New technical specifications for the national cartography

Directorate-General for the Territory

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New technical specifications for the national cartography

The need for this review was mostly driven by :

- the current users' needs;
- the new technological developments, which significantly changed the way how we use and explore geographic information nowadays;
- the need to align the national technical specifications to the standards and rules defined by the INSPIRE Directive.

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New technical specifications for the national cartography

Roadmap:

- Decision on the need to reformulate the technical specifications of cartography;
- Establishment of a work team;
- Consultation of external experts;
- Cartography of other European countries;
- Analysis of other adaptations to the INSPIRE Directive;
- ➢ 1st version of the technical specifications document;
- Interaction with data producers (e.g. central and local public administration, private sector) and academy;
- Consultation with the user community;
- Final version of the technical specifications document;
- Capacity building and awareness sessions for the user community.

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New technical specifications for the national cartography

Directorate-General for the Territory multidisciplinary team, with expertise in:

- The elaboration of cartography technical specifications;
- The verification and validation of spatial data;
- The preparation of technical advice on the cartography used in the territorial management documents;
- INSPIRE Directive;
- Web services;
- Adapting spatial data sets to the INSPIRE specifications.

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New technical specifications for the national cartography

Consultation of external experts

Several meetings with external experts coming from the:

- Local Public Administration;
- Central Public Administration;
- Academy;
- Private sector.

Main topics discussed:

- Analysis of the data model;
- Characteristics of the feature catalogue;
- Characteristics of the Cartography Model – model for visual representation of spatial data.

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New technical specifications for the national cartography

General guidelines for the national cartography:

- Revision and global reorganization of the feature catalogue and creation of a dictionary that characterizes the several features;
- Definition of clear rules for the acquisition and representation of each feature;
- Take into account that the Local Public Administration identifies that the main themes are the transports and hydrographic networks and also the buildings;
- The multicodification model of the current specifications should no longer be considered;
- The solution to be implemented must be supported by open source software and include the formats PostgreSQL/PostGis, Shapefile and Dwg;
- A specific and simple model should be considered for printing;
- The new technical specifications must take into account the procedures for updating the spatial data;

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Current technical specifications

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Current technical specifications

Data model structured with multi-codes

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NOME DO FICHEIRO

XXX_XHID

Modelo Numérico Topográfico para a Cartografia 1:10 000

DIMENSÃO 2D

CÓDIGO					CARACTERISTICAS GRÁFICAS DO ELEMENTO					REPRESENTAÇÃO	Nome do	OBSERVAÇÕES
Dom	Sub	Fam	Obj		TIPO objetO	NÍVEL	Tipo Linha	ESPESSURA	COR	Gráfica	Símbolo Pontual	
12				HIDROGRAFIA								
	01			NASCENTES E CURSOS DE ÁGUA								
		01		NASCENTES								
12	01	01	01	NASCENTE A CÉU ABERTO	PONTO	1	0	0	39	Símbolo pontual	NASCAB	
12	01	01	02	NASCENTE MINERAL A CÉU ABERTO	"	1	0	0	55	"	NMCA	
12	01	01	05	MÃE DE ÁGUA	"	2	0	0	71	"	MAGUA	
		02		RIOS								
12	01	02	03	EIXO DO RIO NAVEGÁVEL OU FLUTUÁVEL	LINHA	40	4	0	1	POLIGONAL		
12	01	02	04	EIXO DO RIO NÃO NAVEGÁVEL NEM FLUTUÁVEL	"	41	4	0	1	POLIGONAL		
		03		CANAIS								
12	01	03	00	CANAIS EM GERAL	LINHA	10	0	0	87	POLIGONAL		
		05		AQUEDUTOS								
12	01	05	01	AQUEDUTO SUPERFICIAL	LINHA	12	0	0	18	POLIGONAL		
12	01	05	03	AQUEDUTO SOBRE ARCADAS OU PILARES	"	12	0	0	39	"		
12	01	05	04	AQUEDUTO SUBTERRÂNEO	"	12	2	0	55	"		
		06		RIBEIRAS (LINHAS DE ÁGUA)								
12	01	06	03	EIXO DA LINHA DE ÁGUA	LINHA	43	2	0	47	POLIGONAL		
12	01	06	04	EIXO DA RIBEIRA	"	42	2	0	247	POLIGONAL		
		07		VALAS								
12	01	07	01	VALA	LINHA	13	0	0	39	POLIGONAL		
		08		FORMAS ESPECIAIS								
12	01	08	02	QUEDA DE ÁGUA	PONTO	4	0	0	18	Símbolo pontual	QAGUA	

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Current technical specifications

Data model structured with multi-codes

Dom	Sub	Fam	Obj	
12				**HIDROGRAFIA**
	01			**NASCENTES E CURSOS DE ÁGUA**
		01		**NASCENTES**
12	01	01	01	NASCENTE A CÉU ABERTO
12	01	01	02	NASCENTE MINERAL A CÉU ABERTO
12	01	01	05	MÃE DE ÁGUA
		02		**RIOS**
12	01	02	03	EIXO DO RIO NAVEGÁVEL OU FLUTUÁVEL
12	01	02	04	EIXO DO RIO NÃO NAVEGÁVEL NEM FLUTUÁVEL
		03		**CANAIS**
12	01	03	00	CANAIS EM GERAL

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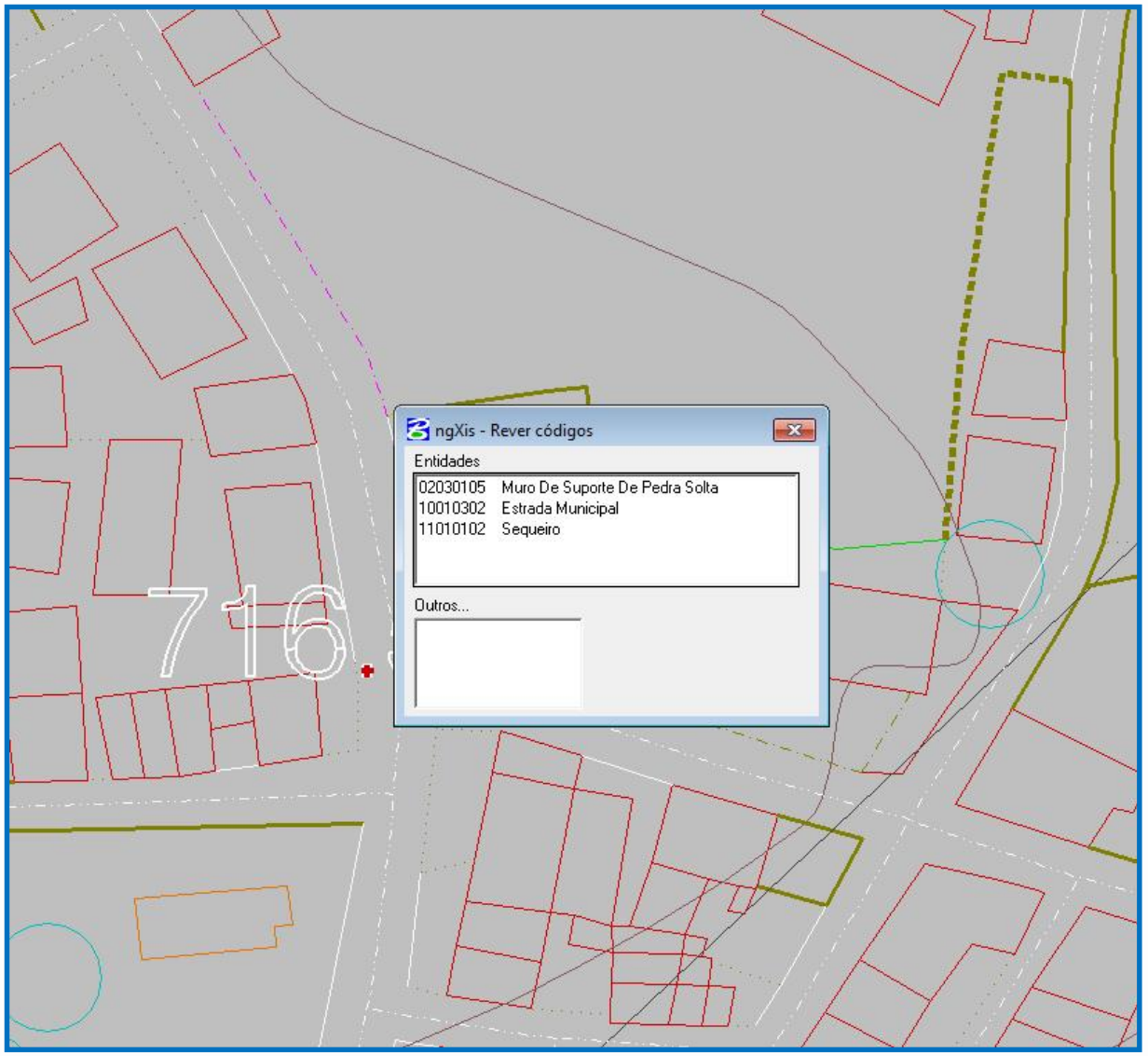
Current technical specifications

Data model structured with multi-codes



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Current technical specifications

Data model structured with multi-codes

Main characteristics:

- Initially designed for a CAD environment;
- Possible later conversion of the spatial data to *shapefiles* or to geographic databases;
- Rules for the creation of a cartographic model for visual interpretation or for possible graphic printing.

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Process of Restructuring the Technical Specifications of Cartography

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Restructuring Process

- Reformulate the feature catalogue taking into account INSPIRE;
- Create a dictionary for the feature catalogue;
- Define the Digital Terrain Model specifications;
- Define the Orthophotos specifications;
- Define the characteristics for the cartographic model (model for visual interpretation or eventual printing)

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INSPIRE Directive

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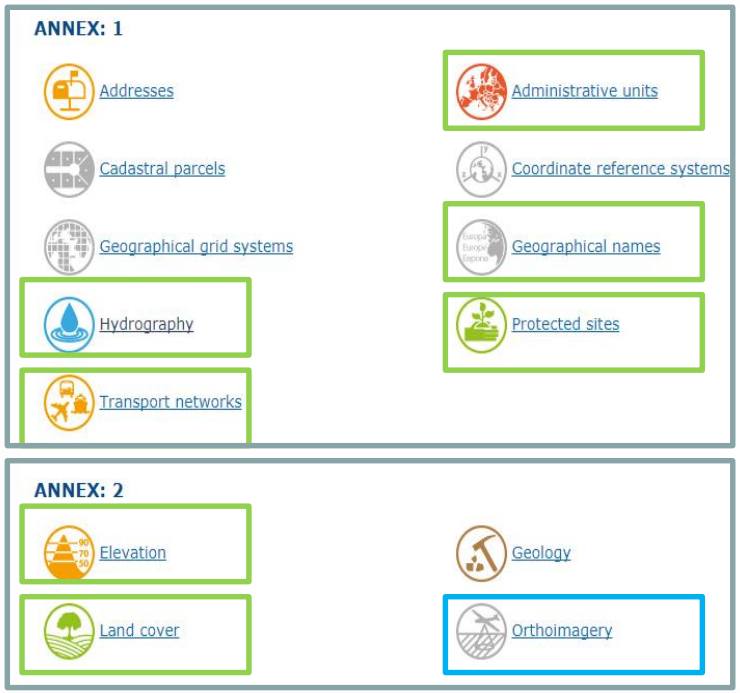
INSPIRE Themes



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Restructuring the Feature Catalogue

INSPIRE Themes to consider

Annex I

GN	Geographical Names
TN	Transport networks
HY	Hydrography
PS	Protected Sites
AU	Administrative Units

Annex II

EL	Elevation
LC	Land Cover
OI	Orthoimagery

Annex III

BU	Buildings
PF	Production and industrial facilities
US	Utility and governmental services

Around 75% of the features are in 5 main themes

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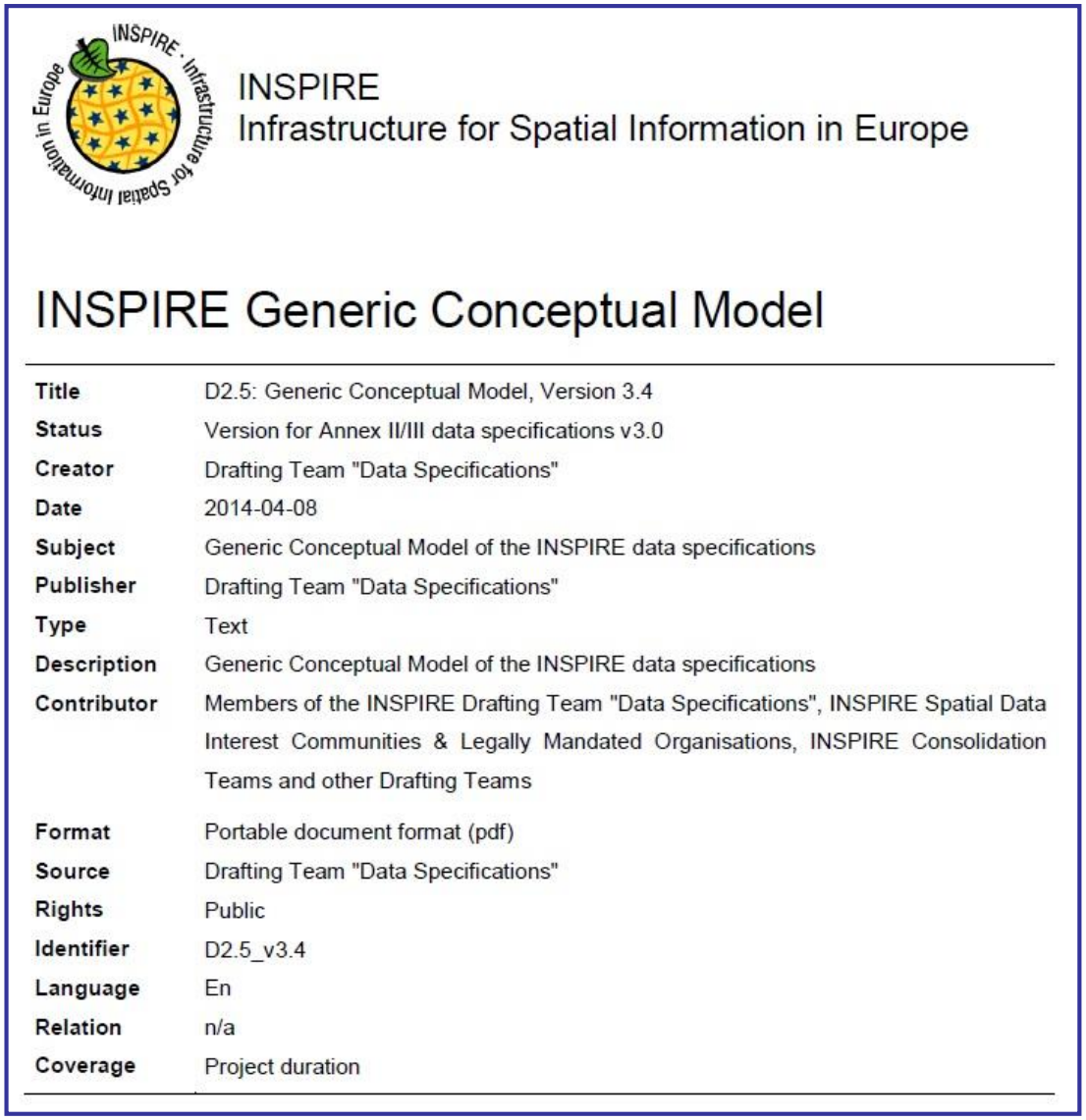
INSPIRE Documents analyzed

INSPIRE Conceptual Model



INSPIRE
Infrastructure for Spatial Information in Europe

INSPIRE Generic Conceptual Model

Title	D2.5: Generic Conceptual Model, Version 3.4
Status	Version for Annex II/III data specifications v3.0
Creator	Drafting Team "Data Specifications"
Date	2014-04-08
Subject	Generic Conceptual Model of the INSPIRE data specifications
Publisher	Drafting Team "Data Specifications"
Type	Text
Description	Generic Conceptual Model of the INSPIRE data specifications
Contributor	Members of the INSPIRE Drafting Team "Data Specifications", INSPIRE Spatial Data Interest Communities & Legally Mandated Organisations, INSPIRE Consolidation Teams and other Drafting Teams
Format	Portable document format (pdf)
Source	Drafting Team "Data Specifications"
Rights	Public
Identifier	D2.5_v3.4
Language	En
Relation	n/a
Coverage	Project duration

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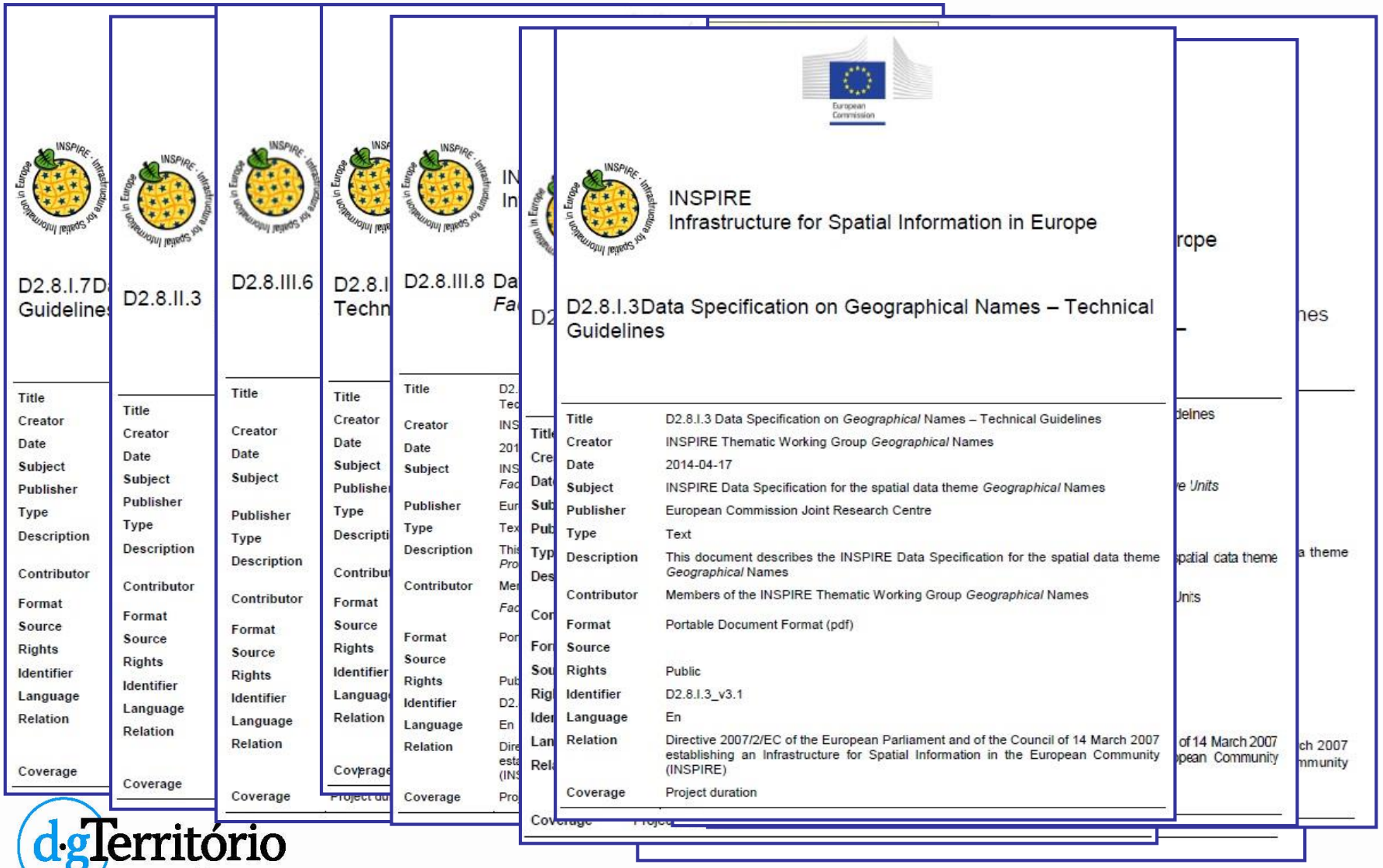
INSPIRE Documents analyzed

Data Specification – Technical Guidelines



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INSPIRE Documents analyzed

Data Specification – Technical Guidelines

Strategy

- Study in detail the Application Schemas of each theme :
  - Analysis of UML diagrams;
  - Analysis of the Feature catalogues, their attributes and enumerations
- Establish a relationship between the current model of technical specifications and the models for each theme of the INSPIRE Directive.

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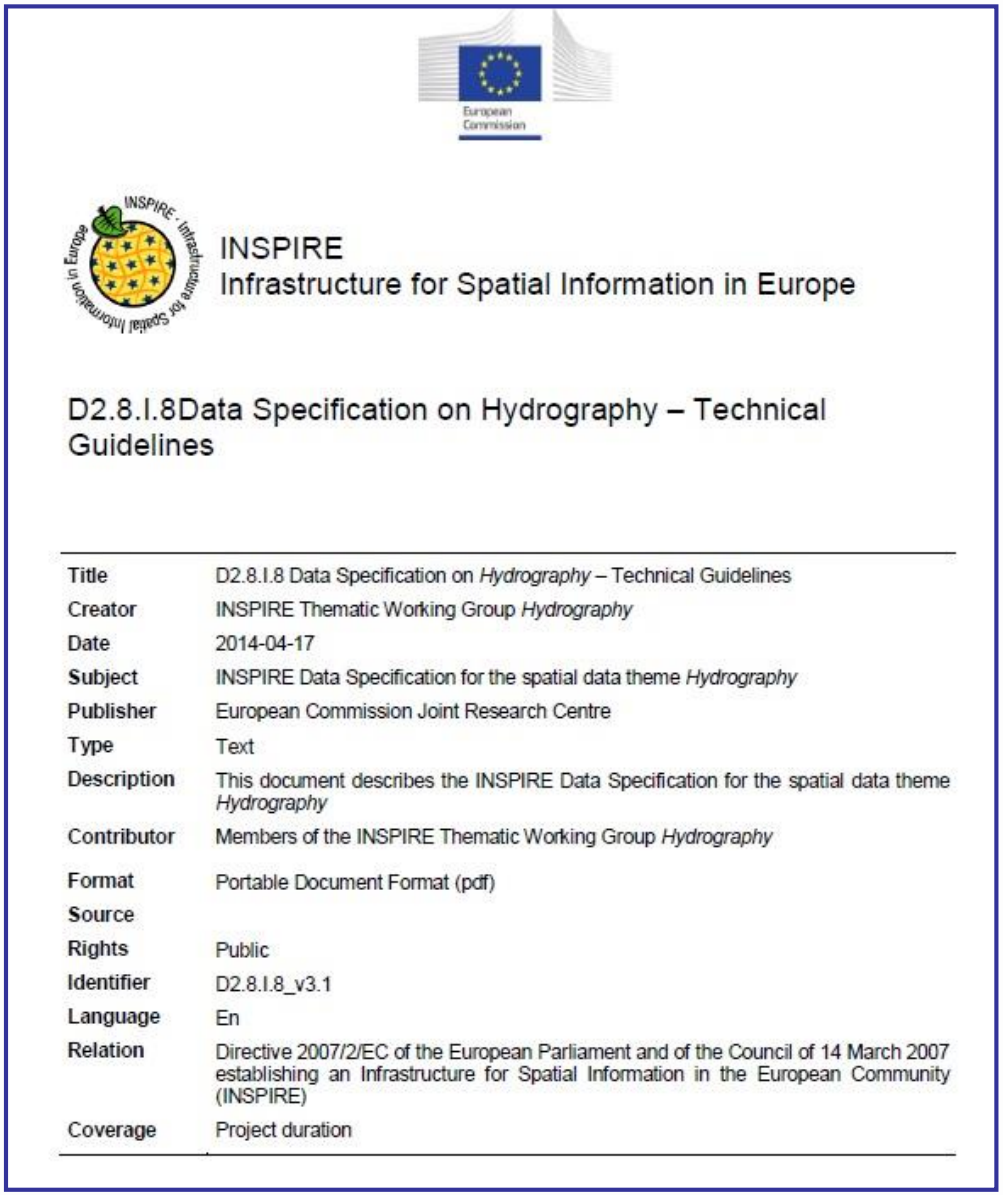
INSPIRE Documents analyzed

*Data Specification – Technical Guidelines - **Hydrography***



INSPIRE
Infrastructure for Spatial Information in Europe

D2.8.I.8Data Specification on Hydrography – Technical Guidelines

Title	D2.8.I.8 Data Specification on *Hydrography* – Technical Guidelines
Creator	INSPIRE Thematic Working Group *Hydrography*
Date	2014-04-17
Subject	INSPIRE Data Specification for the spatial data theme *Hydrography*
Publisher	European Commission Joint Research Centre
Type	Text
Description	This document describes the INSPIRE Data Specification for the spatial data theme *Hydrography*
Contributor	Members of the INSPIRE Thematic Working Group *Hydrography*
Format	Portable Document Format (pdf)
Source	
Rights	Public
Identifier	D2.8.I.8_v3.1
Language	En
Relation	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)
Coverage	Project duration

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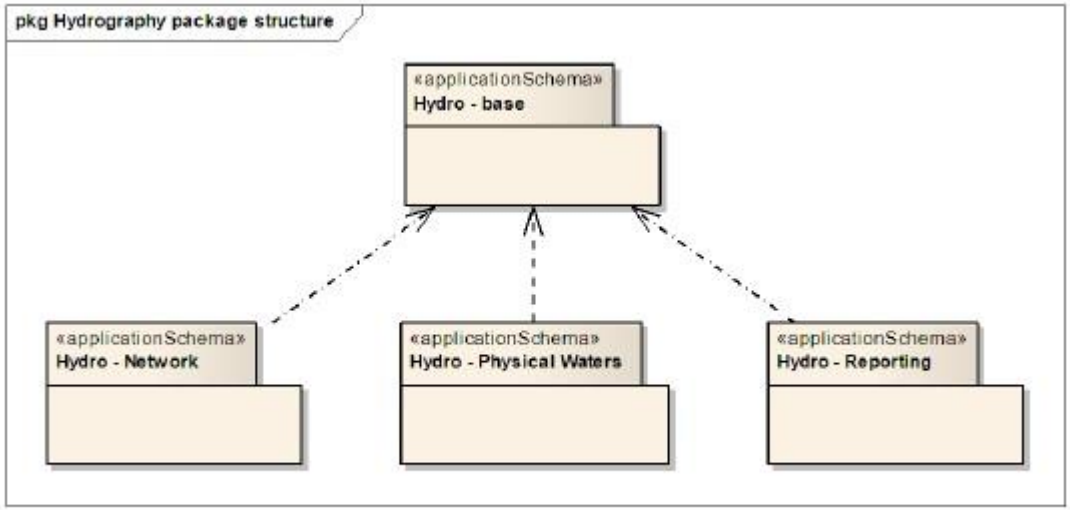
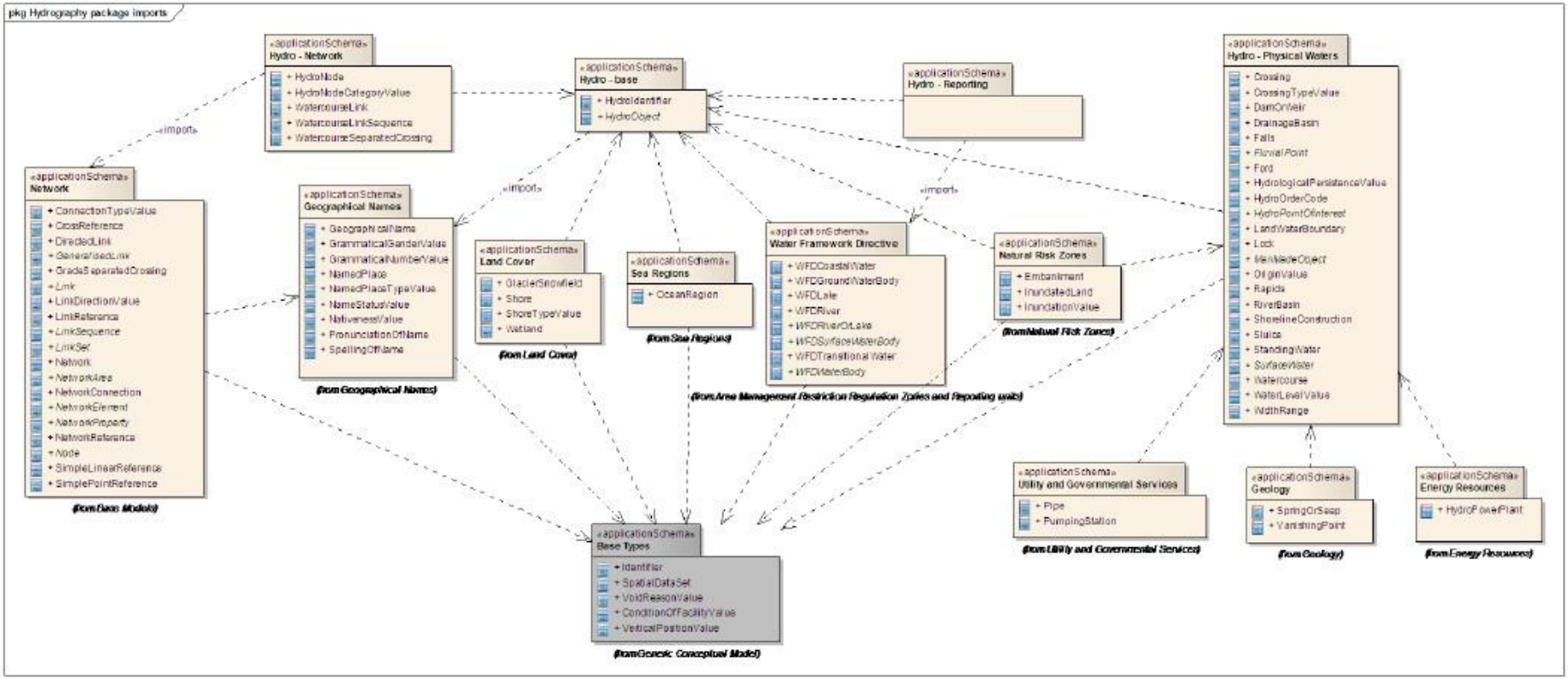
Application Schemas - Hydrography



Package structure of the Hydrography application schemas

Application Schemas - Hydrography

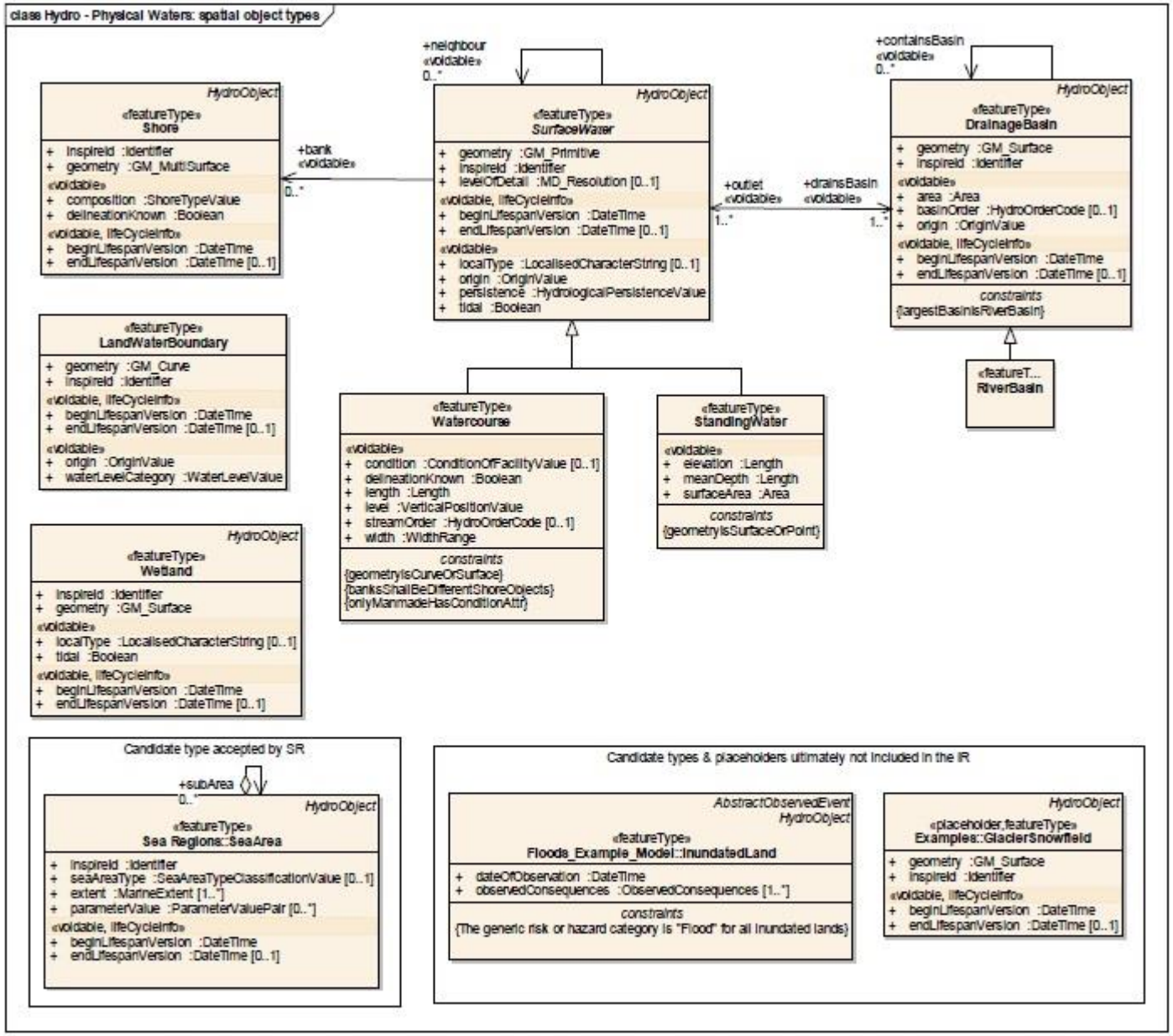


Package relationships in the Hydrography application schemas

Data Specification Technical Guidelines

Application Schemas –

Hydrography (*Phisical Waters*) UML Diagram



UML class diagram: 'Physical Waters' spatial object types (including related classes from other themes)

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Data Specification Technical Guidelines

Application Schemas –

Hydrography (*Phisical Waters*) Feature Catalogue

5.5.2 Feature catalogue

Feature catalogue metadata

Application Schema	INSPIRE Application Schema Hydro - Physical Waters
Version number	3.0

Types defined in the feature catalogue

Type	Package	Stereotypes
Crossing	Hydro - Physical Waters	«featureType»
CrossingTypeValue	Hydro - Physical Waters	«codeList»
DamOrWeir	Hydro - Physical Waters	«featureType»
DrainageBasin	Hydro - Physical Waters	«featureType»
Embankment	Hydro - Physical Waters	«featureType»
Falls	Hydro - Physical Waters	«featureType»
FluvialPoint	Hydro - Physical Waters	«featureType»
Ford	Hydro - Physical Waters	«featureType»
HydroOrderCode	Hydro - Physical Waters	«dataType»
HydroPointOfInterest	Hydro - Physical Waters	«featureType»
HydrologicalPersistenceValue	Hydro - Physical Waters	«codeList»
LandWaterBoundary	Hydro - Physical Waters	«featureType»
Lock	Hydro - Physical Waters	«featureType»
ManMadeObject	Hydro - Physical Waters	«featureType»
Rapids	Hydro - Physical Waters	«featureType»
RiverBasin	Hydro - Physical Waters	«featureType»
Shore	Hydro - Physical Waters	«featureType»
ShoreTypeValue	Hydro - Physical Waters	«codeList»
ShorelineConstruction	Hydro - Physical Waters	«featureType»
Sluice	Hydro - Physical Waters	«featureType»
StandingWater	Hydro - Physical Waters	«featureType»
SurfaceWater	Hydro - Physical Waters	«featureType»
WaterLevelValue	Hydro - Physical Waters	«codeList»
Watercourse	Hydro - Physical Waters	«featureType»
Wetland	Hydro - Physical Waters	«featureType»
WidthRange	Hydro - Physical Waters	«dataType»

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Data Specification Technical Guidelines

Application Schemas –

Hydrography (*Phisical Waters*) Feature Catalogue

StandingWater	
Subtype of:	SurfaceWater
Definition:	A body of water that is entirely surrounded by land.
Description:	SOURCE [DFDD]. NOTE It may occur in a natural terrain depression in which water collects, or may be impounded by a dam, or formed by its bed being hollowed out of the soil, or formed by embanking and/or damming up a natural hollow (for example: by a beaver dam). It may be connected to inflowing / outflowing watercourses or other standing waters.
Stereotypes:	«featureType»
Attribute: elevation	
Value type:	Length
Definition:	Elevation above mean sea level.
Description:	SOURCE [Based on EuroRegionalMap].
Multiplicity:	1
Stereotypes:	«voidable»
Attribute: meanDepth	
Value type:	Length
Definition:	Average depth of the body of water.
Multiplicity:	1
Stereotypes:	«voidable»
Attribute: surfaceArea	
Value type:	Area
Definition:	Surface area of the body of water.
Multiplicity:	1
Stereotypes:	«voidable»

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Other Documents studied - Analysis of maps from other European countries

Maps from other *National Mapping Agencies* (NMA)

- IGN, Belgium, Top10 Vector
- Land Survey Office, Czech Republic, State Map 1:5000
- National Land Survey, Finland, Basic Map
- Geodesy, Cartography and Cadastre Authority, Slovakia, ZBGIS
- Lantmäteriet , Sweden, GSD-Topographic Map
- Swisstopo, Switzerland, Swiss Map Vector 10
- Kadaster, Netherlands, TOP10N

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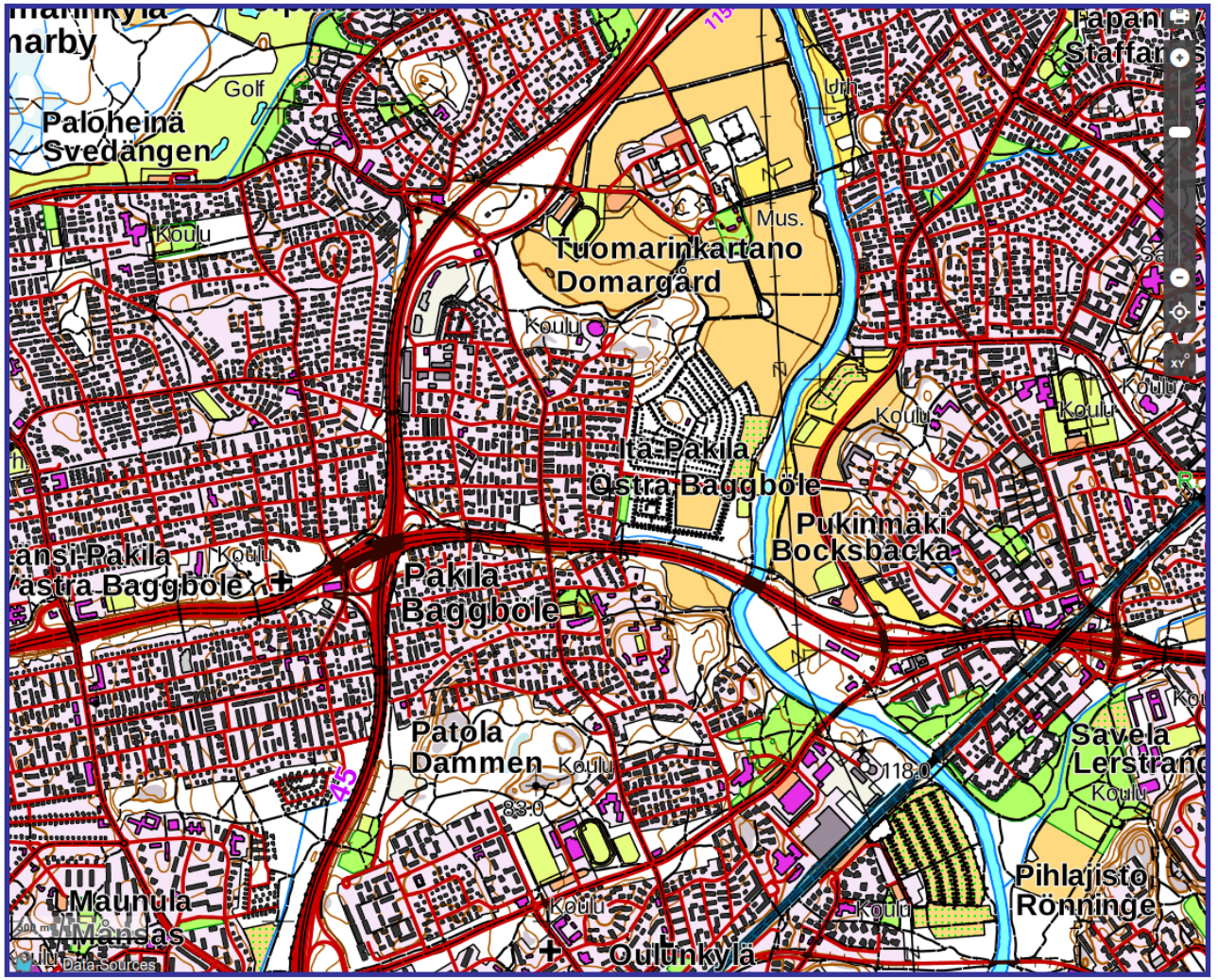
Other Documents studied - Analysis of maps from other European countries

National Land Survey - Finland



Basic Map

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Other Documents studied

Analysis of INSPIRE adaptations done by other entities

- **Spain**

Transformation guide for adapting Spanish spatial data to the INSPIRE specifications

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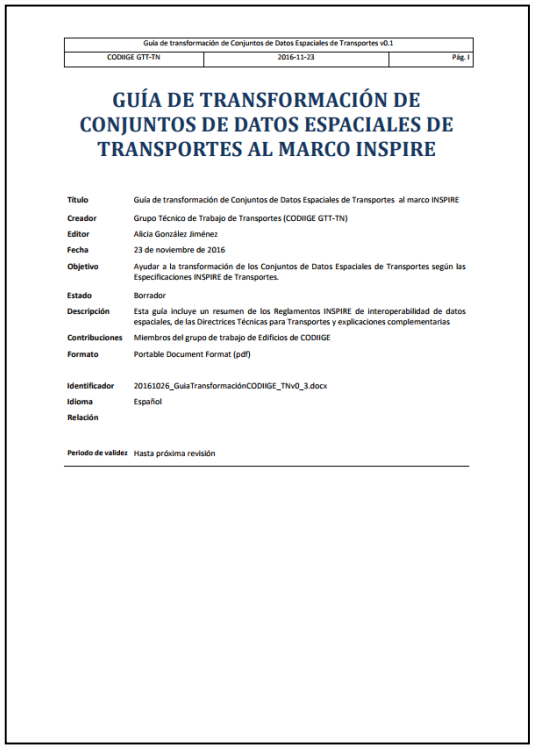
Other Documents studied

Analysis of INSPIRE adaptations done by other entities

- **Spain**

Transformation guide for adapting Spanish spatial data to the INSPIRE specifications – a guide by INSPIRE theme

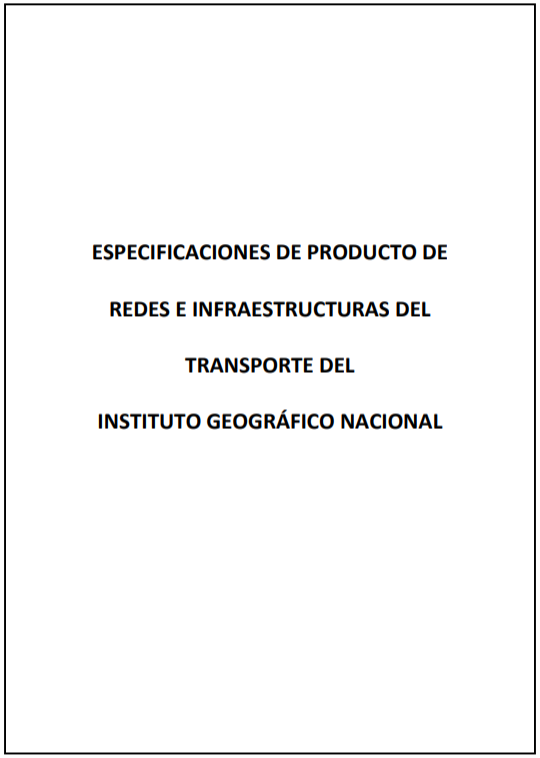


Guía de transformación de Conjuntos de Datos Espaciales de Transportes v0.1

CODIIGE GTT-TN | 2016-11-23 | Pág. I

GUÍA DE TRANSFORMACIÓN DE CONJUNTOS DE DATOS ESPACIALES DE TRANSPORTES AL MARCO INSPIRE

Título	Guía de transformación de Conjuntos de Datos Espaciales de Transportes al marco INSPIRE
Creador	Grupo Técnico de Trabajo de Transportes (CODIIGE GTT-TN)
Editor	Alicia González Jiménez
Fecha	23 de noviembre de 2016
Objetivo	Ayudar a la transformación de los Conjuntos de Datos Espaciales de Transportes según las Especificaciones INSPIRE de Transportes.
Estado	Borrador
Descripción	Esta guía incluye un resumen de los Reglamentos INSPIRE de interoperabilidad de datos espaciales, de las Directrices Técnicas para Transportes y explicaciones complementarias
Contribuciones	Miembros del grupo de trabajo de Edificios de CODIIGE
Formato	Portable Document Format (pdf)
Identificador	20161026_GuiaTransformaciónCODIIGE_TNv0_3.docx
Idioma	Español
Relación	
Periodo de validez	Hasta próxima revisión

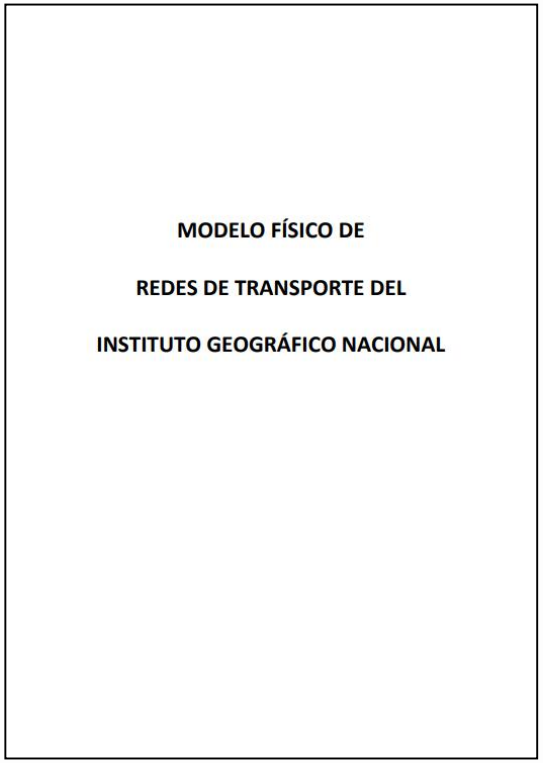


ESPECIFICACIONES DE PRODUCTO DE

REDES E INFRAESTRUCTURAS DEL

TRANSPORTE DEL

INSTITUTO GEOGRÁFICO NACIONAL



MODELO FÍSICO DE

REDES DE TRANSPORTE DEL

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New Technical Specifications

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New technical specifications

Spatial Data format

Data in spatial databases – open source format **PostgreSQL/PostGIS**

Main Advantages

- more suitable for applying the INSPIRE data models;
- closer to have a centralized and national database with spatial data.

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New specifications – Data Model structure

Data Model structured by:

- Theme
- Feature

The spatial data will be structured by theme and organized as follows:

Theme Name
    Feature Name

The specifications will de defined for two degrees of detail

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New Technical Specifications – Themes

Themes:

Themes
Geodetic Network
Administrative Units
Geographical names
Transports network
Hydrography
Elevation
Land Cover
Buildings
Production and Industrial Facilities
Utility and Governmental Services
Points of interest

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New Technical Specifications – Themes

Theme : Elevation

Feature	Geometry	Dimension
Contour Line	Line	3D
Spot Height	Point	3D
Breakline	Line	3D

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New Technical Specifications – Themes

Theme : Elevation Feature: Contour Line **Main Attributes**

Contour Type	
Value	**Description**
1	Master
2	Ordinary
3	Auxiliary

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New Technical Specifications – Themes

Theme : Buildings

Feature	Geomety	Dimension
Building	Poligon	2D
Linear Constructions	Line	2D
Other Poligon Constructions	Poligon	2D

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New Technical Specifications – Themes

Theme : Buildings Feature: Building **Main Attributes**

Current Use *		Building Nature		Name
Value	Description	Value	Description	Value
1	residencial	1	arch	Free text
11	Individual Residence	2	bunker	
12	Colective Residence	3	canopy	
13	residenceForCommunities	4	caveBuilding	
2	agriculture	5	chapel	
3	industrial	6	castle	
4	commerceAndServices	7	church	
41	office	8	dam	
42	trade	9	greenhouse	
43	publicServices	10	lighthouse	
5	ancilary	11	mosque	
21	*agricultura*	12	shed	
22	*pesca*	13	silo	
31	*indústria extrativa*	14	stadium	
32	*indústria transformadora*	15	storageTank	
44	*turismo*	16	synagogue	
45	*transportes*	17	temple	
46	*comunicações*	18	tower	
47	*parques de estacionamento e interfaces*	19	windmill	
		20	windTurbine	
		21	*palácio*	
		22	*armazém*	
		23	*hangar*	
		24	*espigueiro*	
		25	*azenha*	
		26	*praça de touros*	

*** Only the first two hierarchical levels**

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New technical specifications for the national cartography

Conclusion

- The new technical specifications for the national cartography will have a more structured data model, adapted to the current users' needs;

- The spatial data sets obtained with the new technical specifications will be more aligned with the data models defined by the INSPIRE Directive.

Roamap

- Interaction with data producers;
- Consultation with the user community;
- Final version of the technical specifications document;
- Capacity building and awareness sessions for the user community.

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Thank you

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