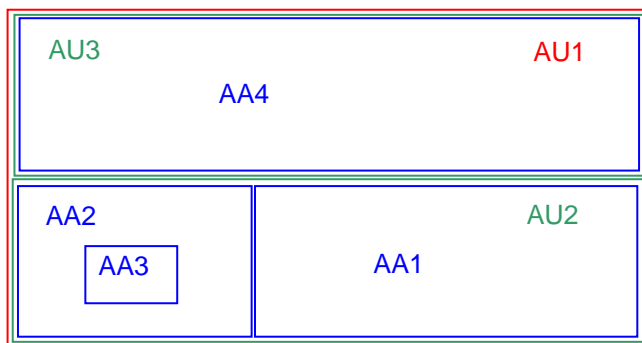
The spatial characteristics of all objects in this specification are limited to Simple Feature Access as defined by OGC document 06-103r3.

All geometries are limited to linear interpolation.

Beyond that there are no specific requirements/recommendations that apply to all spatial object types. The description of the geometric representations of the spatial object types is found in the application schema.

The geometric structure of the boundary objects is described by the following example:

5.1.1.6.1 Area features



AU = Administrative Unit
AA = Administrative Unit Area
red = AdministrativeUnitUpperLevel
green = AdministrativeUnitLowestLevel
blue = AdministrativeUnitArea (with AA1, AA4=main area, AA2=coastal water, AA3=island)

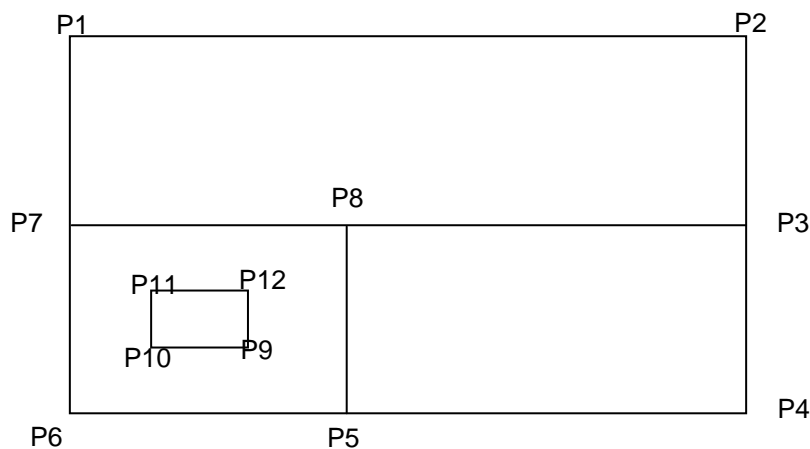
AU1 = AU2 + AU3
AU2 = AA1 + AA2 + AA3
AU3 = AA4

Administrative Areas do not overlap. The area of an AU is equal to the sum of its AA.

5.1.1.6.2 Boundary features and geometric structure

- Curves (C) are built based on the topological structure of the AdministrativeUnitAreas
- Boundary features (BF) are built for every Curve
- The boundaryLevel of the BF contains (only) the highest level of the administrative hierarchy

For the example the following structure of vertices is assumed:



Then, the curves and Boundary features are built as follows:

- C1 = (P7, P1, P2, P3) = BF1 with BoundaryLevelType (upper Level)
- C2 = (P3, P4, P5) = BF2 with BoundaryLevelType (upper Level)
- C3 = (P5, P6, P7) = BF3 with BoundaryLevelType (upper Level)
- C4 = (P7, P8) = BF4 with BoundaryLevelType (lowest Level)
- C5 = (P8, P3) = BF5 with BoundaryLevelType (lowest Level)
- C6 = (P8, P5) = BF6 with CoastlineType (Coastline Coastal Waters)
- C7 = (P9, P10, P11, P12, P9) = BF7 with BoundaryLevelType (lowestLevel)

Note that BF6 is not an AdministrativeBoundary feature but a Coastline feature.

5.1.1.6.3 Associations

- BF1 → AU1, AU3, AA4
- BF2 → AU1, AU2, AA1
- BF3 → AU1, AU2, AA2
- BF4 → AU2, AU3, AA2, AA4
- BF5 → AU2, AU3, AA1, AA4
- BF6 → AA1, AA2
- BF7 → AA3, -AA2

5.1.1.7 Temporality representation

The application schema uses the 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 2 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 "unknown".

In addition to the lifespan of the spatial object information about when the facts represented by the objects was/will be true in the real world is of vital importance. Administrative units (at each national level) can be changed from time to time (deleted, merged, occurred, divided, renamed or get a new code) according to a defined reference date and it is therefore necessary to capture the valid time of administrative units. The temporal reference of administrative units is important for purpose of linking of thematic information (which should refer to the same reference date).

The validFrom attribute of each spatial object keeps this information. ValidTo tells when an administrative unit ceased to exist.

5.1.2 Feature catalogue

5.1.2.1 Feature catalogue metadata

Feature catalogue name	INSPIRE feature catalogue <i>Administrative units</i>
Scope	Administrative units
Field of application	Linking of thematic data, Statistical analysis, disaster management
Version number	2.0
Version date	2008-11-28
Definition source	INSPIRE Data product specification <i>Administrative units</i>

Table 4 – Types defined in the feature catalogue

Type Name	Package Name	Stereotypes	Section
AdministrativeAreaType	AdministrativeUnits	«enumeration»	
AdministrativeBoundary	AdministrativeUnits	«featureType»	
AdministrativeHierarchyLevel	AdministrativeUnits	«enumeration»	
AdministrativeUnit	AdministrativeUnits	«featureType»	
AdministrativeUnitArea	AdministrativeUnits	«featureType»	
AdministrativeUnitLowestLevel	AdministrativeUnits	«featureType»	
AdministrativeUnitUpperLevel	AdministrativeUnits	«featureType»	
Boundary	AdministrativeUnits	«featureType»	
BoundaryLevelType	AdministrativeUnits	«enumeration»	
BoundaryStatusType	AdministrativeUnits	«enumeration»	
Coastline	AdministrativeUnits	«featureType»	
CoastlineType	AdministrativeUnits	«enumeration»	
LandCoverType	AdministrativeUnits	«enumeration»	
MeaningOfLineType	AdministrativeUnits	«enumeration»	
NUTSLevelType	AdministrativeUnits	«enumeration»	
NUTSRegion	AdministrativeUnits	«featureType»	
ResidenceOfAuthority	AdministrativeUnits	«dataType»	

5.1.2.2 Spatial Object Types

5.1.2.2.1 *AdministrativeUnits.AdministrativeBoundary*

Class: «featureType» AdministrativeUnits.AdministrativeBoundary

Definition: A line of demarcation between administratively controlled areas (administrative units).
Subtype of: Boundary
Status: Proposed
Stereotypes: «featureType»

Attribute: boundaryLevel

Definition: Level of administration in the country's hierarchy.
Value type: BoundaryLevelType
Multiplicity: 1..1
Stereotypes:

Attribute: boundaryStatus

Definition: Legal status of the administrative boundary.
Value type: BoundaryStatusType
Multiplicity: 1..1
Stereotypes: «voidable»

Attribute: meaningOfLine

Definition: Classification of an AdministrativeBoundary instance according to the land-water nature of the adjacent areas.
Value type: MeaningOfLineType
Multiplicity: 1..1
Stereotypes:

5.1.2.2.2 *AdministrativeUnits.AdministrativeUnit*

AbstractClass: «featureType» AdministrativeUnits.AdministrativeUnit

Definition: Units of administration where Member States have and/or exercise jurisdictional rights, for local, regional and national governance.
Subtype of:
Status: Proposed
Stereotypes: «featureType»

Attribute: SHNcode

Definition: Thematic identifier corresponding to the national administrative codes defined in each country. To ensure that this (SHN) identifier is European-wide unique, it is strictly hierarchical built (according to the number of levels of the administrative hierarchy of the country) and the first two characters have to be the 2 digit country code according to ISO 3166.
Value type: CharacterString
Multiplicity: 1..1
Stereotypes:

Attribute: id

Definition: External object identifier published by the responsible body, which may be used by external applications to reference the administrative unit.

Comment 1: Identifier is an INSPIRE base type composed by a namespace, a local identifier and an optional (voidable) version identifier.
 Example: An administrative unit instance from Denmark could carry this identifier:
 Namespace: DK_ADMUNIT
 Local iIdentifier: 0A3F507C3AB032D38E04556003BA298018
 Version identifier: 12-02-2008T10:05:01+01:00
 Comment 2: The four requirements for unique object identifiers are: uniqueness, persistence, traceability, and feasibility.
 Comment 3: The primary purpose of this identifier is to enable links between various sources and the administrative unit

Value type: Identifier
 Multiplicity: 1..1
 Stereotypes:

Attribute: nationalLevel

Definition: Level in national administrative hierarchy.
 Value type: AdministrativeHierarchyLevel
 Multiplicity: 1..1
 Stereotypes:

Attribute: nationalLevelName

Definition: Name of level in national administrative hierarchy.
 Value type: CharacterString
 Multiplicity: 0..*
 Stereotypes: «voidable»

Attribute: country

Definition: Two-character country code according to ISO 3166.
 Value type: CountryCode
 Multiplicity: 1..1
 Stereotypes:

Attribute: name

Definition: Geographical (official national) name of the administrative unit.
 Value type: GeographicalName
 Multiplicity: 0..*
 Stereotypes:

Attribute: beginLifespanVersion

Definition: Date and time at which this version of the spatial object was inserted or changed in the spatial data set.
 Value type: DateTime
 Multiplicity: 1..1
 Stereotypes: «voidable,lifeCycleInfo»

Attribute: validFrom

Definition: Date and time the administrative unit object was/will be created in the real world.
 Value type: DateTime
 Multiplicity: 1..1
 Stereotypes:

Attribute: validTo

Definition: Date and time at which the administrative unit object ceased/will cease to exist in the real world.

Value type: DateTime

Multiplicity: 0..1

Stereotypes: «voidable»

Attribute: endLifespanVersion

Definition: Date and time at which this version of the spatial object was superseded or retired in the spatial data set.

Value type: DateTime

Multiplicity: 0..1

Stereotypes: «voidable,lifeCycleInfo»

Attribute: residenceOfAuthority

Definition: Center for national or local administration.

Value type: ResidenceOfAuthority

Multiplicity: 0..1

Stereotypes: «voidable»

Association role: boundary

Definition:

Value type: Boundary

Multiplicity: 1..*

Stereotypes: «voidable»

Association role: upperLevelUnit

Definition: Each administrative unit of national administrative hierarchy has (exactly) one upper level unit, except the administrative unit at the top of the hierarchy representing the whole country.

Value type: AdministrativeUnitUpperLevel

Multiplicity: 0..1

Stereotypes: «voidable»

Constraint: adminUnitHierarchy

Natural language: A higher level unit (e.g. administrative level of 1) must have a lower value for administrativeLevel than lower level units (e.g. having a administrative level of 2).

OCL: `inv: self.administrativeLevel < self.lowerLevelUnit.administrativeLevel`

5.1.2.2.3 *AdministrativeUnits.AdministrativeUnitArea*

Class: «featureType» AdministrativeUnits.AdministrativeUnitArea

Definition: Prime part of an administrative unit. Geometrically it is represented by only one surface. It can represent all or part of a (lowest level) unit, i.e. an administrative unit is composed of one or more administrative areas.

Subtype of:

Status: Proposed

Stereotypes: «featureType»

Attribute: geometry

Definition: Surface geometry of the administrative area.

Value type: GM_Surface
 Multiplicity: 1..1
 Stereotypes:

Attribute: id

Definition: External object identifier published by the responsible body, which may be used by external applications to reference the administrative area.

Comment 1: Identifier is an INSPIRE base type composed by a namespace, a local identifier and an optional (voidable) version identifier.

Example: An administrative area instance from Denmark could carry this identifier:

Namespace: DK_ADMUNIT

Local iIdentifier: OF3F1035C%BD041E67E27010813BA298018

Version identifier: 12-02-2008T10:05:01+01:00

Comment 2: The four requirements for unique object identifiers are: uniqueness, persistence, traceability, and feasibility.

Comment 3: The primary purpose of this identifier is to enable links between various sources and the administrative area

Value type: Identifier
 Multiplicity: 1..1
 Stereotypes:

Attribute: administrativeAreaType

Definition: The type of administrative area describes the property of the area (for instance to be main area or exclave).

Value type: AdministrativeAreaType
 Multiplicity: 1..1
 Stereotypes:

Attribute: beginLifespanVersion

Definition: Date and time at which this version of the spatial object was inserted or changed in the spatial data set.

Value type: DateTime
 Multiplicity: 1..1
 Stereotypes: «voidable,lifeCycleInfo»

Attribute: endLifespanVersion

Definition: Date and time at which this version of the spatial object was superseded or retired in the spatial data set.

Value type: DateTime
 Multiplicity: 0..1
 Stereotypes: «voidable,lifeCycleInfo»

Attribute: landCoverType

Definition: classification of an AdministrativeArea according to its land-water nature.

Value type: LandCoverType
 Multiplicity: 1..1
 Stereotypes:

Attribute: validFrom

Definition: Date and time the administrative area object was/will be created in the real world.

Value type: DateTime
 Multiplicity: 1..1
 Stereotypes: «voidable»

Attribute: validTo

Definition: Date and time at which the administrative unit area object ceased/will cease to exist in the real world.
 Value type: DateTime
 Multiplicity: 0..1
 Stereotypes: «voidable»

Association role: boundary

Definition: Each administrative area is limited by one or more Boundary features.
 Value type: Boundary
 Multiplicity: 1..*
 Stereotypes: «voidable»

Association role: administrativeUnit

Definition: Each AdministrativeUnitArea is part of exactly 1 administrative unit at lowest level.
 NOTE 1 Each administrative unit at lowest level consists at least of one administrative area (the so called main area).
 NOTE 2 For special areas like condominiums, the area can be part of more than one administrative unit.
 Value type: AdministrativeUnitLowestLevel
 Multiplicity: 1..*
 Stereotypes: «voidable»

5.1.2.2.4 AdministrativeUnits.AdministrativeUnitLowestLevel

Class: «featureType» AdministrativeUnits.AdministrativeUnitLowestLevel

Definition: Unit at lowest level in the national administrative hierarchy.

NOTE1 For most of the Member States these units correspond to the Local Administrative units (LAU) at second level.

Subtype of: AdministrativeUnit

Status: Proposed

Stereotypes: «featureType»

Attribute: geometry

Definition: Surface geometry of the administrative unit at lowest level.

Value type: GM_MultiSurface

Multiplicity: 0..1

Stereotypes:

Attribute: LAUcode

Definition: Statistical code of local administrative units (LAU) as defined by the National Statistical Institutes.

Value type: CharacterString

Multiplicity: 0..1

Stereotypes: «voidable»

Association role: NUTS

Definition: Each administrative unit at lowest level belongs to a NUTS3-Region, which belongs to a specific NUTS2-region and this again belongs to a specific NUTS1-region.

NOTE1 each lowest level unit has associations to 3 NUTS-regions at different levels

Value type: NUTSRegion

Multiplicity: 1..3

Stereotypes: «voidable»

Association role: administrativeArea

Definition: Each AdministrativeUnitLowestLevel consists of one or more AdministrativeAreas (land areas, coastal waters, inland waters, exclaves, islands)

Value type: AdministrativeUnitArea

Multiplicity: 1..*

Stereotypes: «voidable»

5.1.2.2.5 *AdministrativeUnits.AdministrativeUnitUpperLevel*

Class: «featureType» AdministrativeUnits.AdministrativeUnitUpperLevel

Definition: An administrative unit at upper level of national administrative hierarchy is composed of lower level administrative units. The relations between administrative units at upper levels are country specific (see examples in Annex C)

Subtype of: AdministrativeUnit

Status: Proposed

Stereotypes: «featureType»

Attribute: geometry

Definition: Surface geometry of the administrative unit at upper level.

Value type: GM_MultiSurface

Multiplicity: 0..1

Stereotypes:

Association role: lowerLevelUnit

Definition: Each upper level unit includes 2 or more lower level units (in exceptional cases only one)

Value type: AdministrativeUnit

Multiplicity: 1..*

Stereotypes: «voidable»

5.1.2.2.6 *AdministrativeUnits.Boundary*

AbstractClass: «featureType» AdministrativeUnits.Boundary

Definition: Abstract superclass for all administrative boundaries and coastlines/shorelines.

Subtype of:

Status: Proposed

Stereotypes: «featureType»

Attribute: geometry

Definition: Geometry of border line.

Value type: GM_Curve

Multiplicity: 1..1

Stereotypes:

Attribute: id

Definition: External object identifier published by the responsible body, which may be used by external applications to reference the boundary.

Comment 1: Identifier is an INSPIRE base type composed by a namespace, a local identifier and an optional (voidable) version identifier.

Example: An boundary instance from Denmark could carry this identifier:

Namespace: DK_ADMUNIT
 Local iIdentifier: 0A3F1037C3AB032E67E04556003BA298018
 Version identifier: 12-02-2008T10:05:01+01:00

Comment 2: The four requirements for unique object identifiers are: uniqueness, persistence, traceability, and feasibility.

Comment 3: The primary purpose of this identifier is to enable links between various sources and the boundary

Value type: Identifier
 Multiplicity: 1..1
 Stereotypes:

Attribute: country

Definition: Two-character country code according to ISO 3166.
 Value type: CountryCode
 Multiplicity: 1..1
 Stereotypes:

Attribute: beginLifespanVersion

Definition: Date and time at which this version of the spatial object was inserted or changed in the spatial data set.
 Value type: DateTime
 Multiplicity: 1..1
 Stereotypes: «voidable,lifeCycleInfo»

Attribute: endLifespanVersion

Definition: Date and time at which this version of the spatial object was superseded or retired in the spatial data set.
 Value type: DateTime
 Multiplicity: 0..1
 Stereotypes: «voidable,lifeCycleInfo»

Attribute: validFrom

Definition: Date and time the boundary object was/will be created in the real world.
 Value type: DateTime
 Multiplicity: 1..1
 Stereotypes: «voidable»

Attribute: validTo

Definition: Date and time at which the boundary object ceased/will cease to exist in the real world.
 Value type: DateTime
 Multiplicity: 0..1
 Stereotypes: «voidable»

Association role: admArea

Definition: Two adjacent administrative areas are separated by an (administrative) boundary line.
 Value type: AdministrativeUnitArea
 Multiplicity: 1..2
 Stereotypes: «voidable»

Association role: admUnit

Definition:
 Value type: AdministrativeUnit
 Multiplicity: 1..*
 Stereotypes: «voidable»

5.1.2.2.7 AdministrativeUnits.Coastline

Class: «featureType» AdministrativeUnits.Coastline	
Definition:	Boundary between land and water.
Subtype of:	Boundary
Status:	Proposed
Stereotypes:	«featureType»
Attribute: type	
Definition:	Type of coastline.
Value type:	CoastlineType
Multiplicity:	1..1
Stereotypes:	«voidable»

5.1.2.2.8 AdministrativeUnits.NUTSRegion

Class: «featureType» AdministrativeUnits.NUTSRegion	
Definition:	Territorial unit for statistics defined in the framework of the Regulation (EC) No 1059/2003 of the European Parliament and of the Council of 26 May 2003.
	NOTE NUTS regions subdivide each Member State into a whole number of territorial units for statistic at NUTS1 level. Each of these is then subdivided into regions at NUTS2 level and these in turn into regions at NUTS3 level.
Subtype of:	
Status:	Proposed
Stereotypes:	«featureType»
Attribute: geometry	
Definition:	Surface geometry of NUTS-region.
Value type:	GM_MultiSurface
Multiplicity:	0..1
Stereotypes:	«voidable»
Attribute: id	
Definition:	External object identifier published by the responsible body, which may be used by external applications to reference the NUTSRegion.
	Comment 1: Identifier is an INSPIRE base type composed by a namespace, a local identifier and an optional (voidable) version identifier. Example: An NUTSRegion instance from Denmark could carry this identifier: Namespace: DK_ADMUNIT Local iIdentifier: 0A3G5047C3DF032E87E04556003BA298018 Version identifier: 12-02-2008T10:05:01+01:00 Comment 2: The four requirements for unique object identifiers are: uniqueness, persistence, traceability, and feasibility. Comment 3: The primary purpose of this identifier is to enable links between various sources and the NUTSRegion
Value type:	Identifier
Multiplicity:	1..1
Stereotypes:	
Attribute: NUTSCode	

Definition: Unique code of the territorial unit for statistics as defined in the framework of the Regulation (EC) No 1059/2003 of the European Parliament and of the Council of 26 May 2003.

Example: A NUTScode from Denmark could be DK031

Value type: `CharacterString`

Multiplicity: 1..1

Stereotypes:

Attribute: NUTSlabel

Definition: Official name of the territorial unit for statistics as defined in the framework of the Regulation (EC) No 1059/2003 of the European Parliament and of the Council of 26 May 2003.

Example: NUTSlabel example from Denmark could be Fyn

Value type: `CharacterString`

Multiplicity: 1..1

Stereotypes:

Attribute: NUTSLevel

Definition: Level in NUTS hierarchy.

Example: NUTSlevel belonging to DK031 and Fyn would here be NUTS3

Value type: `NUTSLevelType`

Multiplicity: 1..1

Stereotypes:

Attribute: beginLifespanVersion

Definition: Date and time at which this version of the spatial object was inserted or changed in the spatial data set.

Value type: `DateTime`

Multiplicity: 1..1

Stereotypes: «voidable,lifeCycleInfo»

Attribute: endLifespanVersion

Definition: Date and time at which this version of the spatial object was superseded or retired in the spatial data set.

Value type: `DateTime`

Multiplicity: 0..1

Stereotypes: «voidable,lifeCycleInfo»

Attribute: validFrom

Definition: Date and time the NUTSRegion object was/will be created in the real world.

Value type: `DateTime`

Multiplicity: 1..1

Stereotypes:

Attribute: validTo

Definition: Date and time at which the NUTSRegion object ceased/will cease to exist in the real world.

Value type: `DateTime`

Multiplicity: 0..1

Stereotypes: «voidable»

Association role: admUnit

Definition: Each NUTS-region consists of one or more Administrative units at lowest level.

Value type: AdministrativeUnitLowestLevel

Multiplicity: 1..*

Stereotypes: «voidable»

5.1.2.3 Data Types

5.1.2.3.1 *AdministrativeUnits.ResidenceOfAuthority*

Class: «dataType» AdministrativeUnits.ResidenceOfAuthority

Definition: Type representing name and position of residence of authority.

Subtype of:

Status: Proposed

Stereotypes: «dataType»

Attribute: name

Definition: Name of residence of authority.

Value type: GeographicalName

Multiplicity: 1..1

Stereotypes: «voidable»

Attribute: representationalPoint

Definition: Position of residence of authority.

Value type: GM_Point

Multiplicity: 1..1

Stereotypes: «voidable»

5.1.2.4 Enumerations and Codelists

5.1.2.4.1 *AdministrativeUnits.AdministrativeAreaType*

Class: «enumeration» AdministrativeUnits.AdministrativeAreaType

Definition: The type of administrative area describes the property of the area concerning its role within the national administrative structure.

Status: Proposed

Stereotypes: «enumeration»

Value: Main area

Definition: The main area is the administrative area where the residence of authority is located.

Code: 1

Value: Branch area

Definition: Areas which are geometrically separated from the main area (eg. Exclaves).

Code: 3

Value: Special area

Definition: Area having a specific function of scope (e.g. condominium, non-cadastre area, forest).

Code: 4

5.1.2.4.2 *AdministrativeUnits.AdministrativeHierarchyLevel*

Class: «enumeration» AdministrativeUnits.AdministrativeHierarchyLevel	
Definition:	Levels of administration in the national administrative hierarchy.
Status:	Proposed
Stereotypes:	«enumeration»
Value: 1st order (country level)	
Definition:	Highest level in the national administrative hierarchy.
Code:	1
Value: 2nd order	
Definition:	2nd level in the national administrative hierarchy.
Code:	2
Value: 3rd order	
Definition:	3rd level in the national administrative hierarchy.
Code:	3
Value: 4th order	
Definition:	4th level in the national administrative hierarchy.
Code:	4
Value: 5th order	
Definition:	5th level in the national administrative hierarchy.
Code:	5
Value: 6th order	
Definition:	6th level in the national administrative hierarchy.
Code:	6

5.1.2.4.3 *AdministrativeUnits.BoundaryLevelType*

Class: «enumeration» AdministrativeUnits.BoundaryLevelType	
Definition:	Boundary levels in the national administrative hierarchy.
Status:	Proposed
Stereotypes:	«enumeration»
Value: 1st order	
Definition:	Boundary is representing the country level in the national administrative hierarchy (international boundary).
Code:	1
Value: 2nd order	
Definition:	Boundary is representing the 2nd level in the national administrative hierarchy.
Code:	2
Value: 3rd order	
Definition:	Boundary is representing the 3rd level in the national administrative hierarchy.
Code:	3
Value: 4th order	
Definition:	Boundary is representing the 4th level in the national administrative hierarchy.
Code:	4

Value: 5th order

Definition: Boundary is representing the 5th level in the national administrative hierarchy.

Code: 5

Value: 6th order

Definition: Boundary is representing the 6th level in the national administrative hierarchy.

Code: 6

5.1.2.4.4 *AdministrativeUnits.BoundaryStatusType*

Class: «enumeration» AdministrativeUnits.BoundaryStatusType

Definition: Description of the (legal) status for (international) administrative boundaries.

Status: Proposed

Stereotypes: «enumeration»

Value: Definite

Definition: Edge-matched boundary has been agreed between neighbouring countries and is stable now.

Code: 1

Value: Indefinite

Definition: Edge-matched boundary has not yet agreed between neighbouring countries and could be changed.

Code: 2

Value: In dispute

Definition: No agreement can be reached on boundary between neighbouring countries, boundary is in dispute.

Code: 3

5.1.2.4.5 *AdministrativeUnits.CoastlineType*

Class: «enumeration» AdministrativeUnits.CoastlineType	
Definition:	Type of coastline.
Status:	Proposed
Stereotypes:	«enumeration»
Value: Coastline coastal waters	
Definition:	(Border)line between land and coastal water
Code:	
Value: Coastline/shoreline inland waters	
Definition:	(Border)line between land and inland water (lakes).
Code:	

5.1.2.4.6 *AdministrativeUnits.LandCoverType*

Class: «enumeration» AdministrativeUnits.LandCoverType	
Definition:	Classification of an AdministrativeArea according to its land-water nature.
Status:	Proposed
Stereotypes:	«enumeration»
Value: Land area	
Definition:	Area is on land.
Code:	
Value: Coastal water	
Definition:	Area is part of coastal water.
	NOTE1 The administrative unit, to which this area belongs to has been defined stretching into the sea
Code:	
Value: Inland water	
Definition:	Area is (part of) inland water.
	NOTE1 In some Member States inland water/lakes are defined as (part of) administrative units, but in some not so. The Members States have to define for themselves what they consider to be inland water.
Code:	

5.1.2.4.7 *AdministrativeUnits.MeaningOfLineType*

Class: «enumeration» AdministrativeUnits.MeaningOfLineType	
Definition:	Classification of a boundary according to the land-water nature of the adjacent areas.
Status:	Proposed
Stereotypes:	«enumeration»
Value: Boundary line between land and water	
Definition:	Boundary line following the coastline.
Code:	1
Value: Boundary line on land	
Definition:	Boundary line dividing administrative areas on land.
Code:	7

Value: Boundary line on water

Definition: Boundary line dividing administrative areas on water.
 Code: 9

5.1.2.4.8 *AdministrativeUnits.NUTSLevelType*

Class: «enumeration» AdministrativeUnits.NUTSLevelType

Definition: NUTS levels.
 Status: Proposed
 Stereotypes: «enumeration»

Value: NUTS 1 Level

Definition: First level of hierarchical NUTS classification.
 Code:

Value: NUTS 2 Level

Definition: Second level of hierarchical NUTS classification.
 Code:

Value: NUTS 3 Level

Definition: Third level of hierarchical NUTS classification.
 Code:

6 Reference systems

6.1 Spatial reference system

Requirement 3 For the horizontal component, the European Terrestrial Reference System 1989 (ETRS89) shall be used. This coordinate reference system is linked to the Eurasian tectonic plate. For areas that are not on the stable part of the Eurasian tectonic plate, the International Terrestrial Reference System (ITRS) or other geodetic coordinate reference systems compliant with ITRS shall be used. The parameters of the GRS80 ellipsoid shall be used for the computation of latitude and longitude and for the computation of plane coordinates using a suitable mapping projection.

For the vertical component, the European Vertical Reference System (EVRS) shall be used. Other vertical reference systems may be used in areas that are outside the geographical scope of EVRS.

Recommendation 3 For the representation of data in plane coordinates in general applications, the following projections should be used:

- Lambert Azimuthal Equal Area (ETRS-LAEA) for spatial analysis and display;
- Lambert Conformal Conic (ETRS-LCC) for conformal pan-European mapping at scales smaller or equal to 1:500,000;
- Transverse Mercator (ETRS-TMzn) for conformal pan-European mapping at scales larger than 1:500,000.

6.2 Temporal reference system

Requirement 4 Date values shall be provided using the Gregorian Calendar. Time values shall be provided either using the Coordinated Universal Time (UTC) or as local time including their time zone as an offset from [UTC](#).

7 Data quality

Information on the quality of administrative data allows a data producer to validate how well a dataset meets the criteria set forth in its product specification and assists a data user in determining a product's ability to satisfy the requirements for their particular application. The International Standard 19113 establishes the principles for describing the quality of geographic data and specifies components for reporting quality information.

The product which has to be specified by present document will contain geometry and attributes of administrative units and boundaries at all levels of national administrative hierarchies of EU countries referring to a defined (reference-) date. Delivered data should be of the best available quality. The contributions have to be transformed into the specified structure and spatial reference system and have to be edge matched at international boundaries. The data has to be maintained according to the present product specification.

Quality of delivered national administrative data shall have been checked and may be documented according to the data quality elements described in this section. Data quality measures from ISO/TS 19138 are used when applicable.

Table 3 – Data quality elements used in the theme *Administrative units*

INSPIRE Data Specification Administrative units Section	Data quality element	Usage
7.1.	DQ_LogicalCompleteness	dataset-level
7.2	DQ_LogicalConsistency	dataset-level
7.3	DQ_PositionalAccuracy	dataset-level
7.4	DQ_ThematicAccuracy	dataset-level
7.5	DQ_TemporalAccuracy	dataset-level

7.1 Completeness

7.1.1 Omission

7.1.1.1 Rate of missing items

Name	rate of missing items
Alternative name	-
Data quality element	DQ_LogicalCompleteness
Data quality subelement	DQ_CompletenessOmission
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
Data quality value structure	-
Source reference	-
Example	-
Measure identifier	7

7.2 Logical consistency

7.2.1 Topological consistency

7.2.1.1 Number of faulty point-curve connections

Name	number of faulty point-curve connections
Alternative name	extraneous nodes
Data quality element	DQ_LogicalConsistency
Data quality subelement	DQ_TopologicalConsistency
Data quality basic measure	Error count
Definition	number of faulty point-curve connections in the dataset
Description	A point-curve connection exists where different curves touch. These curves have an intrinsic topological relationship that has to reflect the true constellation. If the point-curve connection contradicts the universe of discourse, the point-curve connection is faulty with respect to this data quality measure. The data quality measure counts the number of errors of this kind.
Parameter	-
Data quality value type	Integer
Data quality value structure	-
Source reference	-
Example	-
Measure identifier	9

7.2.1.2 Number of missing connection due to undershoots

Name	number of missing connection due to undershoots
Alternative name	Undershoots
Data quality element	DQ_LogicalConsistency
Data quality subelement	DQ_TopologicalConsistency
Data quality basic measure	error count
Definition	count of items in the dataset, within the parameter tolerance, that are mismatched due to undershoots
Description	-
Parameter	search distance from the end of a dangling line
Data quality value type	Integer
Data quality value structure	-
Source reference	-
Example	-
Measure identifier	23

7.2.2 Conceptual consistency

7.2.2.1 Conceptual Schema compliance

Name	Conceptual Schema compliance
Alternative name	-
Data quality element	DQ_LogicalConsistency
Data quality subelement	DQ_ConceptualConsistency
Data quality basic measure	Correctness indicator
Definition	indication that an item complies with the rules of the relevant conceptual schema
Description	-
Parameter	-
Data quality value type	True
Data quality value structure	-
Source reference	-
Measure identifier	9

7.3 Positional accuracy

7.3.1 Absolute external positional accuracy

7.3.1.1 Mean value of positional uncertainties (1D, 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

7.4 Thematic accuracy

7.4.1 Classification correctness

7.4.1.1 Number of incorrectly classified features

Name	Number of incorrectly classified features
Alternative name	-
Data quality element	DQ_ThematicAccuracy
Data quality subelement	DQ_ThematicClassificationCorrectness
Data quality basic measure	Error count
Definition	Number of incorrectly classified features
Description	-

Parameter	-
Data quality value type	Integer
Data quality value structure	-
Source reference	-
Example	-
Measure identifier	62

7.5 Temporal accuracy

7.5.1 Temporal validity

7.5.1.1 Validity of data with respect to time

Name	Validity of data with respect to time
Alternative name	-
Data quality element	DQ_TemporalAccuracy
Data quality subelement	DQ_TemporalValidity
Data quality basic measure	
Definition	
Description	-
Parameter	-
Data quality value type	Integer
Data quality value structure	-
Source reference	-
Example	-
Measure identifier	

8 Dataset-level Metadata

Besides the metadata elements required in the INSPIRE Implementing Rule on Metadata and the metadata describing the quality of data (see 7) the following metadata elements may be provided.

Metadata can be reported for each individual feature (feature-level metadata) or once for a complete dataset (dataset-level metadata). Feature-level metadata is fully described in the application schema in 5.1 . If data quality elements are used on a feature level, the documentation shall refer to the appropriate definition in section 7. This section only specifies dataset-level metadata elements.

Mandatory or conditional metadata elements are specified in *Table 5*. Optional metadata elements are specified in *Table 6*.

Requirement 5 The metadata describing a spatial data set or a spatial data set series related to the theme *Administrative units* 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 4*) as well as the theme-specific metadata elements specified in *Table 5*.

Requirement 6 *Table 5*.

Recommendation 4 The metadata describing a spatial data set or a spatial data set series related to the theme *Administrative units* should comprise the theme-specific metadata elements specified in *Table 6*.

Table 4 – Metadata for spatial datasets and spatial dataset series specified in Commission Regulation (EC) No 1205/2008 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	

Table 5 – Mandatory and conditional theme-specific metadata for the theme *Administrative units*

INSPIRE Data Specification <i>Administrative units</i> Section	Metadata element	Multiplicity	Condition
-			

Table 6 – Optional theme-specific metadata for the theme *Administrative units*

INSPIRE Data Specification <i>Administrative units</i> Section	Metadata element	Multiplicity
8.1	maintenanceAndUpdateFrequency	0..1
8.2	updateScope	0..*
8.3	transferSize	0..1

8.1 *maintenanceAndUpdateFrequency*

Metadata element name	maintenanceAndUpdateFrequency
ISO definition	frequency with which changes and additions are made in the resource after the initial resource is completed
ISO 19115 number and name	143. MD_MaintenanceInformation
ISO/TS 19139 path	-
INSPIRE obligation / condition	optional
INSPIRE multiplicity	1
Data type	Class
Domain	MD_MaintenanceFrequencyCode (CodeList B.5.18)
Implementing instructions	
Example	
Comment	

8.2 *updateScope*

Metadata element name	updateScope
ISO definition	scope of data to which maintenance is applied
ISO 19115 number and name	146. MD_MaintenanceIdentification
ISO/TS 19139 path	-
INSPIRE obligation / condition	optional
INSPIRE multiplicity	n
Data type	Class
Domain	MD_Scope_Code (CodeList B.5.25)
Implementing instructions	
Example	
Comment	

8.3 *transferSize*

Metadata element name	transferSize
ISO definition	Estimated size of a unit in the specified transfer format expressed in megabytes, The transfer size is > 0.0
ISO 19115 number and name	276. MD_DigitalTransferOptions
ISO/TS 19139 path	-
INSPIRE obligation / condition	optional
INSPIRE multiplicity	1
Data type	Real
Domain	> 0.0
Implementing instructions	
Example	
Comment	

9 Delivery

9.1 *Delivery medium*

Data conformant to this INSPIRE data specification will be made available through services conformant to the Implementing Rules for Download Services. In these Implementing Rules, two types of Download services are defined:

- 1) a Download service providing access to pre-defined dataset or pre-defined part of a dataset
- 2) a Download service providing direct access to data and streaming data based upon user defined criteria called a filter

9.2 Encodings

9.2.1 Encoding for application schema *Administrative units*

Requirement 7 Data conformant to the application schema *Administrative units* shall be encoded using the encoding specified in section 9.2.1.1.

9.2.1.1 Default Encoding: GML application schema

Format name: *Administrative units* 2.0 GML Application Schema
 Version of the format: *Administrative units* 2.0, 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

No data capture rules specified, except that national administrative data of best available quality according to this specification should be provided after it has been edge matched at international boundaries between responsible organizations of neighbouring countries. It could be useful to consider the experiences (results) from EuroGeographics concerning the edge matching of international boundaries, which has been done by BKG together with the EBM project partners of 39 European National Mapping and Cadastral Agencies for creation of the seamless EuroBoundaryMap reference geo database.

11 Portrayal

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

Requirement 8 If an INSPIRE view services supports the portrayal of data related to the theme *Administrative units*, it shall provide the layers specified in this section.

Requirement 9 If an INSPIRE view services support the portrayal of data related to the theme *Administrative units*, it shall support all (default and other well-defined) styles specified in this section.

Requirement 10 If no user-defined style is specified in a portrayal request to an INSPIRE view service, the default style specified in this section shall be used.

Standard visualisation rules established by EEA for EuroGeographics products should be considered (EEA 2006).

Each application can use other styling different from these rules.

11.1 Layers

The XML fragments in this section use the following namespace prefixes:

- sld="http://www.opengis.net/sld" (WMS/SLD 1.1)
- se="http://www.opengis.net/se" (SE 1.1)
- ogc="http://www.opengis.net/ogc" (FE 1.1)

NOTE : Styles for all feature types are not finalized and must be considered as draft examples in this version

11.1.1 AdministrativeUnitLowestLevel

Element	Description
Layer Title	Administrative Unit
Layer Name	AdministrativeUnits.AdministrativeUnitLowestLevel
Content	Spatial object type: AdministrativeUnitLowestLevel
Keywords	administrative unit lowest level
Default Style (including name, title, abstract and legend)	<pre> <sld:NamedLayer> <se:Name>AdministrativeUnits.AdministrativeUnitLowestLevel</se:Name> <sld:UserStyle> <se:Name>AdministrativeUnitLowestLevelStyle</se:Name> <sld:IsDefault>1</sld:IsDefault> <se:FeatureTypeStyle version="1.1.0" xmlns:AU="urn:x- inspire:specification:AdministrativeUnits:0.1"> <se:Description> <se:Title>Administrative Unit LowestLevel Default Style</se:Title> <se:Abstract>This style uses grey lines for the borders of the administrative units at lowest level and the geographicalName property for labelling (10pt Arial).</se:Abstract> </se:Description> <se:FeatureTypeName>AU:AdministrativeUnitLowestLevel</se:FeatureTypeName> <!-- There could be different rules with the text symbolizer having different presentations depending on the level of the unit. --> <se:Rule> <se:PolygonSymbolizer> <se:Geometry> <ogc:PropertyName>AU:area</ogc:PropertyName> </se:Geometry> <se:Stroke> <se:SvgParameter name="stroke">#333333</se:SvgParameter> <se:SvgParameter name="stroke-width">1</se:SvgParameter> </se:Stroke> </se:PolygonSymbolizer> <se:TextSymbolizer> <se:Geometry> <ogc:PropertyName>AU:area</ogc:PropertyName> </se:Geometry> <se:Label> <ogc:PropertyName>AU:geographicalName</ogc:PropertyName> </se:Label> <se:Font> <se:SvgParameter name="font-family">Arial</se:SvgParameter> <se:SvgParameter name="font-family">Sans- Serif</se:SvgParameter> <se:SvgParameter name="font-size">10</se:SvgParameter> </se:Font> <se:Fill> <se:SvgParameter name="fill">#000000</se:SvgParameter> </se:Fill> </se:TextSymbolizer> </se:Rule> </se:FeatureTypeStyle> </sld:UserStyle> </sld:NamedLayer> </pre>
Additional Well-defined Style (including name, title, abstract and legend)	<pre> <sld:NamedLayer> <se:Name>AdministrativeUnits.AdministrativeUnitLowestLevel</se:Name> <sld:UserStyle> <se:Name>AdministrativeUnitStyleLowestLevel</se:Name> <sld:IsDefault>0</sld:IsDefault> <se:FeatureTypeStyle version="1.1.0" xmlns:AU="urn:x- inspire:specification:AdministrativeUnits:0.1"> <se:Description> </pre>

	<pre> <se:Title>Adminstrative Unit Lowest Level Alternative Style</se:Title> <se:Abstract>This style uses grey lines for the borders of the administrative units at lowest level and the unitCode property for labelling (10pt Arial).</se:Abstract> </se:Description> <se:FeatureTypeName>AU:AdministrativeUnitLowestLevel</se:FeatureTypeName> <se:Rule> <se:PolygonSymbolizer> <se:Geometry> <ogc:PropertyName>AU:area</ogc:PropertyName> </se:Geometry> <se:Stroke> <se:SvgParameter name="stroke">#333333</se:SvgParameter> <se:SvgParameter name="stroke-width">1</se:SvgParameter> </se:Stroke> </se:PolygonSymbolizer> <se:TextSymbolizer> <se:Geometry> <ogc:PropertyName>AU:area</ogc:PropertyName> </se:Geometry> <se:Label> <ogc:PropertyName>AU:unitCode</ogc:PropertyName> </se:Label> <se:Font> <se:SvgParameter name="font-family">Arial</se:SvgParameter> <se:SvgParameter name="font-family">Sans- Serif</se:SvgParameter> <se:SvgParameter name="font-size">10</se:SvgParameter> </se:Font> <se:Fill> <se:SvgParameter name="fill">#000000</se:SvgParameter> </se:Fill> </se:TextSymbolizer> </se:Rule> </se:FeatureTypeStyle> </sld:UserStyle> </sld:NamedLayer> </pre>
Minimum and maximum scales	1:25 000 – 1:1.000.000

11.1.2 AdministrativeUnitUpperLevel

Element	Description
Layer Title	Adminstrative Unit
Layer Name	AdminstrativeUnits.AdministrativeUnitUpperLevel
Content	Spatial object type: AdminstrativeUnitUpperLevel
Keywords	administrative unit upper level
Default Style (including name, title, abstract and legend)	<pre> <sld:NamedLayer> <se:Name>AdminstrativeUnits.AdministrativeUnitUpperLevel</se:Name> </sld:UserStyle> <se:Name>AdminstrativeUnitUpperLevelStyle</se:Name> <sld:IsDefault>1</sld:IsDefault> <se:FeatureTypeStyle version="1.1.0" xmlns:AU="urn:x- inspire:specification:AdministrativeUnits:0.1"> <se:Description> <se:Title>Adminstrative Unit Upper Level Default Style</se:Title> <se:Abstract>This style uses grey lines for the borders of the administrative units at upper levels and the geographicalName property for labelling (10pt arial).</se:Abstract> </se:Description> <se:FeatureTypeName>AU:AdministrativeUnitUpperLevel</se:FeatureTypeName> <!-- There could be different rules with the text symbolizer having different presentations depending on the level of the unit. --> <se:Rule> <se:PolygonSymbolizer> <se:Geometry> <ogc:PropertyName>AU:area</ogc:PropertyName> </se:Geometry> <se:Stroke> <se:SvgParameter name="stroke">#333333</se:SvgParameter> <se:SvgParameter name="stroke-width">1</se:SvgParameter> </pre>

	<pre> </se:Stroke> </se:PolygonSymbolizer> <se:TextSymbolizer> <se:Geometry> <ogc:PropertyName>AU:area</ogc:PropertyName> </se:Geometry> <se:Label> <ogc:PropertyName>AU:geographicalName</ogc:PropertyName> </se:Label> <se:Font> <se:SvgParameter name="font-family">Arial</se:SvgParameter> <se:SvgParameter name="font-family">Sans- Serif</se:SvgParameter> <se:SvgParameter name="font-size">10</se:SvgParameter> </se:Font> <se:Fill> <se:SvgParameter name="fill">#000000</se:SvgParameter> </se:Fill> </se:TextSymbolizer> </se:Rule> </se:FeatureTypeStyle> </sld:UserStyle> </sld:NamedLayer> </pre>
<p>Additional Well-defined Style (including name, title, abstract and legend)</p>	<pre> <sld:NamedLayer> <se:Name>AdministrativeUnits.AdministrativeUnitUpperLevel</se:Name> <sld:UserStyle> <se:Name>AdministrativeUnitUpperLevelStyle</se:Name> <sld:IsDefault>0</sld:IsDefault> <se:FeatureTypeStyle version="1.1.0" xmlns:AU="urn:x- inspire:specification:AdministrativeUnits:0.1"> <se:Description> <se:Title>Administrative Unit Upper Level Alternative Style</se:Title> <se:Abstract>This style uses grey lines for the borders of the administrative units at upper level and the unitCode property for labelling (10pt Arial).</se:Abstract> </se:Description> <se:FeatureTypeName>AU:AdministrativeUnitUpperLevel</se:FeatureTypeName> <se:Rule> <se:PolygonSymbolizer> <se:Geometry> <ogc:PropertyName>AU:area</ogc:PropertyName> </se:Geometry> <se:Stroke> <se:SvgParameter name="stroke">#333333</se:SvgParameter> <se:SvgParameter name="stroke-width">1</se:SvgParameter> </se:Stroke> </se:PolygonSymbolizer> <se:TextSymbolizer> <se:Geometry> <ogc:PropertyName>AU:area</ogc:PropertyName> </se:Geometry> <se:Label> <ogc:PropertyName>AU:unitCode</ogc:PropertyName> </se:Label> <se:Font> <se:SvgParameter name="font-family">Arial</se:SvgParameter> <se:SvgParameter name="font-family">Sans- Serif</se:SvgParameter> <se:SvgParameter name="font-size">10</se:SvgParameter> </se:Font> <se:Fill> <se:SvgParameter name="fill">#000000</se:SvgParameter> </se:Fill> </se:TextSymbolizer> </se:Rule> </se:FeatureTypeStyle> </sld:UserStyle> </sld:NamedLayer> </pre>
<p>Minimum and maximum scales</p>	<p>1:25 000 – 1:1.000.000</p>

11.1.3 AdministrativeBoundary

Element	Description
Layer Title	Adminstrative Boundary
Layer Name	AdminstrativeUnits.AdminstrativeBoundary
Content	Spatial object type: AdminstrativeBoundary
Keywords	administrative boundaries, borders
Style (including name, title, abstract and legend)	<pre> <sld:NamedLayer> <se:Name>AdminstrativeUnits.AdminstrativeBoundary</se:Name> <sld:UserStyle> <se:Name>AdminstrativeBoundaryStyle</se:Name> <sld:IsDefault>1</sld:IsDefault> <se:FeatureTypeStyle version="1.1.0" xmlns:AU="urn:x- inspire:specification:AdministrativeUnits:0.1"> <se:Description> <se:Title>Adminstrative Boundary Style</se:Title> <se:Abstract>This style uses red lines for all boundaries and different stroke widths depending on the value of the boundaryLevel property: 4 px for level 1, 3 px for level 2, 2 px for level 3, and 1 px for all other levels.</se:Abstract> </se:Description> <se:FeatureTypeName>AU:AdministrativeBoundary</se:FeatureTypeName> <se:Rule> <se:Name>Level1</se:Name> <ogc:Filter> <ogc:PropertyIsEqualTo> <ogc:PropertyName>AU:boundaryLevel</ogc:PropertyName> <ogc:Literal>1</ogc:Literal> </ogc:PropertyIsEqualTo> </ogc:Filter> <se:LineSymbolizer> <se:Geometry> <ogc:PropertyName>AU:border</ogc:PropertyName> </se:Geometry> <se:Stroke> <se:SvgParameter name="stroke">#ff0000</se:SvgParameter> <se:SvgParameter name="stroke-width">4</se:SvgParameter> </se:Stroke> </se:LineSymbolizer> </se:Rule> <se:Rule> <se:Name>Level2</se:Name> <ogc:Filter> <ogc:PropertyIsEqualTo> <ogc:PropertyName>AU:boundaryLevel</ogc:PropertyName> <ogc:Literal>2</ogc:Literal> </ogc:PropertyIsEqualTo> </ogc:Filter> <se:LineSymbolizer> <se:Geometry> <ogc:PropertyName>AU:border</ogc:PropertyName> </se:Geometry> <se:Stroke> <se:SvgParameter name="stroke">#ff0000</se:SvgParameter> <se:SvgParameter name="stroke-width">3</se:SvgParameter> </se:Stroke> </se:LineSymbolizer> </se:Rule> <se:Rule> <se:Name>Level3</se:Name> <ogc:Filter> <ogc:PropertyIsEqualTo> <ogc:PropertyName>AU:boundaryLevel</ogc:PropertyName> <ogc:Literal>1</ogc:Literal> </ogc:PropertyIsEqualTo> </ogc:Filter> <se:LineSymbolizer> <se:Geometry> <ogc:PropertyName>AU:border</ogc:PropertyName> </se:Geometry> <se:Stroke> <se:SvgParameter name="stroke">#ff0000</se:SvgParameter> <se:SvgParameter name="stroke-width">2</se:SvgParameter> </se:Stroke> </se:LineSymbolizer> </se:Rule> </se:FeatureTypeStyle> </sld:UserStyle> </sld:NamedLayer> </pre>

	<pre> <se:Rule> <se:Name>OtherLevels</se:Name> <se:ElseFilter/> <se:LineSymbolizer> <se:Geometry> <ogc::PropertyName>AU:border</ogc::PropertyName> </se:Geometry> <se:Stroke> <se:SvgParameter name="stroke">#ff0000</se:SvgParameter> <se:SvgParameter name="stroke-width">1</se:SvgParameter> </se:Stroke> </se:LineSymbolizer> </se:Rule> </se:FeatureTypeStyle> </sld:UserStyle> </sld:NamedLayer> </pre>
Minimum and maximum scales	1:25 000 – 1:1.000.000

11.1.4 AdministrativeUnitArea

Element	Description
Layer Title	Administrative Unit Area
Layer Name	AdministrativeUnits.AdministrativeUnitArea
Content	Spatial object type: AdministrativeUnitArea
Keywords	administrative unit
Style (including name, title, abstract and legend)	<pre> <sld:NamedLayer> <se:Name>AdministrativeUnits.AdministrativeUnitArea</se:Name> <sld:UserStyle> <se:Name>AdministrativeUnitAreaStyle</se:Name> <sld:IsDefault>1</sld:IsDefault> <se:FeatureTypeStyle version="1.1.0" xmlns:AU="urn:x- inspire:specification:AdministrativeUnits:0.1"> <se:Description> <se:Title>Administrative Unit Area Default Style</se:Title> <se:Abstract>This style uses grey lines for the borders of the administrative unit areas.</se:Abstract> </se:Description> <se:FeatureTypeName>AU:AdministrativeUnitArea</se:FeatureTypeName> <se:Rule> <se:PolygonSymbolizer> <se:Geometry> <ogc:PropertyName>AU:area</ogc:PropertyName> </se:Geometry> <se:Stroke> <se:SvgParameter name="stroke">#333333</se:SvgParameter> <se:SvgParameter name="stroke-width">1</se:SvgParameter> </se:Stroke> </se:PolygonSymbolizer> </se:Rule> </se:FeatureTypeStyle> </sld:UserStyle> </sld:NamedLayer> </pre>
Minimum and maximum scales	1:25 000 – 1:1.000.000

11.1.5 NUTSRegion

Element	Description
Layer Title	NUTS Region
Layer Name	AdministrativeUnits.NUTSRegion
Content	Spatial object type: NUTSRegion
Keywords	NUTS, NUTS region, NUTS code
Style (including name, title, abstract and legend)	<pre> <sld:NamedLayer> <se:Name>AdministrativeUnits.Nutsregion</se:Name> <sld:UserStyle> <se:Name>NUTSRegionStyle</se:Name> </pre>

	<pre> <sld:IsDefault>1</sld:IsDefault> <se:FeatureTypeStyle version="1.1.0" xmlns:AU="urn:x- inspire:specification:AdministrativeUnits:0.1"> <se:Description> <se:Title>NUTSRegion Default Style</se:Title> <se:Abstract>This style uses grey lines for the borders of for NUTS regions.</se:Abstract> </se:Description> <se:FeatureTypeName>AU:Nutsregion </se:FeatureTypeName> <se:Rule> <se:PolygonSymbolizer> <se:Geometry> <ogc:PropertyName>AU:region</ogc:PropertyName> </se:Geometry> <se:Stroke> <se:SvgParameter name="stroke">#333333</se:SvgParameter> <se:SvgParameter name="stroke-width">1</se:SvgParameter> </se:Stroke> </se:PolygonSymbolizer> </se:Rule> </se:FeatureTypeStyle> </sld:UserStyle> </sld:NamedLayer> </pre>
Minimum and maximum scales	1:25 000 – 1:1.000.000

11.2 Layers organization

No special layer organization defined.

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INSPIRE	Reference: INSPIRE_DataSpecification_AU_v2.0.pdf		
TWG-AU	Data Specification on <i>Administrative units</i>	2008-12-19	Page 42

Annex A Abstract Test Suite

A.1 Test cases for mandatory conformance requirements for a dataset with this INSPIRE data specification *Administrative units*

Conformance and abstract test suite in conformance with the ISO 19105 and the INSPIRE conceptual modelling framework.

The IR (Annex B7) specifies a mandatory conformity element that can take one of the following values:

1. Conformant (conformant)
The resource is fully conformant with the cited specification.
2. Not Conformant (notConformant)
The resource does not conform to the cited specification.
3. Not evaluated (notEvaluated)
Conformance has not been evaluated.

A.1.1 Conformance of data sets to the application schema and requirements in the data specification for *Administrative units*

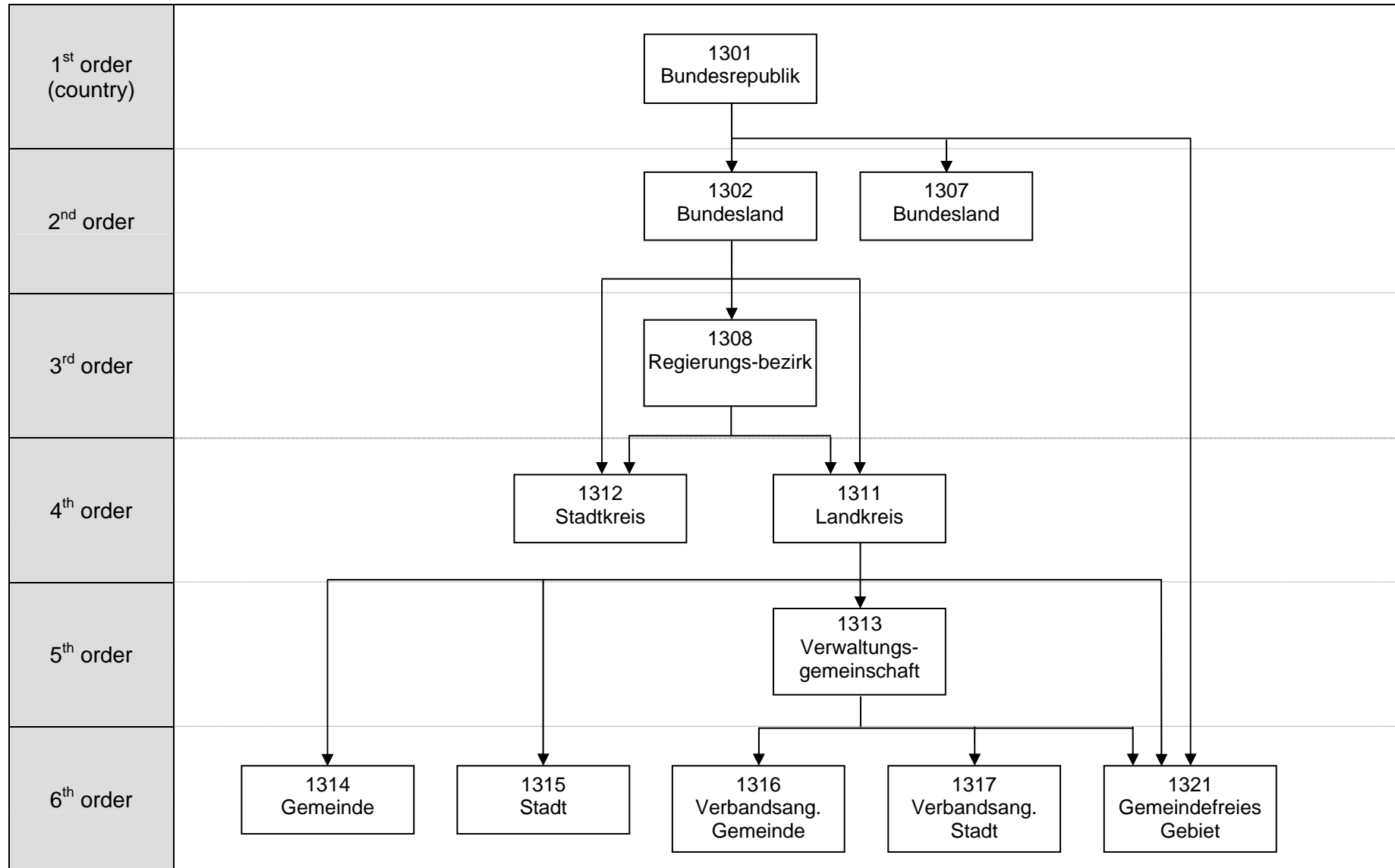
- a) Test purpose: Verify that a dataset is conformant with the INSPIRE data specification *Administrative units*
- b) Test method:
 - Conceptual consistency – does the dataset adhere to the application schema.*
Inspect the data specification for *Administrative units* and check that the data set is in conformance with the application schema described in the data specification for *Administrative units*
 - Requirements for Administrative Units.*
Inspect the data specification for *Administrative units* and check that the data set are in conformance with the listed requirements.
- c) Reference: INSPIRE data specification for *Administrative units*.
- d) Test Type: Basic test.

Annex B Correspondence between national administrative levels and NUTS-levels (2007)

	country-level	2nd order	3rd order	4th order	5th order	6th order
BE	ÉtatFédéral	Région (NUTS1) 3	Province (NUTS2) 10	Arrondissement (NUTS3) 43	Commune, Gemeente (LAU2) 589	
BG	Държава	Област (NUTS3) 28	Община (LAU1) 264	Землище (~ LAU2) 4623		
CZ	Stát (NUTS1)	Kraj (NUTS3) 14	Okres (LAU1) 76	Obec (LAU2) 6249		
DK	Kongeriget (NUTS1)	Sysler (NUTS2) 6	Kommuner (LAU1) 99			
DE	Bundesrepublik	Bundesland (NUTS1) 16	Regierungsbezirk (~ NUTS2) 22	Landkreis, Stadtkreis (NUTS3) 437	Verwaltungsgemeinschaft (LAU1) 1471	Gemeinde, Stadt (~LAU2) 12458
EE	Vabariik (NUTS1, NUTS2)	Maakond (LAU1) 15	Linn, Vald (LAU2) 226			
IE	Republic (NUTS1)	Euregion (NUTS2) 2	Regional Authority (NUTS3) 8	County (LAU1) 34	Electoral Division (LAU2) 3441	
GR	Ελληνική Δημοκρατία	Περιφέρεια (NUTS2) 13	Νομός (~ NUTS3) 55	Δήμος/Κοινότητα (LAU1) 1034		
ES	Reino	Comunidad Autónoma (NUTS2) 17	Provincia (~ NUTS3) 50	Término Municipal, Ciudad Autónoma (+Condominio) (~ LAU2) 8108 (+84)		
FR	République	Région (NUTS2) 26	Département (NUTS3) 100	Arrondissement 342	Canton de rattachement (~ LAU1) 3806	Commune (+Zone d'eau) (~ LAU2) 36702 (+2)
IT	Repubblica	Regione (NUTS2) 20	Provincia (NUTS3) 107	Comune (LAU2) 8101		
CY	Δημοκρατία (NUTS1, NUTS2, NUTS3)	Επαρχία (LAU1) 6	Δήμος/Κοινότητα (LAU2) 611			
LV	Republika (NUTS1, NUTS2)	Republikas pilsēta, Rajons (LAU1) 33	Pagasts, Pilsētas lauku teritorija, Novads, Rajona pilsēta (LAU2) 523			
LT	Respublika	Apskritis 10	Rajono 62	Seniūnija, Seniūnija 516		

	(NUTS1, NUTS2)	(NUTS3)		savivaldybė, Miesto savivaldybė, Savivaldybė (LAU1)		(m.sav.) (LAU2)					
LU	Grand-Duché (NUTS1,NUTS2, NUTS3)	Canton (LAU1)	12	Commune (LAU2)	116						
HU	Ország	Régió (NUTS2)	7	Megye (NUTS3)	20	Kistérség (LAU1)	168	Település (~ LAU2)	3167		
MT	Repubblika (NUTS1, NUTS2)	Kunsilli Locali (LAU2)	68								
NL	Land	Provincie (NUTS2)	12	Gemeente (~ LAU2)	458						
AT	Republik	Bundesland (NUTS2)	9	Bezirkshaupt- mannschaft	98	Gemeinde (LAU2)	2358				
PL	Państwo	Województwo (NUTS2)	16	Powiat (LAU1)	379	Gmina (LAU2)	2478				
PT	República	Continente, Região Autónoma (NUTS1)	3	Distrito, Ilha	29	Concelho (LAU1)	308	Freguesia (LAU2)	4260		
RO	Țara	Minicipiul București, Județ (NUTS3)	42	Sector, Municipiu, Oraș, Comună (~ LAU2)	3160						
SI	Država (NUTS1)	Občina (LAU2)	210	Naselje	6005						
SK	Republika (NUTS1)	Kraj (NUTS3)	8	Okres (LAU1)	79	Obec (LAU2)	2928				
FI	Tasavalta,Republik	Lääni, Län	6	Maakunta, Landskap (NUTS3)	20	Kunta, Kommun (~ LAU2)	431				
SE	Kungarike	Län (NUTS3)	21	Kommun (LAU2)	290			-			
UK:	United Kingdom	Great Britain	1	Country	3	Metropolitan District, County, Unitary Authority, London Borough	264	District, Council	239	Electoral Division,Ward (~ LAU2)	10658

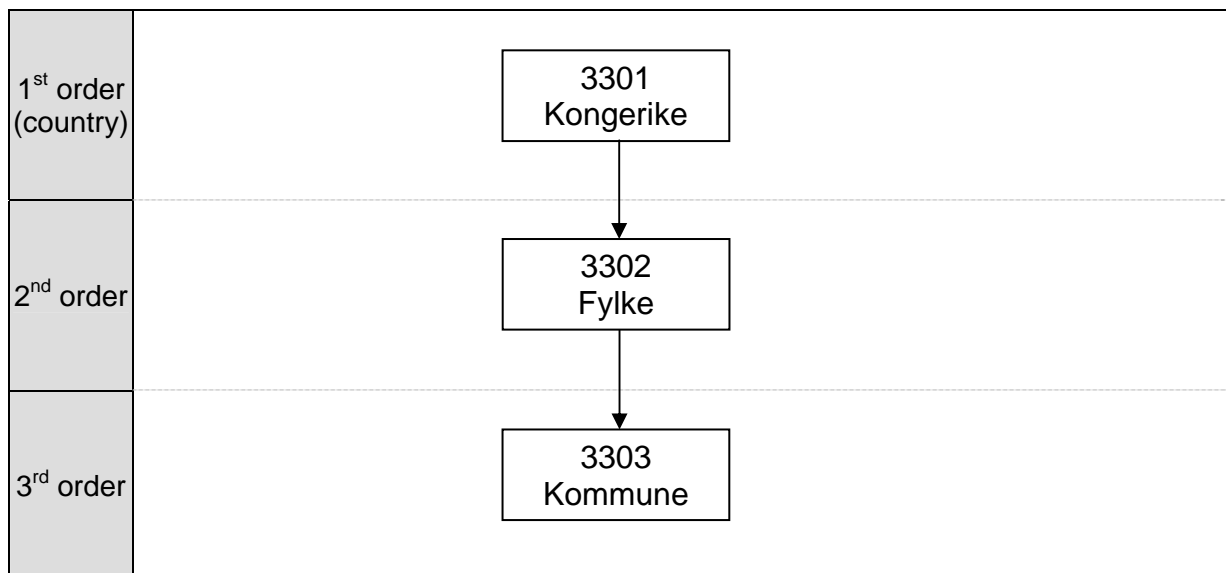
Correspondence between national administrative levels from country level to 6th order level and NUTS/LAU-levels (2007), number of units of administrative levels has been derived from data/metadata delivered by National Mapping and Cadastral Agencies for EuroGeographics EuroBoundaryMap v2.0 product (2007), table has been established by EBM-manager and approved by Eurostat in August 2008



(taken from German lineage file for EBM v2.0)

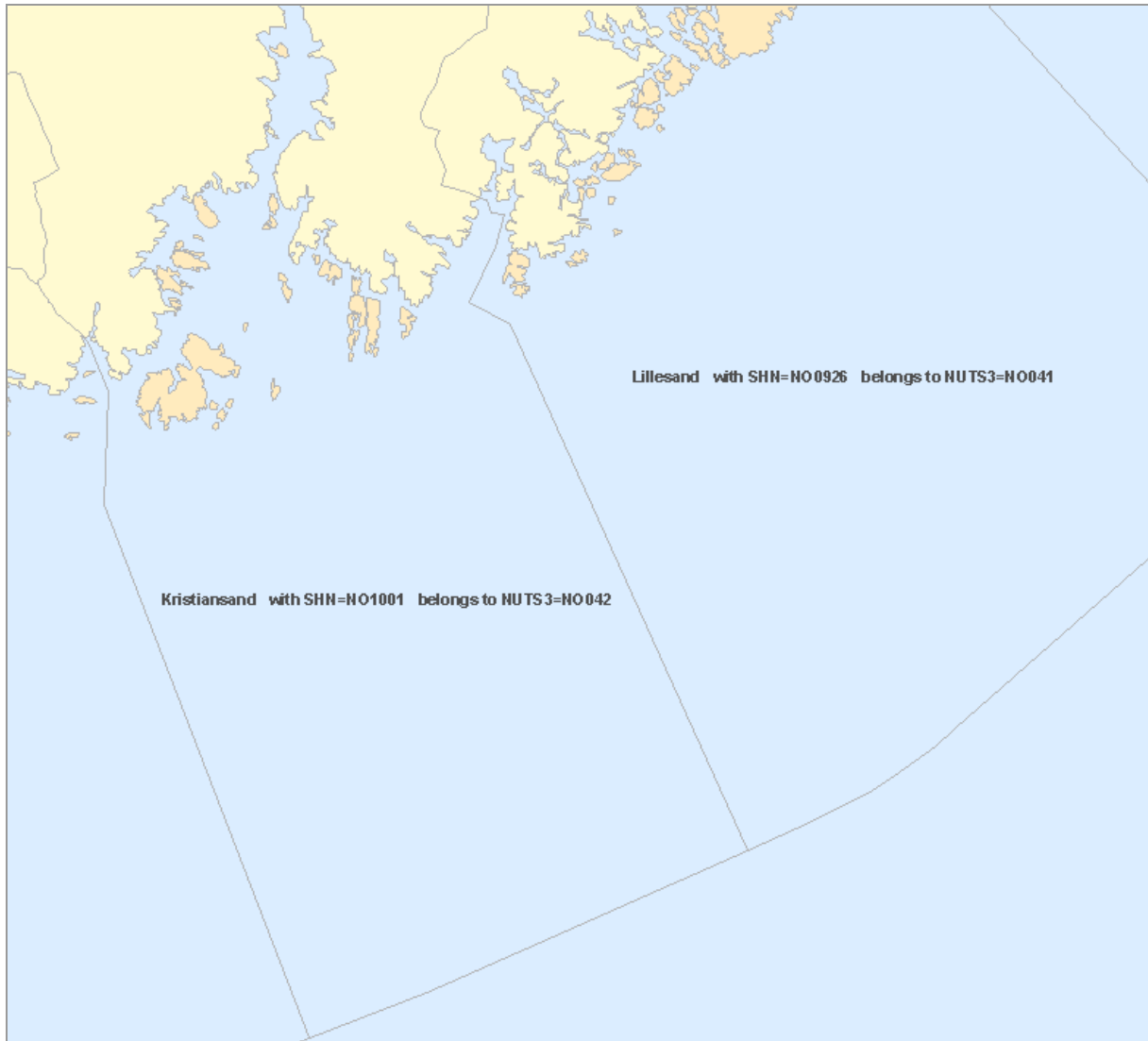
Norway (NO)						
Level of administration	Unique structure identifier	Designation of the hierarchy level given in national characters	Designation of the hierarchy level transliterated in ASCII characters	English translation or equivalent of the designation	Significant digits of the SHN code	Number of objects
USE	ISN	DESN	DESA			
1 st order (country)	3301	Kongerike	Kongerike	Country	2	1
2 nd order	3302	Fylke	Fylke	County	4	19
3 rd order	3303	Kommune	Kommune	Municipality	6	430

	USE1		USE2		USE3	
SHN	N	O				



(taken from Norwegian lineage file for EBM v2.0)

Annex D Administrative units consisting of different areas



AdministrativeUnitLowestLevel composed of main area (on land), branch areas (islands) and coastal water, i.e. administrative units have been defined stretching into the sea for Norway