National Spatial Data Infrastructure

Croatian National Spatial Data Infrastructure Metadata Specification

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Version	Date	Change
1.0	28/11/2011	-
2.0	21/05/2013	Document was modified and revised in terms of content and structure.

Table of contets

1 Introduction

This document is a second version of Croatian NSDI metadata specifications. In relation to the previous one, this version is much more developed and expanded in terms of content and structure. Using practical examples, the document has been made more user-friendly. It provides the basics of UML diagrams. The specifics of the INSPIRE metadata profile in relation to ISO are presented. The ISO, INSPIRE and Croatian NSDI metadata profiles are compared to one another. The document is extended with ISO UML metadata diagrams and data glossaries, and serves as a comprehensive document for defining metadata profiles. The code lists required for the Croatian NSDI metadata profile are listed. A list of Croatian NSDI coordinate reference systems is created.

Croatian National Spatial Data Infrastructure (NSDI) metadata specification defines the Croatian NSDI metadata elements harmonized with national and international standards. This document is harmonized with the National Spatial Data Infrastructure Act (Official Gazette 56/2013), Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing Spatial information infrastructure in the European Community (*INfrastructure for SPatial InfoRmation in Europe*, INSPIRE), Commission Regulation (EC) no. of 3 December 2008 establishing Directive 2007/2/EC of the European Parliament and of the Council with regard to metadata (OJ L 326, 4/12/2008), and with ISO/TC211 19115, ISO/TC211 19119 and other relevant ISO standards.

The metadata elements described in this document define the basic set of metadata elements according to which metadata for each spatial data resource (dataset, dataset series or service) will be created and connected into Croatian NSDI. Such approach will ensure discovery, view, download and use of spatial data resources, raising the level of interoperability.

2 Normative references

The following documents are essential for the development and implementation of this document:

ISO 19115:2005, Geographic information - Metadata

ISO 19115/Cor.1:2006, Geographic information – Metadata, Technical Corrigendum

ISO 19119:2005, Geographic information - Services

ISO 19119:2005/Amd 1:2008, Extensions of the service metadata model

ISO 19108:2005, Geographic information – Temporal Schema

ISO 639-2, Codes for the representation of names of languages - Part 2: Alpha-3 code

ISO 8601, Data elements and interchange formats - Information interchange - Representation of dates and times

ISO/TS 19139:2007, Geographic information - Metadata – XML Schema Implementation

CSW2 AP ISO, OpenGIS Catalogue Services Specification 2.0.2 - ISO Metadata Application Profile, Version 1.0.0, OGC 07-045, 2007

National Spatial Data Infrastructure Act (OG 56/2013)

Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing Spatial information infrastructure in the European Community (*INfrastructure for SPatial InfoRmation in Europe*, INSPIRE)

Regulation 1205/2008 of the European Commission (EC) of 3 December 2008 establishing Directive 2007/2/EC of the European Parliament and of the Council with regard to metadata (OJ L 326, 4/12/2008)

INSPIRE Metadata Implementation Rules, Technical guidelines based on EN ISO 19115 and EN ISO 19119, version 1.2

IETF RFC1738, Uniform Resource Locators (URL), 1994.

3 Definitions

The following definitions are used in this document:

spatial data
data directly or indirectly linked to a certain position in space or a geographic area

INfrastructure for SPatial InfoRmation in Europe (INSPIRE)
initiative started with a purpose of creating European Union spatial data infrastructure, and is defined by the INSPIRE Directive

interoperability
involves the possibility of combining spatial datasets and the interaction between services, with no repetitive manual intervention, in order to obtain a consistent result and attain the added value of datasets and services

metadata
information describing spatial data sources and enabling their discovery, view and use

metadata element
individual metadata item related to certain metadata resource

electronic information resource
source of information maintained in an electronic or computer format which may be accessed, found and retrieved using an electronic network or other electronic data processing technology

spatial data resource
spatial dataset, spatial dataset series or spatial data services

spatial dataset
uniquely identifiable collection of spatial data

spatial dataset series
spatial datasets created according to same specification

spatial data service
computer operations that can be performed, by calling up a computer application, with spatial data in a spatial dataset or with associated metadata

4 Acronyms and abbreviations

The following acronyms and abbreviations are used in this document:

1D	One-dimensional coordinate system (e.g. height)
2D	Two-dimensional coordinate system (e.g. in projection plane or on ellipsoid surface)
3D	Three-dimensional coordinate system (e.g. space X, Y, Z or ellipsoidal φ, λ, h or compound 2D + 1D)
2D + 1D	Compound coordinate system composed of two-dimensional (2D) and one-dimensional (1D) (height) system (e.g. position on projection plane is determined by plane coordinates on map (E, N – 2D), while heights are determined in independent system using contour lines and elevation (H-1D))
C	Conditional
Cl	CodeList
CSW2 AP ISO	ISO Metadata Application Profile
DCMI	The Dublin Core Metadata Initiative
E, N	Coordinates in projection plane E (Easting - east coordinate), N (Northing – north coordinate)
EDEN	l'Equipe D'Experts en Normalisation
eng	English
EC	European Community
GEMET	General Multilingual Environmental Thesaurus
GeoTIFF	Geo Tagged Image File Format
GK	Gauss-Krüger projection
GMD	Geoscientific Model Development
GML	Geography Markup Language
GN	Geopotential Numbers
GRS80	Geodetic Reference System 1980
h	Geodetic (ellipsoidal) height – height from reference ellipsoid plane to observed point along ellipsoid normal)
H	Height with respect to gravity field (e.g. from geoid plane to observed point along real vertical)
HDKS1901_GK	Croatian National Coordinate System 1901, in Gauss-Krüger projection
HR	Hrvatska
hrv	hrvatski
HTRS96_TM	Hrvatski terestrički referentni sustav za epohu 1996, poprečne Mercatorove projekcije (eng. Transverse Mercator Projection)
IETF	Internet Engineering Task Force
INSPIRE	Infrastructure for Spatial Information in the Europe
ISO	International Organization for Standardization
ISO/TC211	ISO Technical Committee 211
LAEA	Lambert Azimuthal Equal Area Projection
LCC	Lambert Conformal Conic Projection
M	Mandatory
MGI	Militär-Geographische Institut, Vienna

MD	Metadata
MP	metapodaci
N	multiple value
NAP	Normaal Amsterdams Peil (Amsterdam)
NIPP	Nacionalna infrastruktura prostornih podataka
NN	Narodne novine
NSDI	National Spatial Data Infrastructure
OG	Official Gazette
O	obvezan
OGC	Open Geospatial Consortium
PDF	Portable Document Format
TM	Transverse Mercator Projection
TM	Temporal
U	uvjetan
UELN	United European Levelling Network
UML	Unified Modeling Language
URI	Unique Resource Identifier
URL	Uniform Resource Locator
URN	Uniform Resource Name
UTM	Universal Transverse Mercator
XML	eXtensible Markup Language
XPath	XML Path Language
XSD	XML Schema Definition
X, Y	Projection plane coordinates
X, Y, Z	Three-dimensional Cartesian coordinate system coordinates
WGS84	World Geodetic System 1984
ϕ	Geodetic (ellipsoid) latitude
λ	Geodetic (ellipsoid) longitude

5 On metadata

Metadata have been used for a long time, since people started making lists of objects, inventories and phenomena for the purpose of their systematic records and getting an overview of them, resulting in lists, inventories, content catalogues etc. In using spatial data, such as maps in raster or vector format in GIS environment, spatial databases, or when downloading data through a web-service, we often don't know or are not sure who collected the data and when they did it, what the quality of the data is, what coordinate reference system the data are in, what version the data format is or other information on data that allow to be used and interpreted. Such data and their application (e.g. products and services based on them) have a lower value. To avoid these problems, metadata are collected. Metadata are integral part of data and together they make single units. Metadata need to be collected during the collection of data and they need to be updated when data are changed. In other words, important actions related to data have to be documented through metadata.

The word metadata consists of the words 'meta' and 'data'. The prefix 'meta' was used in ancient Greek, meaning 'after' and 'with'. With time, 'meta' came to be used to signify transcendent or supernatural. The Latin word 'data' refers to pieces of information or a set of mutually different objects. Today, the most general definition of metadata is that they are data about data.

Since 1990s, metadata have been understood as machine-readable description. With the development of computers, metadata started to be used systematically, with each data file containing accompanying information about the amount of memory it takes, date of creation, user rights etc. Metadata thus became a general term referring to anything from interests to collections of stamps and sports events during a year. However, describing different types of resources requires different types of metadata and different metadata thematic norms. Inventarisation of everything (knowledge), made possible by metadata, is supported by computers and the amount of information computer systems can store and process, while the development of IT technologies made data sharing an everyday necessity. To be able to use shared data, different groups of users need to know the format of data, their coordinate reference system and other information that can be obtained through metadata catalogues.

There is a clear trend of developing systematic metadata cataloguing (e.g. INSPIRE and national metadata catalogues). To connect different metadata systems, there needs to be some structural link between metadata. INSPIRE was created under a strong influence of ISO metadata standardization, while Croatian NSDI metadata, except national needs, meet the INSPIRE requirements, as well. Each Croatian NSDI metadata element is compared with ISO and INSPIRE metadata, which allows metadata exchange and interoperability.

Harvesting, as an operation allowing downloading metadata from a metadata catalogue, enables linking between catalogues and linking several catalogues with applications, like internet search engines do. The *Dublin Core Metadata Initiative* (DCMI), as a respectable international not profit organization involved in metadata standardization for various professional, thematic and business needs, differentiates between *Dublin Core Metadata Initiative*:

- **Shared term definitions** define metadata interoperability based on shared natural-language definitions. Within an application environment such as an intranet, library system, or repository, participants agree what terms to use for their metadata and how those terms are defined. Most existing metadata applications currently operate at this level of operability.

- **Formal semantic interoperability** defines metadata interoperability based on the shared formal model provided by *Resource Description Framework* (RDF), which is developed to support linked data that are exposed, shared, and connecting pieces of data, information, and knowledge on the Semantic Web using URI and RDF. Over the past two years, big amounts of commercial and public-sector data have been added to a growing linked data cloud. Search engines such as Yahoo have implemented this level of interoperability. Due to a rapid development of *data* clouding, this level of metadata interoperability is undergoing a boost.
- **Description Set syntactic interoperability** defines metadata interoperability through applications compatible with the linked data model and, in addition, share an abstract syntax for validatable metadata records, the "description set".
- **Description Set Profile interoperability** defines metadata interoperability as a process whereby records are exchanged among metadata-using applications following, in addition, a common set of constraints, use the same vocabularies, and reflect a shared model of the world. Levels 3 and 4 are more in the domain of research and development.

Besides the basic role of metadata to describe data, those in the system of INfrastructure for SPatial Information (INSPIRE) or Croatian National Spatial Data Infrastructure (NSDI) also meet a certain functionality, i.e. business model. ISO defines metadata as data on data, which is a general definition. INSPIRE defines metadata as information describing spatial datasets and spatial data services allowing their finding and use. This definition sets the goals for the business model that metadata must achieve (i.e. describe spatial data and find and use spatial data).

5.1 Unified Modelling Language (UML) for metadata

INSPIRE uses ISO metadata standardization to define metadata. INSPIRE metadata have several additional specific conditions in relation to ISO metadata definitions. Croatian NSDI metadata contain the INSPIRE metadata set, which is necessary to ensure interoperability on the European level, with an extension for national, Croatian needs. Croatian NSDI metadata extension in relation to INSPIRE metadata is done within the ISO metadata set.

ISO metadata standards utilize *Unified Modeling Language (UML)* static structural diagrams with *ISO Interface Definition Language* (IDL) and *UML Object Constraint Language* (OCL) as the conceptual scheme language.

5.1.1   UML notations

UML has several forms of notation. UML notations used for metadata are shown in Figure 5.1.
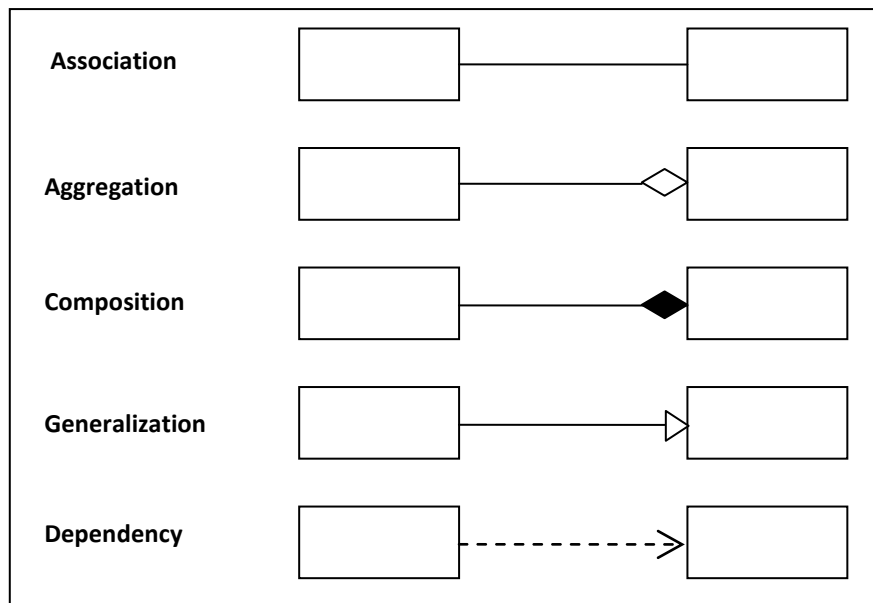
Figure 5.1: UML notation.

5.1.2 UML model relationships

5.1.2.1 Associations

An association is used to describe a relationship between two or more classes. UML defines three different types of relationships: association, aggregation and composition. The three types have different semantics. An ordinary association shall be used to represent a general relationship between two classes, while aggregation and composition association shall be used to create part-whole relationships between two classes. The direction of an association must be specified. If the direction is not specified, it is assumed to be a two-way association. An aggregation association is a relationship between two classes in which one of the classes plays the role of a container and the other plays the role of a containee. A composition association is a strong aggregation. In a composition association, if a container object is deleted, then all of its containee objects are deleted as well.

5.1.2.2 Generalization

A generalization is a relationship between a superclass and the subclasses that may be substituted for it. The superclass is the generalized class, while the subclasses are specified classes.

5.1.2.3 Dependency

A dependency relationship shows that the client class depends on the supplier class/interface to provide certain services, such as:
- Client class accesses a value (constant or variable) defined in the supplier class/interface.
- Operations of the client class invoke operations of the supplier class/interface.
- Operations of the client class have signatures whose return class or arguments are instances of the supplier class/interface.

Dependency represents the act of substituting actual values for the parameters of a parameterized class or parameterized class utility to create a specialized version of the more general item.

5.1.2.4 Roles

If an association is navigable in a particular direction, the model shall supply a "role name" that is appropriate for the role of the target object in relation to the source object. Thus in a two-way association, two role names will be supplied. Figure 5.2 represents how role names and cardinalities are expressed in UML diagrams.
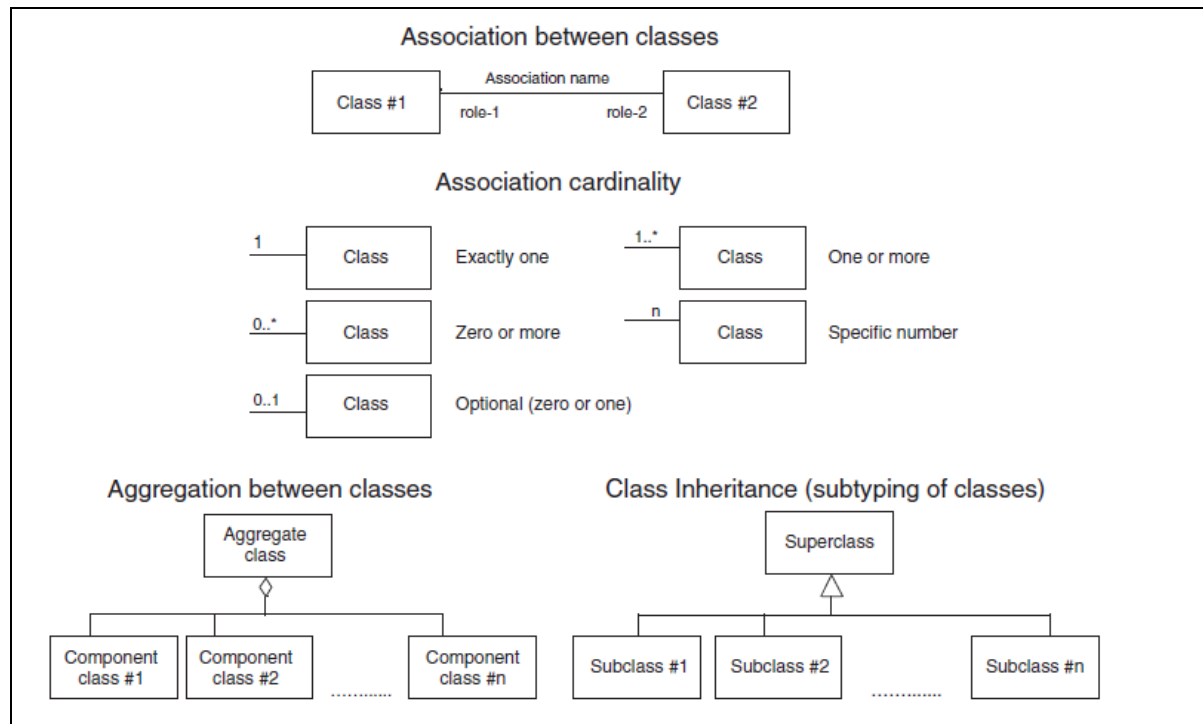
Figure 5.2: UML roles.

5.1.3 UML model stereotypes

A UML stereotype is an extension mechanism for existing UML concepts. It is a model element that is used to classify (or mark) other UML elements so that they in some respect behave as if they were instances of new virtual or pseudo metamodel classes whose form is based on existing base metamodel classes. Stereotypes augment the classification mechanisms on the basis of the built-in UML metamodel class hierarchy. Below are brief descriptions of the stereotypes used:

a) <<Type>> class for specification of a domain of instances (objects), together with the operations applicable to the objects. A type may have attributes and associations.

b) <<Enumeration>> data type whose instances forms list of named literal values. Both the enumeration name and its literal values are declared. Enumeration means a short list of well-understood potential values within a class.

c) <<DataType>> a description of a set of values that lack identity and whose operations do not have side effects. Data types include primitive pre-defined types and user-definable types. Pre-defined types include numbers, string and time.

d) <<CodeList>> used to describe a more open enumeration. Code lists are useful for expressing a list of potential values. If the elements of the list are completely known, enumeration should be used. If only likely values of the elements are known, a code list should be used.

e) <<Union>> describes a selection of one of the specified types. This is useful to specify a set of alternative classes/types that can be used, without the need to create a common super-type/class.

f) <<Abstract>> class (or other classifier) that cannot be directly instantiated.

g) <<Metaclass>> typically use in the construction of metamodels. A metaclass is an object class whose primary purpose is to hold metadata about another class.

h) <<Interface>> named set of operations that characterize the behaviour of an element.

i) <<Package>> cluster of logically related components, containing sub-packages.

j) <<Leaf>> package that contains definitions, without any sub-packages.

6 ISO metadata standardisation

International Organization for Standardisation (ISO) is the international umbrella organisation for standardisation. ISO is divided into *Technical Committees (TCs)*. ISO/TC 211 is in charge of standardising geographic information/geomatics (ISO/TC 211 Geographic information/Geomatics). ISO/TC 211 competences include creating ISO standards and technical specifications bearing the number 19101.

6.1 ISO metadata packages

6.1.1 Metadata packages and relations between entities

Metadata for geographic data are represented by means of UML packages. Each package contains one or more entities (UML classes) that can be specified or generalised. Entities contain elements (UML class attributes) that identify discrete metadata elements. Entities can be aggregated and repeated as needed. Figure 6.1 shows the general overview of a package. Metadata are specified by a UML model diagram and data dictionary for each package .
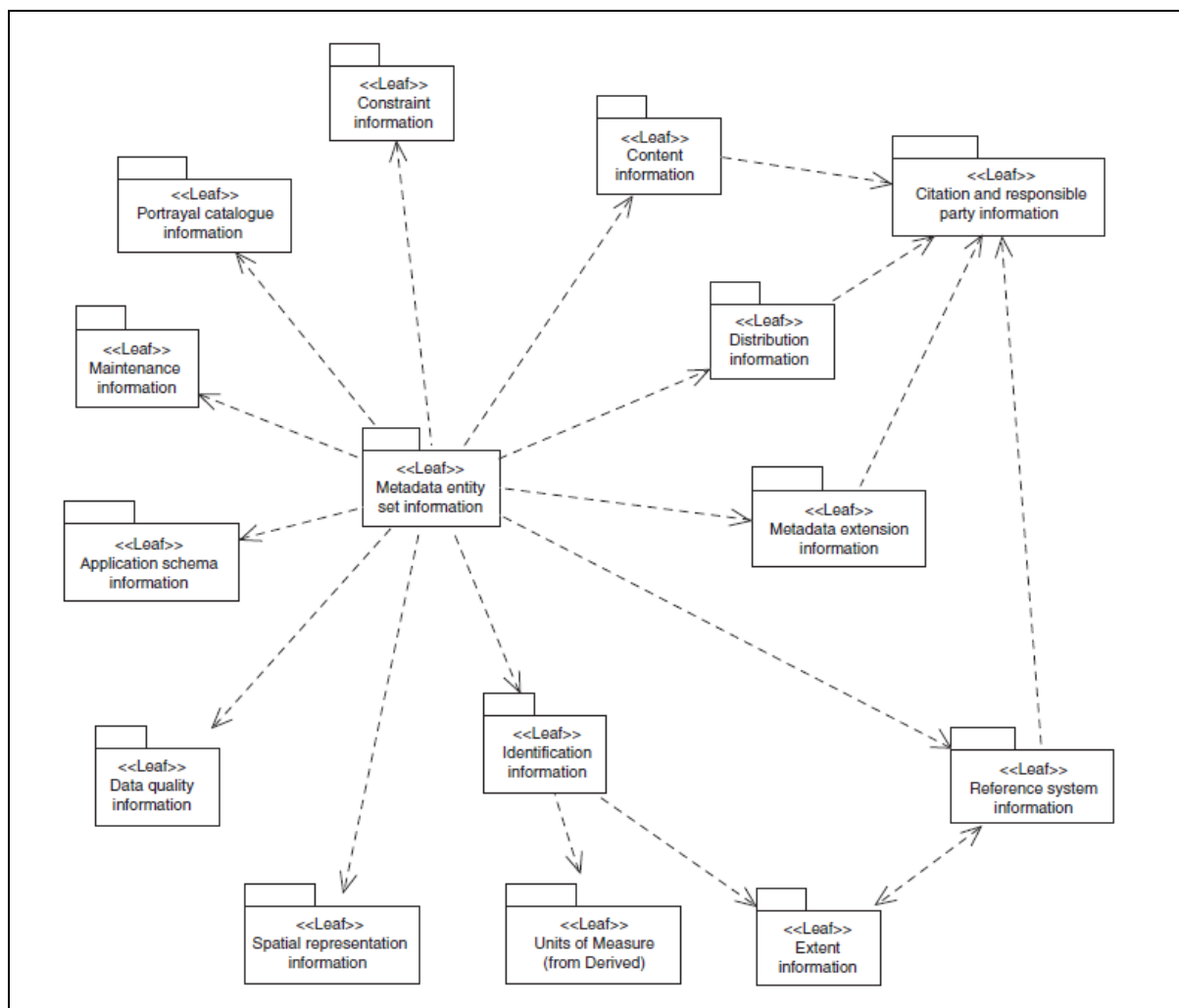
Figure 6.1: Metadata packages.

Relationship between metadata packages and metadata entities are shown in Table 6.1. Metadata packages are shown in column 'Package' and aggregated metadata entities contained within a package are shown in column 'Entity'. Each package includes sub-classes.

Table 6.1: Relationship between metadata packages and metadata entities

Package	Entity
Metadata entity set information	MD_Metadata
Identification information	MD_Identification
Constraint information	MD_Constraints
Data quality information	DQ_DataQuality
Maintenance information	MD_MaintenanceInformation
Spatial representation information	MD_SpatialRepresentation
Reference system information	MD_ReferenceSystem
Content information	MD_ContentInformation
Portrayal catalogue information	MD_PortrayalCatalogueReference
Distribution information	MD_Distribution
Metadata extension information	MD_MetadataExtensionInformation
Application schema information	MD_ApplicationSchemaInformation
Extent information	EX_Extent
Citation and responsible party information	CI_Citation CI_ResponsibleParty

6.1.2   Package abbreviations

Two-letter abbreviations are used to denote the package that contains a class. Those abbreviations precede class names, connected by a "_". List of Abbreviations:

CC   Changing Coordinates (ISO 19111),
CI   Citation (ISO 19115),
CV   Coverage (ISO 19123),
DQ   Data quality (ISO 19115),
DS   Dataset (ISO 19115),
EX   Extent (ISO 19115),
FC   Feature Catalogue (ISO 19110),
FE   Feature (ISO 19109),
FT   Feature Topology (ISO 19107),
GF   General Feature (ISO 19109),
GM   Geometry (ISO 19107),
GR   Graph (ISO 19107),
LI   Lineage (ISO 19115),
MD   Metadata (ISO 19115),
PF   Feature Portrayal (ISO 19117),

PS   Positioning Services (ISO 19116),

RS   Reference System (ISO 19115),

SC   Spatial Coordinates (ISO 19111),

SI   Spatial Identification (ISO 19112),

SV   Services (ISO 19119),

TM   Temporal (ISO 19108),

TP   Topology (ISO 19107),

TS   Simple Topology (ISO 19107).

6.1.3   Metadata application information

Figure 6.2 is a UML class diagram defining the classes of geographic information to which metadata applies.
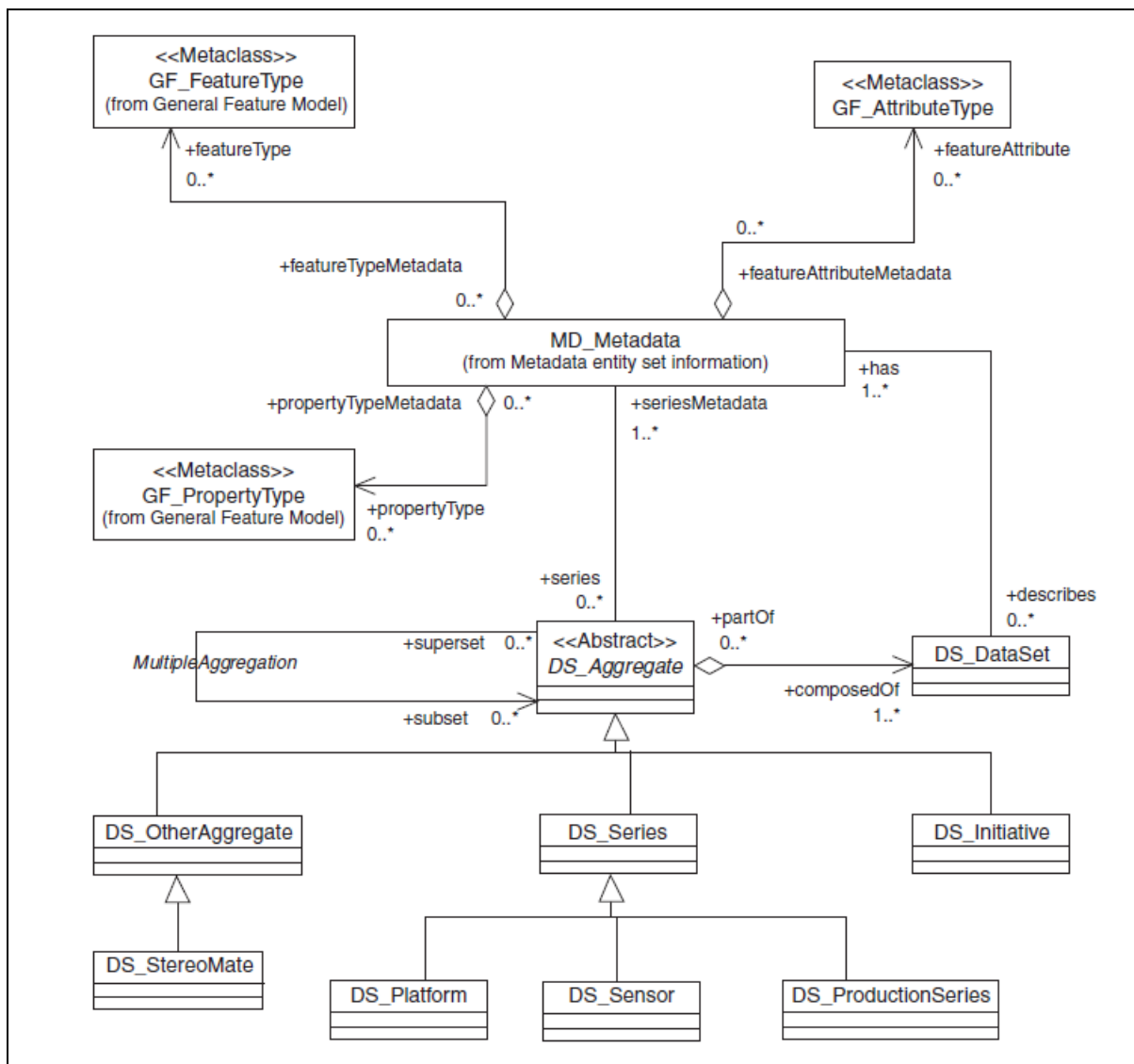
Figure 6.2: Metadata application.

6.2 ISO package descriptions

6.2.1 Metadata entity set information (MD_Metadata)

Metadata entity set information consists of the entity (UML class) MD_Metadata, which is mandatory. The MD-Metadata entity contains both mandatory and optional metadata elements. The MD_Metadata entity is an aggregate of the entities:

- MD_Identification,
- MD_Constraints,
- DQ_DataQuality,
- MD_MaintenanceInformation,
- MD_SpatialRepresentation,
- MD_ReferenceSystem,
- MD_ContentInformation,
- MD_PortrayalCatalogueReference,
- MD_Distribution,
- MD_MetadataExtensionInformation,
- MD_ApplicationSchemaInformation.

6.2.2 Identification information (MD_Identification)

Identification information contains information to uniquely identify data. Identification information includes information about the citation for the resource, an abstract, the purpose, credit, the status and points of contact. The MD_Identification entity is mandatory. The MD_Identification entity may be specified (subclasses) as MD_DataIdentification when used to identify data, and as MD_ServiceIdentification when used to identify a service. MD_ServiceIdentification is an aggregate of the following entities:

- MD_Format   data format
- MD_BrowseGraphic   data graphic overview
- MD_Usage   specific uses of data
- MD_Constraints   constraints placed on data resource
- MD_Keywords   keywords describing data resource
- MD_MaintenanceInformation   how often data is scheduled to be updated and scope of update
- MD_AggregateInformation   information about datasets that are aggregate parts of the dataset that metadata describes.

The extent element of MD_DataIdentification is conditional; either the EX_GeographicBoundingBox or the EX_GeographicDescription subclass of extent's geographicElement role shall be included if the dataset is spatially referenced. If necessary, both may be used.

6.2.3 Constraint information (MD_Constraints)

This package contains information concerning the restrictions placed on data. The MD_Constraints entity is optional and may be specified as MD_LegalConstraints and/or MD_SecurityConstraints. The otherConstraint element of MD_LegalConstraints shall be non-zero

(used) only if accessConstraints and/or useConstraints elements have a value of otherRestrictions, which is found in the MD_RestrictionCode code list.

6.2.4 Data quality information (DQ_DataQuality)

This package contains a general assessment of the quality of data. The DQ_DataQuality entity is optional and contains the scope of the quality assessment. DQ_DataQuality is an aggregate of LI_Lineage and DQ_Element. DQ_Element can be specified as DQ_Completeness, DQ_LogicalConsistency, DQ_PositionalAccuracy, DQ_ThematicAccuracy and DQ_TemporalAccuracy. These five entities represent Elements of data quality and can be further subclassed to the sub-elements of data quality. Users may add additional elements and sub-elements of data quality by sub-classing DQ_Element or the appropriate sub-element.

This package also contains information about the resources and production processes used in producing a dataset. The LI_Lineage entity is optional and contains a statement about the lineage. LI_Lineage is an aggregate of LI_ProcessStep and LI_Source. Either the "report" or "lineage" roles of DQ_DataQuality must be present if DQ_DataQuality.scope.DQ_Scope.level has a value of "dataset".

The "levelDescription" element of DQ_Scope is mandatory if the "level" element of DQ_Scope does not have a value of "dataset" or "series". The "statement" element of LI_Lineage is mandatory if DQ_DataQuality.scope.DQ_Scope.level has a value of "dataset" or "series", and the LI_Lineage roles of "source" and "processStep" are not documented.

The "source" role of LI_Lineage is mandatory if the "statement" element and the "processStep" role of LI_Lineage are not documented.

The "processStep" role of LI_Lineage is mandatory if the "statement" element and the "source" role of LI_Lineage are not documented.

Either the "description" or "sourceExtent" element of LI_Source must be documented.

6.2.5 Maintenance information (MD_MaintenanceInformation)

This package contains information about the scope and frequency of updating data. The MD_MaintenanceInformation entity is optional and contains mandatory and optional metadata elements.

6.2.6 Spatial representation information (MD_SpatialRepresentation)

This package contains information concerning the mechanisms used to represent spatial information in a dataset. The MD_SpatialRepresentation entity is optional and can be specified as MD_GridSpatialRepresentation and MD_VectorSpatialRepresentation. Each of the specified entities contains mandatory and optional metadata elements. When further description is necessary, MD_GridSpatialRepresentation may be specified MD_Georectified and/or MD_Georeferenceable. Metadata for spatial data representation and derived from ISO 19107.

6.2.7 Reference system information (MD_ReferenceSystem)

This package contains the description of the spatial and temporal reference system(s) used in a dataset. MD_ReferenceSystem contains an element to identify the reference system used. MD_ReferenceSystem may be subclassed as MD_CRS which is an aggregate of MD_ProjectionParameters and MD_EllipsoidParameters. MD_ProjectionParameters is an aggregate of MD_ObliqueLineAzimuth and MD_ObliqueLinePoint.

6.2.8 Content information (MD_ContentInformation)

This package contains information identifying the feature catalogue (MD_FeatureCatalogueDescription) and/or information describing the content of a coverage dataset (MD_CoverageDescription). Both entities are subclasses of the MD_ContentInformation entity. MD_CoverageDescription may be subclassed as MD_ImageDescription and has an aggregate of MD_RangeDimension. MD_RangeDimension may additionally be subclassed as MD_Band.

6.2.9 Portrayal catalogue information (MD_PortrayalCatalogueReference)

This package contains information identifying the portrayal catalogue used. It consists of the optional entity MD_PortrayalCatalogueReference. This entity contains the mandatory element used to specify which portrayal catalogue is used by the dataset.

6.2.10 Distribution information (MD_Distribution)

This package contains information about the distributor of, and options for obtaining, a resource. It contains the optional MD_Distribution entity. MD_Distribution is an aggregate of the options for digital distribution of a dataset (MD_DigitalTransferOptions), identification of the distributor (MD_Distributor) and the format of the distribution (MD_Format). MD_DigitalTransferOptions contains the medium used in the distribution (MD_Medium) of a dataset, and is an aggregate of MD_Distributor. MD_Distributor's other aggregate is the process for ordering a distribution (MD_StandardOrderProcess). The "distributionFormat" role of MD_Distribution is mandatory if the "distributorFormat" role of MD_Distributor is not documented. The "distributorFormat" role of MD_Distributor is mandatory if the "distributionFormat" role of MD_Distribution is not documented.

6.2.11 Metadata extension information (MD_MetadataExtensionInformation)

This package contains information about user specified extensions. It contains the optional MD_MetadataExtensionInformation entity. MD_MetadataExtensionInformation is an aggregate of information describing the extended metadata elements MD_ExtendedElementInformation). If the "dataType" element of MD_ExtendedElementInformation does not have a value of 'code list', 'enumeration' or 'codelistElement', then the "obligation", "maximumOccurence" and "domainValue" elements are mandatory. If the "dataType" element of MD_ExtendedElementInformation has a value of 'codelistElement', then the "domainCode" element is mandatory. If the "dataType" element of MD_ExtendedElementInformation does not have a value of 'codelistElement', then the "shortName" element is mandatory. If the "obligation" element of MD_ExtendedElementInformation has a value of 'conditional', then the "condition" element is mandatory.

6.2.12 Application schema information (MD_ApplicationSchemaInformation)

This package contains information about the application schema used to build a dataset. It contains the optional entity MD_ApplicationSchemaInformation.

6.2.13 Extent information (EX_Extent)

The data type in this package is an aggregate of the metadata elements that describe the spatial and temporal extent of the referring entity. The EX_Extent entity contains information about the geographic (EX_GeographicExtent), temporal (EX_TemporalExtent) and vertical (EX_VerticalExtent) extent of the referring entity. EX_GeographicExtent can be subclassed as EX_BoundingPolygon,

EX_GeographicBoundingBox and EX_GeographicDescription. The combined spatial and temporal extent (EX_SpatialTemporalExtent) is an aggregate of EX_GeographicExtent. EX_SpatialTemporalExtent is a subclass of EX_TemporalExtent.

The EX_Extent has three optional roles: "geographicElement", "temporalElement", "verticalElement" and an element called "description". According to ISO, at least one of the four shall be used.

6.2.14 Citation and responsible party information (CI_Citation and CI_ResponsibleParty)

This package provides a standardized method (CI_Citation) for citing a resource, as well as information about the party responsible. The CI_ResponsibleParty data type contains the identity of person(s) and/or position and/or organizations associated with the resource. The location (CI_Address) of the responsible person or organization is also defined here.

6.3 Core metadata for geographic datasets

The ISO 19115 standard defines an extensive set of metadata elements, typically only a subset of the full number of all ISO metadata is used. In thematic definition of the metadata profile, typically only basic metadata elements necessary to identify a dataset are documented, most often for catalogue needs. The catalogue contains metadata elements answering the following questions: "Does a dataset on a specific topic exist (what?)?"; "For a specific place (where)?"; "For a specific date or period (when)?"; "A point of contact to learn more about or order the dataset (who)?"

Using the recommended optional elements in addition to the mandatory elements will increase interoperability, allowing users to understand unambiguously the geographic data and the related metadata provided by either the producer of the distributor. The ISO metadata profile shall include this core. Table 6.2 shows the core metadata elements required for describing a dataset.

Table 6.2: Core ISO metadata for geographic datasets

Dataset title (MD_Metadata > MD_DataIdentification.citation >CI_Citation.title)	Spatial representation type (MD_Metadata > MD_DataIdentification.spatialRepresentationType)
Dataset reference date (MD_Metadata > MD_DataIdentification.citation >CI_Citation.date)	Reference system (MD_Metadata > MD_ReferenceSystem)
Dataset responsible party (MD_Metadata > MD_DataIdentification.pointOfContact >CI_ResponsibleParty)	Lineage (MD_Metadata > DQ_DataQuality.lineage > LI_Lineage)
Geographic location of the dataset (by four coordinates or by geographic identifier) (MD_Metadata > MD_DataIdentification.extent > EX_Extent> EX_GeographicExtent > EX_GeographicBoundingBox or EX_GeographicDescription)	Online resource (MD_Metadata > MD_Distribution > MD_DigitalTransferOption.onLine > CI_OnlineResource)
Dataset language	Metadata file identifier

(MD_Metadata > D_DataIdentification.language)	(MD_Metadata.fileIdentifier)
Dataset character set (MD_Metadata >MD_DataIdentification.characterSet)	**Metadata standard name** (MD_Metadata.metadataStandardName)
Dataset topic category (MD_Metadata > MD_DataIdentification.topicCategory)	**Metadata standard version** (MD_Metadata.metadataStandardVersion)
Spatial resolution of the dataset (MD_Metadata > MD_DataIdentification.spatialResolution > MD_Resolution.equivalentScale or MD_Resolution.distance)	**Metadata language** (MD_Metadata.language)
Abstract describing the dataset (MD_Metadata > MD_DataIdentification.abstract)	**Metadata character set** (MD_Metadata.characterSet)
Distribution format (MD_Metadata > MD_Distribution > MD_Format.name and MD_Format.version)	**Metadata point of contact** (MD_Metadata.contact > CI_ResponsibleParty)
Additional extent information for the dataset (vertical and temporal) (MD_Metadata > MD_DataIdentification.extent > EX_Extent > EX_TemporalExtent or EX_VerticalExtent)	**Metadata date stamp** (MD_Metadata.dateStamp)

6.4 Unified Modelling Language (UML) diagrams and data dictionaries

Metadata schemas in the form of Unified Modelling Language (UML) diagrams (Appendix A), in conjunction with data dictionaries (Appendix B) define the total abstract model of metadata. Code lists and their values are defined by ISO standards, while user extensions to code lists shall follow the rules as described in ISO 19115 and ISO/IEC 11179-6 standards.

7 INSPIRE metadata profile

The INSPIRE metadata profile is created with regard to the ISO/TC211 standards, particularly with regard to ISO 19115 and ISO 19119.

7.1 Basic ISO 19115, INSPIRE and Croatian NSDI metadata elements

ISO standards define a whole range of data resources. INSPIRE is limited to spatial datasets, dataset series and spatial data services and Croatian NSDI uses the same division of spatial data resources as INSPIRE. Metadata for datasets and dataset series are identical and two Croatian NSDI metadata profiles are developed: for datasets and dataset series and for services.

7.1.1 Metadata elements for spatial dataset and spatial dataset series

The table below compares the core requirements of ISO 19115 to the requirements of INSPIRE for spatial dataset and spatial dataset series.

Table 7.1: Comparison of the core requirements of ISO 19115 to the requirements of INSPIRE and Croatian NSDI for spatial datasets and spatial dataset series

ISO 19115 Core	INSPIRE	Croatian NSDI	Comments
Dataset title	Resource title	Resource title	-
Dataset reference date	Temporal reference	Reference date: date of last revision, date of publication and date of creation	ISO 19115 is more demanding. The metadata shall contain a date of publication, revision or creation of the resource, while in INSPIRE and Croatian NSDI systems the Temporal Reference can also be expressed through Temporal Extent.
Dataset responsible party	Responsible organisation	Responsible organisation	INSPIRE and Croatian NSDI are more demanding by mandating both the name of the organisation and a contact e-mail address.
Geographic location of the dataset	Geographic bounding box	Geographic location: western-most geographic longitude, eastern-most geographic longitude, southern-most geographic latitude and northern-most geographic latitude	INSPIRE and Croatian NSDI are more demanding. A geographic bounding box is mandated.
Dataset language	Resource language	Resource language	ISO 19115 is more demanding. It mandates the dataset language, even if the resource does not include any textual information. The ISO 19115 dataset language is defaulted to the metadata language.
Dataset character set	-	-	ISO 19115 is more demanding. The dataset character set has to be documented.
Dataset topic category	Topic category	Topic category	-
Spatial resolution of the dataset	Spatial resolution	Spatial resolution: scale and distance	-

Abstract describing the dataset	Resource abstract	Resource abstract	-
Distribution format	-	Data format	Croatian NSDI is extended in relation to INSPIRE. It is in line with ISO.
Additional extent information for the dataset (vertical and temporal)	Temporal extent	Temporal extent	INSPIRE is more demanding. A temporal reference is mandated, and can be expressed as a temporal extent.
Spatial representation type	-	-	ISO 19115 is more demanding. The dataset character set has to be documented.
Reference system	-	Coordinate reference system	Croatian NSDI is extended in relation to INSPIRE. It is in line with ISO.
Lineage	Lineage	Lineage	INSPIRE and Croatian NSDI are more demanding. A general lineage statement is mandated.
On-line resource	Resource locator	Resource locator	-
Metadata file identifier	-	-	ISO 19115 is more demanding. The dataset character set has to be documented.
Metadata standard name	-	-	ISO 19115 is more demanding. The dataset character set has to be documented.
Metadata standard version	-	-	ISO 19115 is more demanding. The dataset character set has to be documented.
Metadata language	Metadata language	Metadata language	INSPIRE is more demanding. The metadata language is mandated even when defined by the encoding. Croatian NSDI is limited to Croatian and English.
Metadata character set	-	-	ISO 19115 is more demanding. The metadata character set has to be documented in ISO 19115 when ISO10646-1 is not used.
Metadata point of contact	Metadata point of contact	Metadata point of contact	INSPIRE and Croatian NSDI are more demanding by mandating both the name of the organisation and a contact e-mail address.
Metadata date stamp	Metadata date	Metadata date	ISO is more restrictive because this element shall contain the data when the metadata was created, while INSPIRE and NSDI may contain the date when the metadata record was created or updated.
-	Resource type	Resource type	INSPIRE and Croatian NSDI are more demanding than ISO.
-	Unique resource Identifier	Unique resource identifier	INSPIRE and Croatian NSDI are more demanding than ISO.
-	Keyword	Keyword: value and thesaurus	INSPIRE and Croatian NSDI are more demanding than ISO.

-	Conformity	Conformity: specification explanation and degree	INSPIRE and Croatian NSDI are more demanding than ISO.
-	Conditions for access and use	Conditions of access and use	INSPIRE and Croatian NSDI are more demanding than ISO.
-	Limitations on public access	Public access limitations: access and other restrictions	INSPIRE and Croatian NSDI are more demanding than ISO.
Maintenance	-	Update: frequency and note	Croatian NSDI is extended in relation to INSPIRE. It is in line with ISO.
Alternate title	-	Alternative resource title	Croatian NSDI is extended in relation to INSPIRE. It is in line with ISO.

7.1.2 Metadata elements for spatial data services

The table below compares the core requirements of ISO 19115 to the requirements of INSPIRE and Croatian NSDI for services.

Table 7.2: Comparison of ISO 19115, INSPIRE and Croatian NSDI requirements of metadata for services

ISO 19115 Core	INSPIRE	Croatian NSDI	Comments
Dataset title	Resource title	Resource title	-
Dataset reference date	Temporal reference	Reference date: date of last revision, date of publication and date of creation	ISO 19115 is more demanding. Despite its name, the ISO 19115 Core metadata element applies to services. A reference date of the service (date of publication, revision or creation) is mandated.
Dataset responsible party	Responsible organisation	Responsible organisation	-
Geographic location of the dataset	-	-	See INSPIRE Geographic Bounding Box.
-	Geographic bounding box	Geographic location: western-most geographic longitude, eastern-most geographic longitude, southern-most geographic latitude and northern-most geographic latitude	The Geographic Bounding Box is handled in ISO 19119 with a different metadata element from the one corresponding to "Geographic location of the dataset".
Dataset language	-	Resource language	Not applicable to services.
Dataset character set	-	-	Not applicable to services.
Dataset topic category	Topic category	Topic category	Not applicable to services.

Spatial resolution of the dataset	Spatial resolution	Spatial resolution: scale and distance	In the current version of ISO 19119, it is not possible to express the restriction of a service concerning spatial resolution.
Abstract describing the dataset	Resource abstract	Resource abstract	-
Distribution format	-	Data format	Croatian NSDI is extended in relation to INSPIRE. It is in line with ISO.
Additional extent information for the dataset	-	-	ISO 19115 is more demanding. The dataset character set has to be documented.
Spatial representation type	-	-	ISO 19115 is more demanding. The dataset character set has to be documented.
Reference system	-	Coordinate reference system	Croatian NSDI is extended in relation to INSPIRE. It is in line with ISO.
Lineage	-	-	ISO 19115 is more demanding. The dataset character set has to be documented.
On-line resource	Resource locator	Resource locator	-
Metadata file identifier	-	-	ISO 19115 is more demanding. The dataset character set has to be documented.
Metadata standard name	-	-	ISO 19115 is more demanding. The dataset character set has to be documented.
Metadata standard version	-	-	ISO 19115 is more demanding. The dataset character set has to be documented.
Metadata language	Metadata language	Metadata language	Croatian NSDI is limited to Croatian and English.
Metadata character set	-	-	ISO is more demanding.
Metadata point of contact	Metadata point of contact	Metadata point of contact	-
Metadata date stamp	Metadata date	Metadata date	ISO is more restrictive because this element shall contain the data when the metadata was created, while INSPIRE and Croatian NSDI may contain the date when the metadata record was created or updated.
-	Resource type	Resource type	INSPIRE and Croatian NSDI are more demanding than ISO.
-	Coupled resource	Coupled resource	INSPIRE and Croatian NSDI are more demanding than ISO.

-	Spatial Data service type	Service type	INSPIRE and Croatian NSDI are more demanding than ISO.
-	Keyword	Keyword: value and thesaurus	INSPIRE and Croatian NSDI are more demanding than ISO.
-	Conformity	Conformity: specification, explanation and degree	INSPIRE and Croatian NSDI are more demanding than ISO.
-	Conditions for access and use	Conditions of access and use	INSPIRE and Croatian NSDI are more demanding than ISO.
-	Limitations on public access	Public access limitations: access and other restrictions	INSPIRE and Croatian NSDI are more demanding than ISO.
Maintenance	-	Update: frequency and note	INSPIRE and Croatian NSDI are more demanding than ISO.
Alternate title	-	Alternative resource title	INSPIRE and Croatian NSDI are more demanding than ISO.

7.2 INSPIRE specific constraints

The metadata model based on INSPIRE implementation rules for metadata ensures that Croatian NSDI metadata are not in conflict with the ISO 19115 standard. INSPIRE and Croatian NSDI constraints in relation to the ISO 19115/ISO 19119 metadata set, i.e. the MD_Metadata instance, are as follows:

1. MD_Metadata.language is mandatory.
2. MD_Metadata.hierarchyLevel is mandatory.
3. INSPIRE only considers the first instance of MD_Metadata.hierarchyLevel (i.e. MD_Metadata.hierarchyLevel[1]) when there are many.
4. If the value of MD_Metadata.hierarchyLevel[1] is not dataset, dataset series or service, the metadata set is out of scope of the INSPIRE Directive.
5. When there are many instances of MD_Metadata.identificationInfo, only the first one (i.e. MD_Metadata.identificationInfo[1]) concerns the INSPIRE resource.
6. INSPIRE only considers the instance of MD_Metadata.dataQualityInfo applicable to the whole resource.
7. There shall be no more than one instance of MD_Metadata.identificationInfo[1].MD_Identification.citation.CI_Citation.date declared as a creation date (i.e. CI_Date.dateType having the creation value).
8. MD_Metadata.identificationInfo[1].MD_DataIdentification.citation.CI_Citation.identifier is mandatory for metadata related to spatial dataset and spatial dataset series.
9. The data type of MD_Metadata.identificationInfo.MD_DataIdentification.language is the code list LanguageCode from ISO/TS 19139.
10. There shall be at least one instance of MD_Metadata.identificationInfo[1].MD_DataIdentification.extent defining the geographic location of the resource as a geographic bounding box (i.e. an instance of EX_GeographicBoundingBox or one of its subclasses).
11. MD_Metadata.identificationInfo[1].SV_ServiceIdentification.operatesOn shall be instantiated by reference.
12. There shall be at least one instance of MD_Metadata.identificationInfo[1].MD_Identification.resourceConstraints.

13. The coordinates of the bounding boxes (instance of EX_GeographicBoundingBox) shall be expressed in any geodetic coordinate reference system within the Greenwich Prime Meridian.

14. For datasets and dataset series
MD_Metadata.identificationInfo[1].MD_DataIdentification.pointOfContact[1].CI_Responsible Party.organisationName and
MD_Metadata.identificationInfo[1].MD_DataIdentification.pointOfContact[1].CI_Respon sibleParty.contactInfo.CI_Contact.address.CI_Address.electronicMailAddress are mandatory.
For services, these elements are also mandatory but are referred as:
MD_Metadata.identificationInfo[1].SV_ServiceIdentification.pointOfContact[1].CI_Responsib leParty.organisationName and
MD_Metadata.identificationInfo[1].SV_ServiceIdentification.pointOfContact[1].CI_Responsib leParty.contactInfo.CI_Contact.address.CI_Address.electronicMailAddress.

15. MD_Metadata.contact[1].CI_ResponsibleParty.organisationName and
MD_Metadata.contact[1].CI_ResponsibleParty.contactInfo.CI_Contact.address.CI_Address.el ectronicMailAddress are mandatory.

16. The value of MD_Metadata.contact[1].CI_ResponsibleParty.role.CI_RoleCode shall be pointOfContact.

17. For datasets and dataset series, at least one keyword of GEMET thesaurus shall be documented using
MD_Metadata.identificationInfo[1].MD_DataIdentification.descriptiveKeywords.

18. For services, at least one keyword of Part D.4 of Commission Regulation (EC) No. 1205/2008 shall be documented using
MD_Metadata.identificationInfo[1].SV_ServiceIdentification.descriptiveKeywords.

8 Croatian NSDI metadata profile

The Croatian NSDI metadata profile is created with regard to the INSPIRE Metadata Implementation Rules and meeting the INSPIRE requirements. The Croatian NSDI metadata profile is extended in relation to the INSPIRE profile. The extensions have been made in accordance with ISO standards.

8.1 Overview of Croatian NSDI metadata elements

This chapter provides an overview of Croatian NSDI metadata element. Croatian NSDI metadata elements are divided into two groups, according to the type of the spatial data resource - elements of spatial datasets and dataset series and elements of spatial data services. An overview of metadata elements in the tables below is provided using the following:

- **Nr.** - consecutive number of the metadata element in the table
- **Element name** – name of the metadata element
- **Definition** - definition of the metadata element
- **Maximum occurrence** - defines whether the element consists of only one value (single, 1) or may have several values (multiple, N)
- **Obligation** – defines whether the element is mandatory (M) or conditional (C).
- **Comment** – additional comment.

For subordinate elements, the obligation and maximum occurrence of the reference object is used. For instance, for the element 'metadata point of contact' which is mandatory and may have multiple values, the subordinate element 'e-mail address' has the obligation and maximum occurrence of the reference object, i.e. metadata point of contact.

Table 8.1: Metadata elements for spatial datasets and spatial dataset series

Nr.	Element name	Definition	Maximum occurrence (1-single, N-multiple)	Obligation (M-mandatory, C-conditional)	Comment
1	Resource title	Characteristic, and often unique, name by which the resource is known.	1	M	
2	Alternative resource title	Abbreviation, acronym, other name or resource title in another language.	N	C	
3	Source abstract	Brief narrative summary of the resource content.	1	M	
4	Resource type	Type of resource described by the metadata.	1	M	
5	Resource locator	Defines the link(s) to the resource and/or the link to additional information about the resource.	N	C	Mandatory if there is URL available providing additional information about the resource

					and/or service related to resource access.
6	Unique resource identifier	Value uniquely identifying the resource.	N	M	
7	Coordinate reference system	Designates the data resource coordinate (spatial) reference system.	N	M	
8	Data format	Format for resource data transfer.	N	M	
9	Resource language	Language/s used within the resource.	N	C	Mandatory if the resource contains textual information.
10	Topic category	Topic category is a high-level classification scheme to assist in the grouping and topic-based search of available spatial data resources.	N	M	
11	Keyword value	Keyword value is a commonly used word, formalized word or phrase used to describe the subject.	N	M	
12	Keyword thesaurus	Formally registered thesaurus or a similar authoritative source of keywords.	N	C	
13	Geographic location: western-most geographic longitude	Westernmost coordinate of the data extent boundary defined by geographic longitude in degrees (positive towards east).	N	M	
14	Geographic location: eastern-most geographic longitude	Easternmost coordinate of the data extent boundary defined by geographic longitude in degrees (positive towards east).	N	M	
15	Geographic location: southern-most geographic latitude	Southernmost coordinate of the data extent boundary defined by geographic latitude in degrees (positive towards north).	N	M	
16	Geographic location: northern-most geographic	Northernmost coordinate of the data extent boundary defined by geographic latitude in degrees (positive towards north).	N	M	

	latitude				
17	Temporal extent	Temporal extent covered by the content of the resource.	N	M	
18	Reference date: date of last review	Date of last review of the resource, if any.	1	C	
19	Reference date: date of publication	Date of publication of the resource, if any, or date when the resource become official.	N	C	
20	Reference date of creation	Date of creation of the resource.	1	C	
21	Update: frequency	Frequency with which modifications are made and data added to the resource after the initial resource has been finished.	1	M	
22	Update: note	Information related to specific requirements of resource maintenance.	1	M	
23	Lineage	Statement on process history and/or overall quality of the spatial dataset.	1	M	
24	Spatial resolution: scale	Spatial resolution refers to the level of detail of the dataset, while spatial resolution scale specifies the level of detail of data by stating the map scale denominator.	N	C	Mandatory for dataset and dataset series if the scale equivalent or resolution distance equivalent can be specified.
25	Spatial resolution: distance	Spatial resolution refers to the level of detail of the data set, while spatial resolution distance specifies the level of detail of data by stating the sample resolution distance.	N	C	Mandatory for dataset and dataset series if the scale or resolution distance equivalent can be specified.
26	Conformity: specification	Citing implementation rules or other documents with which the spatial data resource is harmonised.	N	M	
27	Conformity: explanation	Explanation of conformity.	N	M	
28	Conformity: level	Indication of conformity result.	N	M	

29	Conditions for access and use	Conditions for accessing and using the spatial data resource with fees, if applicable.	N	M	
30	Public access limitations: access	Access limitations are applied to ensure the protection of privacy or intellectual rights, or any other impediments or restrictions to access data resource.	N	M	
31	Public access limitations: other restrictions	Other restrictions and legal terms for accessing and using resources or metadata.	N	M	
32	Responsible party	Description of the organization responsible for the establishment, management, maintenance and distribution of the resource.	N	M	
33	Responsible party role	Role the responsible party has.	N	M	
34	Metadata point of contact	Description of the organization responsible for the creation and maintenance of metadata	N	M	
35	Metadata date	Date which specifies when the metadata record was created or updated.	1	M	
36	Metadata language	Language in which metadata elements are expressed.	1	M	

Table 8.2: Metadata elements for spatial data services

Nr.	Element name	Definition	Maximum occurrence (1-single, N-multiple)	Obligation (M-mandatory, C-conditional)	Comment
1	Resource title	Characteristic, and often unique, name by which the resource is known.	1	M	
2	Alternative resource title	Abbreviation, acronym, other name or resource title in another language.	N	C	
3	Source abstract	Brief narrative summary of the resource content.	1	M	
4	Resource type	Type of resource described by the metadata.	1	M	
5	Resource locator	Defines the link(s) to the resource and/or the link to additional information about the resource.	N	C	Mandatory if there is link to the service.
6	Coordinate reference system	Designates the data resource coordinate (spatial) reference system.	N	M	
7	Keyword value	Keyword value is a commonly used word, formalized word or phrase used to describe the subject.	N	M	
8	Keyword thesaurus	Formally registered thesaurus or a similar authoritative source of keywords.	N	C	Mandatory if the keyword originates for the thesaurus.
9	Geographic location: western-most geographic longitude	Westernmost coordinate of the data scope boundary defined by geographic longitude in degrees (positive towards east).	N	C	Mandatory for services with explicit geographic propagation.
10	Geographic location: eastern-most geographic longitude	Easternmost coordinate of the data scope boundary defined by geographic longitude in degrees (positive towards east).	N	C	Mandatory for services with explicit geographic propagation.
11	Geographic location: southern-most geographic latitude	Southernmost coordinate of the data scope boundary defined by geographic latitude in degrees (positive towards north).	N	C	Mandatory for services with explicit geographic propagation.
12	Geographic	Northernmost coordinate of the	N	C	Mandatory for

	location: northern-most geographic latitude	data scope boundary defined by geographic latitude in degrees (positive towards north).			services with explicit geographic propagation.
13	Temporal extent	Temporal extent covered by the content of the resource.	N	M	
14	Reference date of last review	Date of last review of the resource, if any.	1	C	
15	Reference date of publication	Date of publication of the resource, if any, or date when the resource become official.	N	C	
16	Reference date of creation	Date of creation of the resource.	1	C	
17	Spatial resolution: scale	Spatial resolution refers to the level of detail of the dataset, while spatial resolution scale specifies the level of detail of data by stating the map scale denominator.	N	C	Mandatory if there is limitation of spatial resolution for the service observed.
18	Spatial resolution: distance	Spatial resolution refers to the level of detail of the dataset, while spatial resolution distance specifies the level of detail of data by stating the sample resolution distance.	N	C	Mandatory if there is limitation of spatial resolution for the service observed.
19	Conformity: specification	Citing implementation rules or other documents with which the spatial data resource is harmonised.	N	M	
20	Conformity: explanation	Explanation of conformity.	N	M	
21	Conformity: level	Indication of conformity result.	N	M	
22	Conditions of access and use	Conditions for accessing and using the spatial data resource with fees, if applicable.	N	M	
23	Public access limitations: access	Access limitations are applied to ensure the protection of privacy or intellectual rights, or any other impediments or restrictions to access data resource.	N	M	
24	Public access limitations: other	Other restrictions and legal terms for accessing and using resources or metadata.	N	M	

	restrictions				
25	Responsible party	Description of the organization responsible for establishment, management, maintenance and distribution of the resource.	N	M	
26	Responsible party role	Role the responsible party has.	N	M	
27	Metadata point of contact	Description of the organization responsible for the creation and maintenance of metadata	N	M	
28	Metadata date	Date which specifies when the metadata record was created or updated.	1	M	
29	Metadata language	Language in which metadata elements are expressed.	1	M	
30	Service type	Type of spatial data service.	1	M	
31	Coupled resource	If the data service resource, coupled resource, is identified, where this is relevant, link to the service of spatial dataset(s) is created with a unique resource identifier.	N	C	Mandatory if there is available link to the dataset related to the service.

9 Croatian NSDI metadata XML schemas

Several metadata XML schemas, in line with ISO standards, are publicly available. The following are used most often:

- ISO schema repository
- OGC schema repository
- EDEN schema repository.

The application of different metadata XML schemas results in variations of metadata profile. Croatian NSDI recommends l'Equipe D'Experts en Normalisation (EDEN) XSD schema as the basic one. EDEN is a collaborative work space for standardisation in the geographic information area. For additional information see http://eden.ign.fr/welcome. EDEN schemas are shown on http://eden.ign.fr/xsd/isotc211/isofull/20090316. The advantages of selecting the EDEN schemas are the following:

- XSD schemas consistency
- GML 3.2.1 support
- inclusion of metadata for services.

As a basis, schema files are used for:

- spatial datasets and dataset series of sets: gmd/gmd.xsd,
- spatial data services: srv/srv.xsd.

10 Croatian NSDI metadata elements

This chapter describes in detail the Croatian NSDI metadata elements. To describe each metadata element precisely, the following terms are used:

Number - consecutive number of the Croatian NSDI metadata element.

Name - name of the Croatian NSDI metadata element.

Definition - definition of the Croatian NSDI metadata element.

INSPIRE equivalent - if applicable, the corresponding INSPIRE metadata element is named from *INSPIRE Metadata Implementing Rules* (v. 1.2, 2010-06-16).

Comparison with INSPIRE – indicates if the element is equal or different in comparison with INSPIRE.

ISO equivalent – if there is an ISO equivalent, the metadata element is named with number from ISO/TC211 19115/19119 standards.

Comparison with ISO – indicates if the Croatian NSDI metadata element is equivalent or different in comparison with ISO/TC211 19115/19119 standards.

XPath – XPath expression indicates the XML-path of the metadata element within the ISO 19115 /ISO19119 UML model.

Obligation – defines whether the metadata element is mandatory (M) or conditional (C).

Cardinality – specifies the maximum number of values that the metadata element can have; single-valued [1] or can have multiple values [N].

Data type – specifies the value of the domain with operations allowed with domain values.

Domain – allowable set of metadata element values.

Example - common example for the element value(s) illustrating concrete application.

Implementation instructions - any comment or hint that needs to be considered when implementing the metadata element.

10.1 Resource title

Number	1
Name	Resource title
Definition	Characteristic, and often unique, name by which the resource is known.
Obligation	• dataset or dataset series: mandatory • service: mandatory
Cardinality	single
Example	Register of geographic names

Data resource must have a unique and easily identifiable title. In determining a resource title, the needs of potential users must be taken into consideration. The title must be informative and diminish the potential risk of mistaking one data resource for another.

Generic search engines most often analyse the first record. It is therefore desirable for a resource title to clearly define spatial data and differentiate between similar search results.

Technical data

INSPIRE equivalent	Resource title
Comparison with INSPIRE	equivalent
ISO equivalent	[360] title
Comparison with ISO	equivalent
XPath	identificationInfo/*/citation/*/title
Data type	character string
Domain	free text
Implementation instructions	none

Encoding example

```
<gmd:MD_Metadata…
…
   <gmd:identificationInfo>
     <gmd:MD_DataIdentification>
       <gmd:citation>
         <gmd:CI_Citation>
           <gmd:title>
             <gco:CharacterString>Register of geographic names</gco:CharacterString>
           </gmd:title>
         </gmd:CI_Citation>
```

```
          </gmd:citation>
        </gmd:MD_DataIdentification>
      </gmd:identificationInfo>
…
</gmd:MD_Metadata>
```

10.2 Alternative resource title

Number	2
Name	Alternative resource title
Definition	Abbreviation, acronym, other name or resource title in another language.
Obligation	• dataset or dataset series: conditional • service: conditional
Cardinality	multiple
Example	1. CroGeoNames 2. CGN

Along with the main title, alternative resource title is the title that makes a resource identifiable. Acronyms and abbreviations are common alternative forms of the main resource title.

Technical data

INSPIRE equivalent	none
Comparison with INSPIRE	-
ISO equivalent	[361] alternateTitle
Comparison with ISO	equivalent
XPath	/*/identificationInfo/*/citation/*/alternateTitle
Data type	character string
Domain	free text
Implementation instructions	none

Encoding example

```
<gmd:MD_Metadata...
...
   <gmd:identificationInfo>
     <gmd:MD_DataIdentification>
       <gmd:citation>
         <gmd:CI_Citation>
           <gmd:alternateTitle>
             <gco:CharacterString>CroGeoNames</gco:CharacterString>
           </gmd:alternateTitle>
           <gmd:alternateTitle>
             <gco:CharacterString>CGN</gco:CharacterString>
           </gmd:alternateTitle>
```

```
            </gmd:CI_Citation>
          </gmd:citation>
        </gmd:MD_DataIdentification>
      </gmd:identificationInfo>
…
</gmd:MD_Metadata>
```

10.3 Resource abstract

Number	3
Name	Resource abstract
Definition	Brief narrative summary of the resource content.
Obligation	• dataset or dataset series: mandatory • service: mandatory
Cardinality	single
Example	Register of geographic names contains geographic names on the territory of Croatia from official maps and other original official sources. The Register contains the names of counties, cities/municipalities, inhabited places, UNESCO cultural heritage in Croatia, airports, national parks, nature parks and other protected natural areas, sheets names of new topographic maps, names from EuroGlobalMap v.3.0. etc. Also, the names of all islands, rivers, lakes, mountains, peaks and other dominant geographic features in line with the scale are included. Position data are given in the HTRS96/TM reference system. UTF8 encoding is used.

The abstract serves to give a potential user a clear insight into the nature of data. Description should be complete and concise. In making an abstract, all needs of a potential user should be taken into consideration. It is desirable to use words and expression a potential user is expected to use in searching.

The first sentences are crucial in the searching process. They need to be clear and written using simple language, and are followed with details related to the data resource observed. It is recommended to clearly describe the data collection method.

In the abstract, the system of character encoding used in the spatial data resource must be documented (XML value from the table *MD_CharacterSetCode<<CodeList>>*). In particular, these data must be documented if the UTF8 character encoding was not used.

It is not recommended an abstract to have more than 3500 characters (including spaces).

Technical data

INSPIRE equivalent	Resource abstract
Comparison with INSPIRE	equivalent
ISO equivalent	[25] abstract
Comparison with ISO	equivalent
XPath	identificationInfo/*/abstract
Data type	character string
Domain	free text
Implementation	none

instructions	

Encoding example

<gmd:MD_Metadata...

...

   <gmd:identificationInfo>

     <gmd:MD_DataIdentification>

...

       <gmd:abstract>

         <gco:CharacterString>**Register of geographic names contains geographic names on the territory of Croatia from official maps and other original official sources. The Register contains the names of counties, cities/municipalities, inhabited places, UNESCO cultural heritage in Croatia, airports, national parks, nature parks and other protected natural areas, sheets names of new topographic maps, names from EuroGlobalMap v.3.0. etc. Also, the names of all islands, rivers, lakes, mountains, peaks and other dominant geographic features in line with the scale are included. Position data are given in the HTRS96/TM reference system. UTF8 encoding is used.**</gco:CharacterString>

       <gmd:abstract>

...

     </gmd:MD_DataIdentification>

   </gmd:identificationInfo>

...

</gmd:MD_Metadata>

10.4 Resource type

Number	4
Name	Resource type
Definition	Type of resource described by the metadata.
Obligation	• dataset or dataset series: mandatory • service: mandatory
Cardinality	single
Example	dataset

Generally, there are very many types of data resources. Croatian NSDI recognises the following resource types: spatial dataset, spatial dataset series, and spatial data services. Based on the type of resource, Croatian NSDI has two XML metadata models: the dataset and dataset series model, and the spatial data services model. To select the right metadata model, one needs to know the type of spatial data resource before they are entered.

Technical data

INSPIRE equivalent	Resource type
Comparison with INSPIRE	equivalent
ISO equivalent	[6] hierarchyLevel
Comparison with ISO	equivalent, but limited to spatial datasets, dataset series and services
XPath	hierarchyLevel
Data type	Class
Domain	*MD_ScopeCode<<CodeList>>* (see Appendix B)
Implementation instructions	none

Encoding example

<gmd:MD_Metadata...
...
   <gmd:hierarchyLevel>
<gmd:MD_ScopeCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas/resources/Codelist/gmxCodelists.xml#MD_ScopeCode"codeListValue="dataset">**dataset**</gmd:MD_ScopeCode>
   </gmd:hierarchyLevel>
...
</gmd:MD_Metadata>

10.5 Resource locator

Number	5
Name	Resource locator
Definition	Defines the link(s) to the resource and/or the link to additional information about the resource.
Obligation	• dataset or dataset series: conditional; mandatory if there is URL available providing additional information about the resource and/or service related to resource access. • service: conditional; mandatory if there is link to the service.
Cardinality	multiple
Example	http://cgn.dgu.hr

This element specifies the address(es) of the web-page (URL) linked to a data resource. If there is no web-address, a link may be indicated to the point of contact. If the resource is available through a service, this element is a service address (URL), for instance http://geoportal.dgu.hr/wms . The address prefix ("http://") has to be written.

Technical data

INSPIRE equivalent	Resource locator
Comparison with INSPIRE	equivalent
ISO equivalent	[397] linkage
Comparison with ISO	equivalent
XPath	distributionInfo/*/transferOptions/*/onLine/*/linkage
Data type	Class
Domain	URL (IETF RFC1738 and IETF RFC 2056)
Implementation instructions	none

Encoding example

```
<gmd:MD_Metadata...
...
    <gmd:distributionInfo>
        <gmd:MD_Distribution>
...
            <gmd:transferOptions>
                <gmd:MD_DigitalTransferOptions>
                    <gmd:onLine>
                        <gmd:CI_OnlineResource>
                            <gmd:linkage>
                                <gmd:URL>http://cgn.dgu.hr</gmd:URL>
```

```
                </gmd:linkage>
              </gmd:CI_OnlineResource>
            </gmd:onLine>
          </gmd:MD_DigitalTransferOptions>
        </gmd:transferOptions>
      </gmd:MD_Distribution>
    </gmd:distributionInfo>
...
</gmd:MD_Metadata>
```

10.6 Unique resource identifier

Number	6
Name	Unique resource identifier
Definition	Value uniquely identifying the resource.
Obligation	• dataset or dataset series: mandatory • service: not applicable.
Cardinality	multiple
Examples	Code: 0001 Code space: hr:nipp:pp Version 1.0

This element serves to uniquely identify a data resource in the specified code space. It is a mandatory element consisting of an identification code, code space and code space version that uniquely identify the spatial data resource. The code uniquely identifies a resource and must be set. The code space is a collection of names used in XML documents. It enables the names of elements and attributes to be uniquely identified and is set if there is one.

Unique Resource Identifier (URI) can use Uniform Resource Locator (URL) or Uniform Resource Name (URN). URN is more desirable because it does not change if data location does. Universally Unique Identifier (UUID) can also be used. The existing URL for a dataset, dataset series or data service can be documented. If a link is not available, a link can be made to the point of contact with more information.

Croatian NSDI point of contact is accompanied with Croatian NSDI unique resource identifier. In filling metadata into the Croatian NSDI system, the metadata editor should consult infonipp@dgu.hr and request a unique resource identifier. Unique resource identifier cannot be changed.

Technical data

INSPIRE equivalent	Unique resource Identifier
Comparison with INSPIRE	equivalent
ISO equivalent	[365] identifier
Comparison with ISO	equivalent
XPath	identificationInfo/*/citation/*/identifier
Data type	Class
Domain	*MD_Identifier<<DataType>>* (see App. B) • code *RS_Identifier<<DataType>>* (see App. B) • code space • version

Implementation instructions	It can be documented only code or code, code space and version of code space. If the code, code space and a version of it are defined, *RS_Identifier* is used instead of *MD_Identifier.*

Encoding example

```
<gmd:MD_Metadata…
…
   <gmd:identificationInfo>
     <gmd:MD_DataIdentification>
       <gmd:citation>
         <gmd:CI_Citation>
…
           <gmd:identifier>
             <gmd:RS_Identifier>
               <gmd:code>
                 <gco:CharacterString>0001</gco:CharacterString>
               </gmd:code>
               <gmd:codeSpace>
                 <gco:CharacterString>hr:nipp:pp</gco:CharacterString>
               </gmd:codeSpace>
               <gmd:version>
                 <gco:CharacterString>1.0</gco:CharacterString>
               </gmd:version>
             </gmd:RS_Identifier>
           </gmd:identifier>
         </gmd:CI_Citation>
       </gmd:citation>
…
     </gmd:MD_DataIdentification>
   </gmd:identificationInfo>
…
</gmd:MD_Metadata>
```

10.7 Coordinate reference system

Number	7
Name	Coordinate reference system
Definition	Designates the data resource coordinate (spatial) reference system.
Obligation	• dataset or dataset series: mandatory • service: mandatory
Cardinality	multiple
Example	Code: 004 Code space: hr:nipp:crs Version: 1.0

Coordinate reference system documents the coordinate reference system in which data are. A data resource may use two or more coordinate reference systems, For example, topographic map in scale 1:25000 are using the Croatian Terrestrial Reference System 1996 in Transverse Mercator projection (HTRS96/TM) to represent positions in the plane of projection and the Croatian Vertical Reference System (HVRS71) to represent heights. Both reference systems must be documented.

Code, code space and code space version may be documented. The code uniformly represents the coordinate reference system, while code space and its version specify the domain in which the code is defined. In case no code, code space and code space version are set for the coordinate reference system, free text should be used as code to define the coordinate reference system.

Appendix B, Table "Croatian NSDI coordinate reference systems" brings an initial list of Croatian NSDI coordinate reference systems. If the coordinate reference system of spatial data is not on the list, the metadata editor enters the new value as free text.

The European Petroleum Survey Group (EPSG) has been developing a system of geodetic parameters since 1985. They publicised data in 1993, and in 2005 the EPSG was restructured as *the Surveying and Positioning Committee of the International Association of Oil and Gas Producers* (OGP). The EPSG collects and develops geodetic data, while the OGC uses them as reference data. For more about the EPSG, look on http://www.epsg.org.

Technical data

INSPIRE equivalent	none
Comparison with INSPIRE	-
ISO equivalent	[187] referenceSystemIdentifier
Comparison with ISO	equivalent
XPath	referenceSystemInfo/*/referenceSystemIdentifier
Data type	Class

Domain	MD_Identifier<<DataType>> (see Appendix B) • code RS_Identifier<<DataType>> (see Appendix B) • code space • version
Implementation instructions	It can be documented only code or code, code space and version of code space. If the code, code space and a version of it are defined, *RS_Identifier* is used instead of *MD_Identifier.*

Encoding example

```
<gmd:MD_Metadata...
...
   <gmd:referenceSystemInfo>
     <gmd:MD_ReferenceSystem>
       <gmd:referenceSystemIdentifier>
         <gmd:RS_Identifier>
           <gmd:code>
             <gco:CharacterString>004</gco:CharacterString>
           </gmd:code>
           <gmd:codeSpace>
             <gco:CharacterString>hr:nipp:crs</gco:CharacterString>
           </gmd:codeSpace>
           <gmd:version>
             <gco:CharacterString>1.0</gco:CharacterString>
           </gmd:version>
         </gmd:RS_Identifier>
       </gmd:referenceSystemIdentifier>
     </gmd:MD_ReferenceSystem>
   </gmd:referenceSystemInfo>
...
</gmd:MD_Metadata>
```

10.8 Data format

Number	8
Name	Data format
Definition	Format for resource data transfer.
Obligation	• dataset or dataset series: mandatory • service: not applicable.
Cardinality	multiple
Example	Format name: GeoTIFF Version: 1.8.2

This element defines the format of data transfer and is defined by the format name and version.

Technical data

INSPIRE equivalent	none
Comparison with INSPIRE	-
ISO equivalent	[271] distributionFormat
Comparison with ISO	equivalent
XPath	distributionInfo/*/distributionFormat
Data type	association
Domain	*MD_Format<<DataType>>* [ISO 19115] (see Appendix B) • Format name • version
Implementation instructions	none

Encoding example

```
<gmd:MD_Metadata...
...
   <gmd:distributionInfo>
     <gmd:MD_Distribution>
       <gmd:distributionFormat>
         <gmd:MD_Format>
           <gmd:name>
             <gco:CharacterString>GeoTIFF</gco:CharacterString>
           </gmd:name>
           <gmd:version>
             <gco:CharacterString>1.8.2</gco:CharacterString>
```

```
            </gmd:version>
         </gmd:MD_Format>
      </gmd:distributionFormat>
    </gmd:MD_Distribution>
  </gmd:distributionInfo>
…
</gmd:MD_Metadata>
```

10.9 Resource language

Number	9
Name	Resource language
Definition	Language/s used within the resource.
Obligation	• dataset or dataset series: conditional; mandatory if the resource contains textual information. • service: not applicable.
Cardinality	multiple
Example	hrv

This element defines the language used in a spatial data resource, if the resource contains any text (such as geographic names). Data resource can use several languages, in which case all languages used must be indicated. Three-character language codes must be used (ISO 639-2).

Technical data

INSPIRE equivalent	Resource language
Comparison with INSPIRE	equivalent
ISO equivalent	[3] language
Comparison with ISO	equivalent
XPath	identificationInfo/*/language
Data type	character string
Domain	languages defined by ISO 639-2 standard
Implementation instructions	Only three-letter language codes from ISO 639-2 are used.

The table below shows data for the official EU languages.

Table 10.9.1: EU languages and XML values

Name	XML value	Domain code
Bulgarian	bul	001
Czech	cze	002
Danish	dan	003

English	eng	004
Estonian	est	005
Finnish	fin	006
French	fre	007
Greek	gre	008
Croatian	hrv	009
Irish	gle	010
Lithuanian	lit	011
Latvian	lav	012
Hungarian	hun	013
Maltese	mlt	014
Dutch	dut	015
German	ger	016
Polish	pol	017
Portuguese	por	018
Romanian	rum	019
Slovak	slo	020
Slovenian	slv	021
Spanish	spa	022
Swedish	swe	023
Italian	ita	024

Encoding example

```
<gmd:MD_Metadata...
...
   <gmd:identificationInfo>
      <gmd:MD_DataIdentification>
...
        <gmd:language>
          <gmd:LanguageCode codeList="http://www.loc.gov/standards/iso639-
2"codeListValue="hrv">hrv</gmd:LanguageCode>
        </gmd:language>
```

```
...
     </gmd:MD_DataIdentification>
   </gmd:identificationInfo>
...
</gmd:MD_Metadata>
```

10.10 Topic category

Number	10
Name	Topic category
Definition	Topic category is a high-level classification scheme to assist in the grouping and topic-based search of available spatial data resources.
Obligation	• dataset or dataset series: mandatory • service: not applicable.
Cardinality	multiple
Example	elevation

This element is a standard ISO topic classification helping to group and search spatial data. This is a generalised classification of spatial data themes categorising them roughly. For fine searching, keywords are used. This element's domain values are in accordance with the EN ISO 19115 standard.

Technical data

INSPIRE equivalent	Topic category
Comparison with INSPIRE	equivalent
ISO equivalent	[41] topicCategory
Comparison with ISO	equivalent
XPath	identificationInfo/*/topicCategory
Data type	Class
Domain	*MD_TopicCategoryCode<<Enumeration>>* (see App. B)
Implementation instructions	none

Encoding example

```
<gmd:MD_Metadata...
...
   <gmd:identificationInfo>
     <gmd:MD_DataIdentification>
...
       <gmd:topicCategory>
         <gmd:MD_TopicCategoryCode>elevation</gmd:MD_TopicCategoryCode>
       </gmd:topicCategory>
...
```

```
      </gmd:MD_DataIdentification>
    </gmd:identificationInfo>
...
</gmd:MD_Metadata>
```

10.11 Keyword

Keywords should represent spatial data in a credible and concise manner. They make the principal element for metadata searching. Keywords can be set in two ways:

- selecting a keyword from the thesaurus,
- setting a keyword independently.

1. Selecting a keyword from the thesaurus

Keywords can be selected from an existing, authorised list, called thesaurus. If the keyword is set form a thesaurus, the thesaurus itself must be cited (title, date, date type). One such authorised thesaurus is the *General Environmental Multi-lingual Thesaurus* (GEMET) used for INSPIRE needs. It includes INSPIRE data themes that are selected as keywords. Keywords may also be set using other thesauruses, but it is required to include at least one keyword from GEMET - INSPIRE theme podataka. When entering metadata, the INSPIRE data theme must be selected that best reflects the primary or the most important data resource component. To avoid double or multiple data classification, it is recommended to select only one GEMET-INSPIRE Data Themes. A keyword from the GEMET-INSPIRE data theme must:

- be positioned in the element "Keyword (INSPIRE Theme)",
- be set independently (not in a group of keywords), separated from other, non-"GEMET-INSPIRE data themes" keywords,
- have an identical set of characters, being case-sensitive,
- include accompanying citation of the GEMET thesaurus (title, date, date type).

Table 10.11.1: Croatian NSDI spatial data themes

Nr.	Name	Name in English	Designation	Domain code	Definition
	Annex I				
1	Coordinate reference systems	Coordinate reference systems	coordinateReferenceSystems	001	Systems for uniquely referencing spatial information in space as a set of coordinates (x,y,z) and/or latitude, longitude and height, based on a geodetic horizontal and vertical datum.
2	Geographical grid systems	Geographical grid systems	geographicalGridSystems	002	Harmonised multi-resolution grid with a common point of origin and standardised location and size of grid cells.
3	Geographic names	Geographical names	geographicalNames	003	Names of areas, regions, localities, cities, suburbs, towns or settlements, or any geographical or topographical feature of public or historical interest.
4	Administrative units	Administrative units	administrativeUnits	004	Units of administration, dividing areas where Member States have and/or exercise jurisdictional rights, for local, regional and national governance,

				separated by administrative boundaries.
5	Addresses	Addresses	addresses	005	Location of properties based on address identifiers, usually by road name, house number, postal code.
6	Cadastral parcels	Cadastral parcels	cadastralParcels	006	A cadastral parcel is a part of a cadastral municipality or a cadastral area at sea, defined by the cadastral parcel number and its boundaries.
7	Transport networks	Transport networks	transportNetworks	007	Road, rail, air and water transport networks and related infrastructure. It includes the connections between various networks. Furthermore, it involves the trans-European transport network as determined in Decision no. 1692/96/EZ of the European Parliament and Council of 23 July 1996 about the Community guidelines for the development of a trans-European transport network and the subsequent reviews of that Decision.
8	Hydrography	Hydrography	hydrography	008	Hydrological elements including sea areas and any other water body and its adjoining units, together with the river basins and sub-basins. As needed and in line with the provisions determined by Directive 2000/60/EC of the European Parliament and Council of 23 October 2000 establishing a framework of actions for the Community with regards to the policy on waters׳ and in the form of networks.
9	Protected sites	Protected sites	protectedSites	009	Area determined or governed by international law, law of the Community or its member States, in order to achieve special preservation goals.
10	Data on suspected minefields	(Croatian NSDI extension in relation to INSPIRE)	minesSuspiciousAreas	035	Areas determined as suspicious or unused due to possible or actual existence of mines and explosive materials or unexploded ordnance (Law on Humanitarian Demining (OG 153/05).
	Annex II				
11	Elevation	Elevation	elevation	010	Digital models of altitudes for continental areas, areas of ice and oceans. Includes terrestrial elevation, bathymetry and shoreline.

12	Land cover	Land cover	landCover	011	Physical or biological cover of the Earth's surface, including artificial areas, agricultural lands, forests, (semi) natural areas, swamps and water bodies.
13	Orthoimagery	Orthoimagery	orthoimagery	012	Geo-referenced image data of the Earth's surface, from either satellite or airborne sensors.
14	Geology	Geology	geology	013	Geology is described in line with its composition and structure. Includes bedrock, aquifers and geomorphology.
	Annex III				
15	Statistical units	Statistical units	statisticalUnits	014	Units for dissemination or usage of statistical information.
16	Buildings	Buildings	buildings	015	Geographical location of buildings.
17	Soil	Soil	soil	016	Soils and subsoil characterised according to depth, texture, structure and content of articles and organic material, stoniness, erosion, where appropriate mean slope and anticipated water storage capacity.
18	Land use	Land use	landUse	017	Territory characterised according to its current and future planned functional dimension or socio–economic purpose (e.g. residential, industrial, commercial, agricultural, forestry, recreational).
19	Human health and safety	Human health and safety	humanHealthSafety	018	Geographical distribution of dominance of pathologies (allergies, cancers, respiratory diseases, etc.), information indicating the effect on health (biomarkers, decline of fertility, epidemics) or well-being of humans (fatigue, stress, etc.) linked directly (air pollution, chemicals, depletion of the ozone layer, noise, etc.) or indirectly (food, genetically modified organisms, etc.) to the quality of the environment..
20	Utility and governmental services	Utility and governmental services	utilityGovernmentalServices	019	Includes utility facilities such as sewage, waste management, energy supply and water supply, administrative and social governmental services such as public administrations, civil protection sites, schools and hospitals.
21	Environmental monitoring facilities	Environmental monitoring	environmentalMonitoringFacilities	020	Location and operation of environmental monitoring facilities includes observation

				and measurement of emissions, of the state of environmental media and of other ecosystem parameters (biodiversity, ecological conditions of vegetation, etc.) by or on behalf of public authorities.
22	Production and industrial facilities	Production and industrial facilities	productionIndustrialFacilities	021	Industrial production sites, including installations covered by Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control and water abstraction facilities, mining, storage sites.
23	Agricultural and aquaculture facilities	Agricultural and aquaculture facilities	agriculturalAquacultureFacilities	022	Farming equipment and production facilities (including irrigation systems, greenhouses and stables).
24	Population distribution and demography	Population distribution and demography	populationDistributionDemography	023	Geographical distribution of people, including population characteristics and activity levels, aggregated by grid, region, administrative unit or other analytical unit.
25	Area management / restriction / regulation zones & reporting units	Area management / restriction / regulation zones & reporting units	areaManagement	024	Areas managed, regulated or used for reporting at international, European, national, regional and local levels. Includes dumping sites, restricted areas around drinking water sources, nitrate-ulnerable zones, regulated fairways at sea or large inland waters, areas for the dumping of waste, noise restriction zones, prospecting and mining permit areas, river basin districts, relevant reporting units and coastal zone management areas.
26	Natural risk zones	Natural risk zones	naturalRiskZones	025	Vulnerable areas characterised according to natural hazards (all atmospheric, hydrologic, seismic, volcanic and wildfire phenomena that, because of their location, severity, and frequency, have the potential to seriously affect society), e.g. floods, landslides and subsidence, avalanches, forest fires, earthquakes, volcanic eruptions.
27	Atmospheric conditions	Atmospheric conditions	atmosphericConditions	026	Physical conditions in the atmosphere. Includes spatial data based on measurements, on models or on a combination thereof and includes

				measurement locations.
28	Meteorological geographic features	Meteorological geographical features	meteorologicalGeographicalFeatures	027	Weather conditions and their measurements; precipitation, temperature, evapotranspiration, wind speed and direction.
29	Oceanographic geographical features	Oceanographic geographical features	oceanographicGeographicalFeatures	028	Physical conditions of oceans (currents, salinity, wave heights etc.).
30	Sea regions	Sea regions	seaRegions	029	Physical conditions of seas and saline water bodies divided into regions and sub-regions with common characteristics.
31	Bio-geographical regions	Bio-geographical regions	biogeographicalRegions	030	Areas of relatively homogeneous ecological conditions with common characteristics.
32	Habitats and biotopes	Habitats and biotopes	habitatsBiotopes	031	Geographical areas characterised by specific ecological conditions, processes, structure, and (life support) functions that physically support the organisms that live there. Includes terrestrial and aquatic areas distinguished by geographical, abiotic and biotic features, whether entirely natural or semi-natural.
33	Species distribution	Species distribution	speciesDistribution	032	Geographical distribution of occurrence of animal and plant species aggregated by grid, region, administrative unit or other analytical unit.
34	Energy resources	Energy Resources	energyResources	033	Energy resources including hydrocarbons, hydropower, bio-energy, solar, wind, etc., where relevant including depth/height information on the extent of the resource.
35	Mineral resources	Mineral Resources	mineralResources	034	Mineral resources including metal ores, industrial minerals, etc., where relevant including depth/height information on the extent of the resource.

Table 10.11.2: Citing the selection of an INSPIRE data theme from the GEMET thesaurus

Keyword	Title	Date	Date type
geographic names	GEMET - INSPIRE themes, v.1.0	2008-06-01	published

Table 10.11.3: Citing the selection of keyword value from the GEMET thesaurus

Keyword	Title	Date	Date type
drainage system	GEMET - Themes, v. 2.4	2010-01-13	published

2. Setting independent keyword value

Independent keywords are not linked with the thesaurus. Instead, the metadata editor sets them as free text, assessing which keywords best describe a data resource. Keywords entered should not end with a comma or any special character, since that could lead into an error in checking metadata notations. In determining independent keyword, no link to the thesaurus of keywords is set.

Keyword consists of the following two elements:

- Keyword: value,
- Keyword: thesaurus.

10.11.1 Keyword: value

Number	11
Name	Keyword: value
Definition	Keyword value is a commonly used word, formalized word or phrase used to describe the subject.
Obligation	• dataset or dataset series: mandatory • service: mandatory
Cardinality	multiple
Example	traffic, land cover, topographic map

Keywords allow a more detailed search of metadata records, as well as structured searching by using authorised keywords thesaurus, such as GEMET. Keyword value should, if possible, be taken from the thesaurus.

Dataset and dataset series
If the data resource is a spatial dataset or dataset series, one keyword should be from the GEMET - INSPIRE data theme describing the data theme defined in INSPIRE Appendix I, II or III.

Service
In setting keywords for services, at least one keyword must be selected from *Classification of Spatial Services according to the EN ISO 19119 standard* from the document *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* (see Appendix B). Classification of spatial data services from this

document is based on the taxonomy of services according to EN ISO 19119. This taxonomy is organised into categories and sub-categories, defining the spatial data services classification value domain.

Table 10.11.4: Citing *Classification of Spatial Services according to the EN ISO 19119 standard* keyword thesaurus

Keyword	Title	Date	Date type
catalogue viewer	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	2008-12-03	published

 Search will analyse all keywords. Setting the keyword in the appropriate context can help a user during searching. For example, the word 'Adriatic' can be interpreted as 'Adriatic Sea' or 'Adriatic flora' or 'Adriatic coast' or have another different context. To avoid such ambiguities, the full word should be used, 'Adriatic Sea' or 'Adriatic coast' etc. To avoid 'feigned' errors in checking metadata records, each keyword must end with a letter, and not with another sign, such as comma, space etc.

 Along with mandatory keywords, arbitrary keywords can be added as free text, if the metadata editor assesses that they describe data in a proper way and help in searching.

Technical data

INSPIRE equivalent	Keyword value
Comparison with INSPIRE	equivalent
ISO equivalent	[53] keyword
Comparison with ISO	equivalent
XPath	identificationInfo/*/descriptiveKeywords/*/keyword
Data type	character string
Domain	free text
Implementation instructions	none

Encoding example

<gmd:MD_Metadata...
...

```
    <gmd:identificationInfo>
      <srv:SV_ServiceIdentification >
...
        <gmd:descriptiveKeywords>
          <gmd:MD_Keywords>
            <gmd:keyword>
              <gco:CharacterString>humanCatalogueViewer</gco:CharacterString>
            </gmd:keyword>
            <gmd:thesaurusName>
            …(see encoding example for Keyword: thesaurus)
            </gmd:thesaurusName>
          </gmd:MD_Keywords>
        </gmd:descriptiveKeywords>
      </srv:SV_ServiceIdentification >
    </gmd:identificationInfo>
...
</gmd:MD_Metadata>
```

10.11.2 Keyword: thesaurus

Number	12
Name	Keyword: thesaurus
Definition	Formally registered thesaurus or a similar authoritative source of keywords.
Obligation	• dataset or dataset series: conditional; mandatory if the keyword originates for the thesaurus of keywords. • service: conditional; mandatory if the keyword originates for the thesaurus of keywords.
Cardinality	multiple
Example	Name: GEMET - INSPIRE theme version 1.0 Date: 2008-06-01 Date type: publication

The keyword thesaurus element must be indicated if the keyword is taken from the thesaurus. Citing the keyword thesaurus must include: title, date and date type.

Technical data

INSPIRE equivalent	Originating controlled vocabulary

Comparison with INSPIRE	equivalent
ISO equivalent	[55] thesaurusName
Comparison with ISO	equivalent
XPath	identificationInfo/*/descriptiveKeywords/*/thesaurusName
Data type	Class
Domain	*CI_Citation<<DataType>>* (see Appendix B) • Title • Date • Date type
Implementation instructions	To be compliant with the ISO 19115 standard, all keyword values originating from the same version of the keyword thesaurus must be grouped as one instance and separated by a comma.

Encoding example

```
<gmd:MD_Metadata...
...
   <gmd:identificationInfo>
     <gmd:MD_DataIdentification>
...
        <gmd:descriptiveKeywords>
        <gmd:MD_Keywords>
          <gmd:keyword>
             …(see encoding example Keyword: value)
          </gmd:keyword>
          <gmd:thesaurusName>
            <gmd:CI_Citation>
              <gmd:title>
                <gco:CharacterString>GEMET - INSPIRE themes, version
1.0</gco:CharacterString>
              </gmd:title>
              <gmd:date>
                <gmd:CI_Date>
                  <gmd:date>
                    <gco:Date>2008-06-01</gco:Date>
                  </gmd:date>
                  <gmd:dateType>
                    <gmd:CI_DateTypeCode
```

```
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas/resources/C
odelist/ML_gmxCodelists.xml#CI_DateTypeCode"
codeListValue="publication">publication</gmd:CI_DateTypeCode>
                    </gmd:dateType>
                 </gmd:CI_Date>
              </gmd:date>
           </gmd:CI_Citation>
         </gmd:thesaurusName>
       </gmd:MD_Keywords>
     </gmd:descriptiveKeywords>
   </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
...
</gmd:MD_Metadata>
```

10.12 Geographic location

Geographic location is expressed by the geographic bounding box. Geographic bounding box is the space of propagation of a resource. It is defined by means of the westernmost and easternmost geographic longitude and southernmost and northernmost geographic latitude. Geographic bounding box is used to define the smallest area contains all data.

- Geographic location: northern - most geographic latitude
- Geographic location: southern - most geographic latitude
- Geographic location: eastern - most geographic longitude
- Geographic location: western - most geographic longitude

10.12.1 Geographic location: western - most geographic longitude

Number	13
Name	Geographic location: western - most geographic longitude
Definition	Western - most coordinate of the data scope boundary defined by geographic longitude in degrees (positive towards east).
Obligation	• dataset or dataset series: mandatory • service: conditional; mandatory for services with explicit geographic propagation.
Cardinality	multiple
Example	13,01

Technical data

INSPIRE equivalent	Geographic bounding box: westBoundLongitude
Comparison with INSPIRE	equivalent
ISO equivalent	[344] westBoundLongitude
Comparison with ISO	equivalent
XPath	identificationInfo/*/extent/*/geographicElement/*/westBoundLongitude
Data type	angle, expressed in degrees with at least two decimal digits
Domain	-180,00 ≤ westernmost longitude ≤ 180,00
Implementation instructions	When entering metadata in the Croatian NSDI system, geographic coordinates are set in the HTRS96(GRS80) coordinate reference system in (sexagesimal) degrees to minimum two decimal points.

Encoding example

<gmd:MD_Metadata
…

```
<gmd:identificationInfo>
<gmd:MD_DataIdentification>
…
  <gmd:extent>
    <gmd:EX_Extent>
      <gmd:geographicElement>
        <gmd:EX_GeographicBoundingBox>
          <gmd:extentTypeCode>
            <gco:Boolean>true</gco:Boolean>
          </gmd:extentTypeCode>
          <gmd:westBoundLongitude>
            <gco:Decimal>13,01</gco:Decimal>
          </gmd:westBoundLongitude>
          <gmd:eastBoundLongitude>
            <gco:Decimal>19,45</gco:Decimal>
          </gmd:eastBoundLongitude>
          <gmd:southBoundLatitude>
            <gco:Decimal>41,62</gco:Decimal>
          </gmd:southBoundLatitude>
          <gmd:northBoundLatitude>
            <gco:Decimal>46,55</gco:Decimal>
          </gmd:northBoundLatitude>
        </gmd:EX_GeographicBoundingBox>
      </gmd:geographicElement>
    </gmd:EX_Extent>
  </gmd:extent>
…
</gmd:MD_DataIdentification>
</gmd:identificationInfo>
…
</gmd:MD_Metadata>
```

10.12.2 Geographic location: eastern - most geographic longitude

Number	14
Name	Geographic location: eastern - most geographic longitude
Definition	Eastern - most coordinate of the data scope boundary defined by geographic longitude in degrees (positive towards east).
Obligation	• dataset or dataset series: mandatory • service: conditional; mandatory for services with explicit geographic propagation.
Cardinality	multiple
Example	19,45

Technical data

INSPIRE equivalent	Geographic bounding box: eastBoundLongitude
Comparison with INSPIRE	equivalent
ISO equivalent	[345] eastBoundLongitude
Comparison with ISO	equivalent
XPath	identificationInfo/*/extent/*/geographicElement/*/eastBoundLongitude
Data type	angle, expressed in degrees with at least two decimal digits
Domain	-180,00 ≤ eastern - most longitude ≤ 180,00
Implementation instructions	When entering metadata in the Croatian NSDI system, geographic coordinates are set in the HTRS96 (GRS80) coordinate reference system in (sexagesimal) degrees to minimum two decimal points.

Encoding example

```
<gmd:MD_Metadata
…
<gmd:identificationInfo>
<gmd:MD_DataIdentification>
…
  <gmd:extent>
    <gmd:EX_Extent>
      <gmd:geographicElement>
        <gmd:EX_GeographicBoundingBox>
          <gmd:extentTypeCode>
            <gco:Boolean>true</gco:Boolean>
          </gmd:extentTypeCode>
          <gmd:westBoundLongitude>
            <gco:Decimal>13,01</gco:Decimal>
          </gmd:westBoundLongitude>
          <gmd:eastBoundLongitude>
            <gco:Decimal>19,45</gco:Decimal>
          </gmd:eastBoundLongitude>
          <gmd:southBoundLatitude>
            <gco:Decimal>41,62</gco:Decimal>
          </gmd:southBoundLatitude>
          <gmd:northBoundLatitude>
            <gco:Decimal>46,55</gco:Decimal>
          </gmd:northBoundLatitude>
        </gmd:EX_GeographicBoundingBox>
      </gmd:geographicElement>
    </gmd:EX_Extent>
  </gmd:extent>
```

```
…
</gmd:MD_DataIdentification>
</gmd:identificationInfo>
…
</gmd:MD_Metadata>
```

10.12.3 Geographic location: southern - most geographic latitude

Number	15
Name	Geographic location: southern - most geographic latitude
Definition	Southern - most coordinate of the data scope boundary defined by geographic latitude in degrees (positive towards north).
Obligation	• dataset or dataset series: mandatory • service: conditional; mandatory for services with explicit geographic propagation.
Cardinality	multiple
Example	41,62

Technical data

INSPIRE equivalent	Geographic bounding box: southBoundLatitude
Comparison with INSPIRE	equivalent
ISO equivalent	[346] southBoundLatitude
Comparison with ISO	equivalent
XPath	identificationInfo/*/extent/*/geographicElement/*/southBoundLatitude
Data type	angle, expressed in degrees with at least two decimal digits
Domain	-90,00 ≤ southern - most latitude ≤ northern - most latitude
Implementation instructions	When entering metadata in the Croatian NSDI system, geographic coordinates are set in the HTRS96 (GRS80) coordinate reference system in (sexagesimal) degrees to minimum two decimal points.

Encoding example

```
<gmd:MD_Metadata
…
<gmd:identificationInfo>
<gmd:MD_DataIdentification>
…
```

```
  <gmd:extent>
    <gmd:EX_Extent>
      <gmd:geographicElement>
        <gmd:EX_GeographicBoundingBox>
          <gmd:extentTypeCode>
            <gco:Boolean>true</gco:Boolean>
          </gmd:extentTypeCode>
          <gmd:westBoundLongitude>
            <gco:Decimal>13,01</gco:Decimal>
          </gmd:westBoundLongitude>
          <gmd:eastBoundLongitude>
            <gco:Decimal>19,45</gco:Decimal>
          </gmd:eastBoundLongitude>
          <gmd:southBoundLatitude>
            <gco:Decimal>41,62</gco:Decimal>
          </gmd:southBoundLatitude>
          <gmd:northBoundLatitude>
            <gco:Decimal>46,55</gco:Decimal>
          </gmd:northBoundLatitude>
        </gmd:EX_GeographicBoundingBox>
      </gmd:geographicElement>
    </gmd:EX_Extent>
  </gmd:extent>
...
</gmd:MD_DataIdentification>
</gmd:identificationInfo>
...
</gmd:MD_Metadata>
```

10.12.4 Geographic location: northern - most geographic latitude

Number	16
Name	Geographic location: northern- most geographic latitude
Definition	Northernmost coordinate of the data scope boundary defined by geographic latitude in degrees (positive towards north).
Obligation	• dataset or dataset series: mandatory • service: conditional; mandatory for services with explicit geographic propagation.
Cardinality	multiple
Example	46,55

Technical data

INSPIRE equivalent	Geographic bounding box: northBoundLatitude
Comparison with INSPIRE	equivalent
ISO equivalent	[347] northBoundLatitude
Comparison with ISO	equivalent
XPath	identificationInfo/*/extent/*/geographicElement/*/northBoundLatitude
Data type	angle, expressed in degrees with at least two decimal digits
Domain	Southern - most latitude ≤ northern - most latitude ≤ 90,00
Implementation instructions	When entering metadata in the Croatian NSDI system, geographic coordinates are set in the HTRS96(GRS80) coordinate reference system in (sexagesimal) degrees to minimum two decimal points.

Encoding example

```
<gmd:MD_Metadata
…
<gmd:identificationInfo>
<gmd:MD_DataIdentification>
…
  <gmd:extent>
    <gmd:EX_Extent>
      <gmd:geographicElement>
        <gmd:EX_GeographicBoundingBox>
          <gmd:extentTypeCode>
            <gco:Boolean>true</gco:Boolean>
          </gmd:extentTypeCode>
          <gmd:westBoundLongitude>
            <gco:Decimal>13,01</gco:Decimal>
          </gmd:westBoundLongitude>
          <gmd:eastBoundLongitude>
            <gco:Decimal>19,45</gco:Decimal>
          </gmd:eastBoundLongitude>
          <gmd:southBoundLatitude>
            <gco:Decimal>41,62</gco:Decimal>
          </gmd:southBoundLatitude>
          <gmd:northBoundLatitude>
            <gco:Decimal>46,55</gco:Decimal>
          </gmd:northBoundLatitude>
        </gmd:EX_GeographicBoundingBox>
      </gmd:geographicElement>
    </gmd:EX_Extent>
```

```
   </gmd:extent>
...
</gmd:MD_DataIdentification>
</gmd:identificationInfo>
…
</gmd:MD_Metadata>
```

10.13 Temporal reference

This metadata element documents information about the temporal dimension of data according to INSPIRE requirements. At least one metadata element must be defined, "Temporal extent" or "Reference date", while "Reference date" consists of the elements "Date of publication", "Date of last revision" and "Date of creation". The default calendar format is Gregorian calendar, with dates expressed in accordance with the ISO 8601 standard. Temporal reference consists of the following elements:

- Temporal extent
- Reference date:
  - o Reference date: date of last revision
  - o Reference date: date of publication
  - o Reference date: date of creation
- Update:
  - o Update: frequency
  - o Update: note

10.13.1 Temporal extent

Number	17
Name	Temporal extent
Definition	Time period covered by the content of the resource.
Obligation	• dataset or dataset series: mandatory • service: mandatory
Cardinality	multiple
Example	2002-03-10 2011-01-15

Temporal extent primarily refers to the data collection period. However, if a data resource refers to a historical period, such as the geological Cretaceous period, then temporal extent refers to the moment when data were found or collected. Temporal extent is defined by the start and end dates of data, or either of these. If the start date is not known, it is dropped and only the end date is used. If data are still added to a resource, the end date is dropped, while the start date is indicated, which is also reflected in data status, as being updated.

Technical data

INSPIRE equivalent	Temporal extent
Comparison with INSPIRE	equivalent
ISO equivalent	[351] extent

Comparison with ISO	equivalent
XPath	identificationInfo/*/extent/*/temporalElement/*/extent
Data type	Class
Domain	*TM_primitive<<CodeList>>* [ISO 19108]
Implementation instructions	Temporal extent may be defined in the following forms: - individual dates - interval of dates expressed using the initial and final date of the time interval - combination of individual dates and intervals of dates.

Encoding example

```
<gmd:MD_Metadata...
...
   <gmd:identificationInfo>
     <gmd:MD_DataIdentification>
...
       <gmd:extent>
         <gmd:EX_Extent>
           <gmd:temporalElement>
             <gmd:EX_TemporalExtent>
               <gmd:extent>
                 <gml:TimePeriod gml:id="IDd2febbb4-e66f-4ac8-ba76-8fd9bc7c8be6">
                   <gml:beginPosition>2002-03-10</gml:beginPosition>
                   <gml:endPosition>2011-01-15</gml:endPosition>
                 </gml:TimePeriod>
               </gmd:extent>
             </gmd:EX_TemporalExtent>
           </gmd:temporalElement>
         </gmd:EX_Extent>
       </gmd:extent>
...
     </gmd:MD_DataIdentification>
...
   </gmd:identificationInfo>
...
</gmd:MD_Metadata>
```

10.13.2 Reference date

The element "Reference date" consists of the following elements:

- Reference date: date of last revision
- Reference date: date of publication
- Reference date: date of creation

10.13.2.1 Reference date: date of last revision

Number	18
Name	Reference date: date of last revision
Definition	Date of last review of the resource, if any.
Obligation	• dataset or dataset series: conditional • service: conditional
Cardinality	single
Example	Date: 2010-06-16 Date type: revision
There can be no more than one date of last revision.	

Technical data

INSPIRE equivalent	Date of last revision
Comparison with INSPIRE	equivalent
ISO equivalent	[394] date
Comparison with ISO	equivalent
XPath	identificationInfo/*/citation/*/date[./*/dateType/*/text()='revision']/*/date
Data type	Class
Domain	*CI_Date<<DataType>>* [ISO 19108, ISO 8601] (see Appendix B)
Implementation instructions	Date is set using the values for year, month and day, in the format specified by the ISO 8601 standard. In realising temporal reference, date and date type is specified. Date type serves to distinguish between the dates of creation, the date of publication or the date of last revision.

Encoding example

<gmd:MD_Metadata...
...
   <gmd:identificationInfo>

```
            <gmd:MD_DataIdentification>
              <gmd:citation>
                <gmd:CI_Citation>
...
                    <gmd:date>
                      <gmd:CI_Date>
                        <gmd:date>
                          <gco:DateTime>2010-06-16</gco:DateTime>
                        </gmd:date>
                        <gmd:dateType>
                          <gmd:CI_DateTypeCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas/resources/
Codelist/ML_gmxCodelists.xml#CI_DateTypeCode"
codeListValue="revision">revision</gmd:CI_DateTypeCode>
                        </gmd:dateType>
                      </gmd:CI_Date>
                    </gmd:date>
...
                </gmd:CI_Citation>
              </gmd:citation>
...
            </gmd:MD_DataIdentification>
...
          </gmd:identificationInfo>
...
</gmd:MD_Metadata>
```

10.13.2.2 *Reference date: date of publication*

Number	19
Name	Reference date: date of publication
Definition	Date of publication of the resource, if any, or date when the resource become official.
Obligation	• dataset or dataset series: conditional • service: conditional
Cardinality	multiple
Example	Date: 2010-06-16 Date type: publication

This element defines the date related to data publication. There can be several dates of publication.

Technical data

INSPIRE equivalent	Date of publication
Comparison with INSPIRE	equivalent
ISO equivalent	[394] date
Comparison with ISO	equivalent
XPath	identificationInfo/*/citation/*/date[./*/dateType/*/text()='publication']/*/date
Data type	Class
Domain	*CI_Date<<DataType>>* [ISO 19108, ISO 8601] (see Appendix B)
Implementation instructions	Date is set using the values for year, month and day, in the format specified by the ISO 8601 standard. In realising temporal reference, date and date type is specified. Date type serves to distinguish between the dates of creation, the date of publication or the date of last revision.

Encoding example

```
<gmd:MD_Metadata...
...
   <gmd:identificationInfo>
     <gmd:MD_DataIdentification>
       <gmd:citation>
         <gmd:CI_Citation>
...
           <gmd:date>
             <gmd:CI_Date>
               <gmd:date>
                 <gco:Date>2010-06-16</gco:Date>
               </gmd:date>
               <gmd:dateType>
                 <gmd:CI_DateTypeCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas/resources/
Codelist/ML_gmxCodelists.xml#CI_DateTypeCode" codeListValue="publication">
publication</gmd:CI_DateTypeCode>
               </gmd:dateType>
             </gmd:CI_Date>
```

```
            </gmd:date>
...
          </gmd:CI_Citation>
        </gmd:citation>
...
      </gmd:MD_DataIdentification>
...
    </gmd:identificationInfo>
...
</gmd:MD_Metadata>
```

10.13.2.3 Reference date: date of creation

Number	20
Name	Reference date: date of creation
Definition	Date of creation of the resource.
Obligation	• dataset or dataset series: conditional • service: conditional
Cardinality	single
Example	Date: 2010-06-16 Date type: created
There can be only one date of creation.	

Technical data

INSPIRE equivalent	Date of creation
Comparison with INSPIRE	equivalent
ISO equivalent	[394] date
Comparison with ISO	equivalent
XPath	identificationInfo/*/citation/*/date[./*/dateType/*/text()='creation']/*/date
Data type	Class
Domain	*CI_Date<<DataType>>* [ISO 19108, ISO 8601] (see Appendix B)

Implementation instructions	Date is set using the values for year, month and day, in the format specified by the ISO 8601 standard. In realising temporal reference, date and date type is specified. Date type serves to distinguish between the dates of creation, the date of publication or the date of last revision.

Encoding example

```
<gmd:MD_Metadata...
...
   <gmd:identificationInfo>
     <gmd:MD_DataIdentification>
       <gmd:citation>
         <gmd:CI_Citation>
...
           <gmd:date>
             <gmd:CI_Date>
               <gmd:date>
                 <gco:Date>2010-06-16</gco:Date>
               </gmd:date>
               <gmd:dateType>
                 <gmd:CI_DateTypeCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas/resources/C
odelist/ML_gmxCodelists.xml#CI_DateTypeCode"
codeListValue="creation">creation</gmd:CI_DateTypeCode>
               </gmd:dateType>
             </gmd:CI_Date>
           </gmd:date>
...
         </gmd:CI_Citation>
       </gmd:citation>
...
     </gmd:MD_DataIdentification>
...
   </gmd:identificationInfo>
...
</gmd:MD_Metadata>
```

10.13.3 Update

Update consists of the following elements:
- Update: frequency
- Update: notes.

10.13.3.1 Update: frequency

Number	21
Name	Update: frequency
Definition	Frequency with which modifications are made and data added to the resource after the initial resource has been finished.
Obligation	• dataset or dataset series: mandatory • service: not applicable.
Cardinality	single
Example	monthly
This element documents frequency of the revision of data resource.	

Technical data

INSPIRE equivalent	none
Comparison with INSPIRE	-
ISO equivalent	[143] maintenanceAndUpdateFrequency
Comparison with ISO	equivalent
XPath	identificationInfo/*/resourceMaintenance/*/ maintenanceAndUpdateFrequency
Data type Domain	Class *MD_MaintenanceFrequencyCode<<CodeList>>* (see App. B)
Implementation instructions	'Note' is an important element to document the essence of update frequency.

Encoding example

<gmd:MD_Metadata...
...
   <gmd:identificationInfo>
     <gmd:MD_DataIdentification>
...
       <gmd:resourceMaintenance>
         <gmd:MD_MaintenanceInformation>
           <gmd:maintenanceAndUpdateFrequency>
             <MD_MaintenanceFrequencyCode xmlns="http://www.isotc211.org/2005/gmd"
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas/resources/C

odelist/ML_gmxCodelists.xml#MD_MaintenanceFrequencyCode" codeListValue="**monthly**"/>

                  </gmd:maintenanceAndUpdateFrequency>

...

            </gmd:MD_MaintenanceInformation>

         </gmd:resourceMaintenance>

...

        </gmd:MD_DataIdentification>

     </gmd:identificationInfo>

...

</gmd:MD_Metadata>

10.13.3.2 Update: note

Number	22
Name	Update: note
Definition	Information related to specific requirements of resource maintenance.
Obligation	• dataset or dataset series: mandatory • service: not applicable.
Cardinality	single
Example	Data are updated on the first day of the month.
This element documents additional information about data and metadata update.	

Technical data

INSPIRE equivalent	none
Comparison with INSPIRE	-
ISO equivalent	[148] maintenanceNote
Comparison with ISO	equivalent
XPath	/*/identificationInfo/*/resourceMaintenance/*/maintenanceNote
Data type	character string
Domain	free text
Example	Data are updated on the first day of the month.
Implementation instructions	none

Encoding example

```
<gmd:MD_Metadata...
...
   <gmd:identificationInfo>
     <gmd:MD_DataIdentification>
...
       <gmd:resourceMaintenance>
         <gmd:MD_MaintenanceInformation>
...
           <gmd:maintenanceNote>
             <gco:CharacterString>Data are updated on the first day of the
month.</gco:CharacterString>
           </gmd:maintenanceNote>
         </gmd:MD_MaintenanceInformation>
       </gmd:resourceMaintenance>
...
     </gmd:MD_DataIdentification>
   </gmd:identificationInfo>
...
</gmd:MD_Metadata>
```

10.14 Lineage

Number	23
Name	Lineage
Definition	Statement on process history and/or overall quality of the spatial dataset.
Obligation	• dataset or dataset series: mandatory • service: not applicable.
Cardinality	single
Example	Pursuant to the State Survey and Real Property Cadastre Act, the State Geodetic Administration is responsible to establish and maintain a register of geographical names (Gazetteer). The Gazetteer of the Republic of Croatia is created on the basis of official maps and other official registers and data resources (names of counties, cities and municipalities from the Official Gazette, names of inhabited places from the SGA Register of Spatial Units, the Ministry of Transport Register of Airports etc.). The Gazetteer has been produced since 2004 and now contains geographic names corresponding to map scale 1:200000. The Gazetteer is created in accordance with the INSPIRE data specification for geographic names. Quality control is assured through checks within the name collection procedure and comparisons with other available originals. Quality control is also assured through an online web user interface (http://cgn.dgu.hr) which serves as a place to submit public proposals for changes of existing geographic names of entering new geographic name in the Gazetteer. The Gazetteer of the Republic of Croatia is in use as official document. The Gazetteer also has an international role, since it is published through the EuroGeographics EuroGeoNames system and has been submitted to the UN as a national document (UNGEGN - Gazetter of the Republic of Croatia).

These metadata must document all available relevant information giving a complete picture of data resource origin. They answer the questions: Why? How? When? and similar questions about data resource realisation. Awareness of resource quality is crucial for improving data interoperability, which is why as many relevant information as possible should be stated.

Information about data resource quality control must be indicated, if there are any, and described if quality is assured in another way. It needs to be stated if that is the official version of data (if there are several versions), and if data have legal validity.

Technical data

INSPIRE equivalent	Lineage
Comparison with INSPIRE	equivalent
ISO equivalent	[83] statement
Comparison with ISO	equivalent

XPath	dataQualityInfo/*/lineage/*/statement
Data type	character string
Domain	free text
Implementation instructions	none

Encoding example

<gmd:MD_Metadata …
…
   <gmd:dataQualityInfo>
     <gmd:DQ_DataQuality>
       <gmd:lineage>
         <gmd:LI_Lineage>
           <gmd:statement>
              <gco:CharacterString>**Pursuant to the State Survey and Real Property Cadastre Act, the State Geodetic Administration is responsible to establish and maintain a register of geographical names (Gazetteer). The Gazetteer of the Republic of Croatia is created on the basis of official maps and other official registers and data resources (names of counties, cities and municipalities from the Official Gazette, names of inhabited places from the SGA Register of Spatial Units, the Ministry of Transport Register of Airports etc.). The Gazetteer has been produced since 2004 and now contains geographic names corresponding to map scale 1:200000. The Gazetteer is created in accordance with the INSPIRE data specification for geographic names. Quality control is assured through checks within the name collection procedure and comparisons with other available originals. Quality control is also assured through an online web user interface (http://cgn.dgu.hr) which serves as a place to submit public proposals for changes of existing geographic names of entering new geographic name in the Gazetteer. The Gazetteer of the Republic of Croatia is in use as official document. The Gazetteer also has an international role, since it is published through the EuroGeographics EuroGeoNames system and has been submitted to the UN as a national document (UNGEGN - Gazetter of the Republic of Croatia).</**gco:CharacterString>
           </gmd:statement>
         </gmd:LI_Lineage>
       </gmd:lineage>
     </gmd:DQ_DataQuality>
   </gmd:dataQualityInfo>
…
</gmd:MD_Metadata>

10.15 Spatial resolution

These metadata document spatial data quality and validity. For spatial resolution, scale or distance, at least one metadata element must be documented. Spatial resolution, space is generally used to express spatial distance for maps and products made on the basis of maps, while spatial resolution, distance is used for gridded (raster) data (e.g. aerial and satellite images).

Spatial resolution includes the following elements:

- Spatial resolution : scale,
- Spatial resolution : distance.

10.15.1 Spatial resolution: scale

Number	24
Name	Spatial resolution: scale
Definition	Spatial resolution refers to the level of detail of the dataset, while spatial resolution scale specifies the level of detail of data by stating the map scale denominator.
Obligation	• dataset or dataset series: conditional; mandatory for the dataset or dataset series if the scale equivalent can be specified • service: conditional; mandatory if there is limitation of spatial resolution for the service observed.
Cardinality	multiple
Example	25000

Spatial resolution, scale is most often specified for maps and products made on the basis of maps. It is generally the positive integer value of map scale denominator that is indicated for this element, i.e. 1000 for the map scale 1:1000. If two values are stated, spatial resolution is the value limited by those two values. For example, "25 000, 50 000" assumes the spatial resolution interval to be between scales 1:25 000 and 1:50 000. If data have several scale intervals, the smallest scale is stated.

Technical data

INSPIRE equivalent	Spatial resolution: scale
Comparison with INSPIRE	equivalent
ISO equivalent	[60] equivalentScale
Comparison with ISO	equivalent
XPath	identificationInfo/*/spatialResolution/*/equivalentScale/*/denominator
Data type	integer
Domain	positive integer

Implementation instructions	If spatial resolution: scale is not specified, spatial resolution: distance must be specified.

Encoding example

```
<gmd:MD_Metadata…
…
   <gmd:identificationInfo>
…
      <gmd:MD_DataIdentification>
…
         <gmd:spatialResolution>
            <gmd:MD_Resolution>
               <gmd:equivalentScale>
                  <gmd:MD_RepresentativeFraction>
                     <gmd:denominator>
                        <gco:Integer>25000</gco:Integer>
                     </gmd:denominator>
                  </gmd:MD_RepresentativeFraction>
               </gmd:equivalentScale>
            </gmd:MD_Resolution>
         </gmd:spatialResolution>
…
      </gmd:MD_DataIdentification>
…
   </gmd:identificationInfo>
…
</gmd:MD_Metadata>
```

10.15.2 Spatial resolution: distance

Number	25
Name	Spatial resolution: distance
Definition	Spatial resolution refers to the level of detail of the dataset, while spatial resolution distance specifies the level of detail of data by stating the sample resolution distance.
Obligation	• dataset or dataset series: conditional; mandatory for the dataset or dataset series if the resolution distance equivalent can be specified • service: conditional; mandatory if there is limitation of spatial resolution for the service observed.
Cardinality	multiple

Example	100

Spatial resolution, distance, is most often specified for gridded (raster) data and products on the basis of gridded (raster) data (such as DOF5). It is *Ground Sample Distance* (GSD) that is specified for this element, i.e. the distance from one centre of neighbouring spatial ground samples to another. For raster data, this is the ground distance between centres of neighbouring sample pixels expressed in meters. For point data, GSD expresses the degree of point position reliability.
If two distances are stated, spatial resolution is the area limited by those two values. For example, "20, 50" assumes spatial resolution to be the interval of 20 to 50 meters.
Decimal values are allowed for this element, but are not recommended, except in special cases.

Technical data

INSPIRE equivalent	Spatial resolution: distance
Comparison with INSPIRE	equivalent
ISO equivalent	[61] distance
Comparison with ISO	equivalent
XPath	identificationInfo/*/spatialResolution/*/distance
Data type	length
Domain	Length is the number expressing the value of length and the unit of measure [ISO/TS 19103].
Implementation instructions	Meter is used as units of measure. If spatial resolution: distance is not documented, spatial resolution: scale must be documented.

Encoding example

```
<gmd:MD_Metadata>
   <gmd:identificationInfo>
      <gmd:MD_DataIdentification>
         <gmd:spatialResolution>
            <gmd:MD_Resolution>
               <gmd:distance>
                  <gco:Distance uom="m">100</gco:Distance>
               </gmd:distance>
            </gmd:MD_Resolution>
         </gmd:spatialResolution>
      </gmd:MD_DataIdentification>
   </gmd:identificationInfo>
</gmd:MD_Metadata>
```

10.16 Conformity

Metadata should include information on the degree of conformity with the implementing rules, specifications and other legal acts. ISO 19115 provides a mechanism for reporting about the evaluation of the conformity of the resource against a given specification.

This metadata element is used to indicate the level of conformity with implementation regulations. Conformity is defined by stating the document, the specification and the level of conformity with it. Conformity of a spatial data resource is expressed using the following elements:

- conformity: specification
- conformity: explanation
- conformity: degree.

10.16.1 Conformity: specification

Number	26
Name	Conformity: specification
Definition	Citing implementation rules or other documents with which the spatial data resource is harmonised.
Obligation	• dataset or dataset series: mandatory • service: mandatory
Cardinality	multiple
Example	Title: INSPIRE Data Specification on Geographical Names - Guidelines v 3.0.1 Date: 2010-05-03 Date type: publication
This element defines implementation regulations, specifications and other acts used in checking the conformity of a data resource. The resource may also be in line with several documents. Citation must include the title and the reference data (date of publication, date of last revision or date of creation of the document).	

Technical data

INSPIRE equivalent	Conformity Specification
Comparison with INSPIRE	equivalent
ISO equivalent	[130] specification
Comparison with ISO	equivalent
XPath	dataQualityInfo/*/report/*/result/*/specification
Data type	Class

Domain	CI_Citation<<DataType>> (see Appendix B) • title • date • date type
Implementation instructions	Date is defined in accordance with the ISO 19108 and ISO 8601 standards.

Encoding example

```
<gmd:MD_Metadata...
...
  <gmd:dataQualityInfo>
    <gmd:DQ_DataQuality>
      <gmd:report>
        <gmd:DQ_DomainConsistency>
          <gmd:result>
            <gmd:DQ_ConformanceResult>
              <gmd:specification>
                <gmd:CI_Citation>
                  <gmd:title>
                    <gco:CharacterString>INSPIRE Data Specification on Geographical Names -
Guidelines v 3.0.1</gco:CharacterString>
                  </gmd:title>
                  <gmd:date>
                    <gmd:CI_Date>
                      <gmd:date>
                        <gco:Date>2010-05-03</gco:Date>
                      </gmd:date>
                      <gmd:dateType>
                        <gmd:CI_DateTypeCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas/resources/C
odelist/ML_gmxCodelists.xml#CI_DateTypeCode"codeListValue="publication">publication</gmd:CI_
DateTypeCode>
                      </gmd:dateType>
                    </gmd:CI_Date>
                  </gmd:date>
                </gmd:CI_Citation>
              </gmd:specification>
...
            </gmd:DQ_ConformanceResult>
          </gmd:result>
        </gmd:DQ_DomainConsistency>
      </gmd:report>
...
```

```
        </gmd:DQ_DataQuality>
    </gmd:dataQualityInfo>
</gmd:MD_Metadata>
```

10.16.2 Conformity: explanation

Number	27
Name	Conformity: explanation
Definition	Explanation of conformity.
Obligation	• dataset or dataset series: mandatory • service: mandatory
Cardinality	multiple
Example	Only mandatory items of the cited specification are included in checking the conformity of a data resource and the cited specification. See cited specification.

Technical data

INSPIRE equivalent	explanation*
Comparison with INSPIRE	equivalent*
ISO equivalent	[131] explanation
Comparison with ISO	equivalent
XPath	DQ_DataQuality/report/result/explanation
Data type	character string
Domain	free text
Implementation instructions	none

NOTE: This element is mandatory in the ISO 19115 standard, while the *INSPIRE Metadata Implementing Rules: Technical Guidelines based on EN ISO 19115 and EN ISO 19119 (Version 1.2)* (16.06.2010) do not define it as an independent element, but in the context of other metadata elements.

Encoding example

```
<gmd:MD_Metadata...
...
    <gmd:dataQualityInfo>
        <gmd:DQ_DataQuality>
            <gmd:report>
                <gmd:DQ_DomainConsistency>
                    <gmd:result>
```

```
        <gmd:DQ_ConformanceResult>
...
            <gmd:explanation>
                <gco:CharacterString>Only mandatory items of the cited specification are
included in checking the conformity of a data resource and the cited specification. See cited
specification.</gco:CharacterString>
            </gmd:explanation>
...
        </gmd:DQ_ConformanceResult>
      </gmd:result>
    </gmd:DQ_DomainConsistency>
  </gmd:report>
...
  </gmd:DQ_DataQuality>
 </gmd:dataQualityInfo>
</gmd:MD_Metadata>
```

10.16.3 Conformity: degree

Number	28
Name	Conformity: degree
Definition	Indication of conformity result.
Obligation	• dataset or dataset series: mandatory • service: mandatory
Cardinality	multiple
Example	true

 This element serves to declare the conformity of a data resource with an official document. INSPIRE implementation rules for metadata (COMMISSION REGULATION (EC) No 1205/2008, Part D) define three degrees of conformity: conformant, notConformant, and notEvaluated. The three degrees of conformity follow the following rules:

- When conformity with a specification is applied, it is reported as conformity domain element (instance of DQ_DomainConsistency) from the ISO 19115 standard. In such a case, if checking is successful, the resource is conformant, and in case of an unsuccessful checking, the resource is not conformant.
- If metadata (ISO 19115) related to conformity are missing, the assumption is that conformity with a specification is not applied.

 Conformity with several documents can be made. In such a case, conformity elements are documented for each document.

Technical data

INSPIRE equivalent	Conformity Degree
Comparison with INSPIRE	equivalent
ISO equivalent	[132] pass
Comparison with ISO	equivalent
XPath	dataQualityInfo/*/report/*/result/*/pass
Data type	Boolean
Domain	• true (1=yes) - data resource is harmonised with cited specification • false (0=no) - data resource is not harmonised with cited specification.
Implementation instructions	The first two degrees of conformity defined for metadata in the INSPIRE implementation regulations (COMMISSION REGULATION (EC) No 1205/2008, Part D) map two Boolean domain values from the ISO 19115 standards. The last value (notEvaluated) refers to cases when data on conformity are not included in metadata for certain specification. According to ISO 19115, the subordinate element 'Explanation' of conformity is mandatory if DQ_ConformanceResults is defined.

Encoding example

```
<gmd:MD_Metadata...
...
  <gmd:dataQualityInfo>
    <gmd:DQ_DataQuality>
      <gmd:report>
        <gmd:DQ_DomainConsistency>
          <gmd:result>
            <gmd:DQ_ConformanceResult>
...
              <gmd:pass>
                <gco:Boolean>true</gco:Boolean>
              </gmd:pass>
            </gmd:DQ_ConformanceResult>
          </gmd:result>
        </gmd:DQ_DomainConsistency>
      </gmd:report>
...
    </gmd:DQ_DataQuality>
  </gmd:dataQualityInfo>
```

```
</gmd:MD_Metadata>
```

10.17 Constraints related to access and use

Metadata elements of constraints related to access and use specify a high level of data classification. They provide information to the user about any limitations to access and use of data resources. In setting constraints related to access and use, care must be taken to set specific values for data resources, because metadata are not meant to be repositories of knowledge about a particular right or a special form of licensing. If there are detailed information or documents published about particular rights, links to the relevant document or information can be documented to help the user. Constraints related to access and use are expressed by means of the following:

- Conditions of access and use
- Public access limitations: access
- Public access limitations: other restrictions

10.17.1 Conditions of access and use

Number	29
Name	Conditions of access and use
Definition	Conditions for accessing and using the spatial data resource with fees, if applicable.
Obligation	• dataset or dataset series: mandatory • service: mandatory
Cardinality	multiple
Example	no conditions

These metadata must be documented. All conditions of access to and use of the resource are stated. If the conditions of access and use are not defined, then 'no conditions apply' is stated. If the conditions are not known, 'conditions unknown' is stated. All fees that need to be paid to access and use data must be stated and, as well as the web-address (*Uniform Resource Locator, URL*), if there is any, where information about fees is mentioned.

Technical data

INSPIRE equivalent	Conditions applying to access and use
Comparison with INSPIRE	equivalent
ISO equivalent	[68] useLimitation
Comparison with ISO	equivalent
XPath	identificationInfo/*/resourceConstraints/*/useLimitation
Data type	character string
Domain	free text

Implementation instructions	none

Encoding example

```
<gmd:MD_Metadata...
...
   <gmd:identificationInfo>
     <gmd:MD_DataIdentification>
...
       <gmd:resourceConstraints>
         <gmd:MD_Constraints>
           <gmd:useLimitation>
             <gco:CharacterString>no conditions</gco:CharacterString>
           </gmd:useLimitation>
         </gmd:MD_Constraints>
       </gmd:resourceConstraints>
       <gmd:resourceConstraints>
...      (see encoding example for Public access limitations: access)
       </gmd:resourceConstraints>
...
     </gmd:MD_DataIdentification>
   </gmd:identificationInfo>
...
</gmd:MD_Metadata>
```

10.17.2 Public access limitations

Public access limitations consists of the following elements:

- Public access limitations: access
- Public access limitations: other restrictions

10.17.2.1 Public access limitations: access

Number	30
Name	Public access limitations: access
Definition	Access limitations are applied to ensure the protection of privacy or intellectual rights, or any other impediments or restrictions to access data resource.
Obligation	• dataset or dataset series: mandatory • service: mandatory

Cardinality	multiple
Example	other restrictions

This metadata element provide information about the type of and reasons for limitations of public access to spatial data. It is specifying licensing, paying fees and other conditions limiting free and public access to data. If there are no public access limitations, this fact must be indicated. The ISO 19115 standards provide mechanisms for documenting various forms of limitation through class *MD_Constraints*. INSPIRE defines rules for this element with regard to instance *MD_Constraints*:

1. there may be no limitations of public access to data,
2. there may be one of more instances of *accessConstraints*, which may be connected with one or more instances of *otherRestrictions*, which is an instance of *MD_LegalConstraints*,
3. if *otherRestrictions* is a value of *accessConstraints*, then instance *otherConstraints* must be set to express public access limitations, which is a requirement appearing because public access limitations in some cases may be documented only as free text, and *otherConstraints* is the only document making this possible.

Using an additional URL link may enable on-line access to documents such as contracts, agreements, licences or additional conditions.

At least one data element must be indicated for public access limitation. In cases where there are no limitations, the element *accessConstraints* must include the value *otherRestrictions*, while the element *otherConstraints* must include text 'no limitations'.

Technical data

INSPIRE equivalent	Limitations on public access: accessConstraints
Comparison with INSPIRE	equivalent
ISO equivalent	[70] accessConstraints
Comparison with ISO	equivalent
XPath	identificationInfo/*/resourceConstraints/*/accessConstraints
Data type	character string
Domain	*MD_RestrictionCode<<CodeList>>*
Implementation instructions	This element documents predefined limitations to public access. Public access limitations: there can be more limitations than are suggested by the defined codelist.

Encoding example

```
<gmd:MD_Metadata...
...
   <gmd:identificationInfo>
     <gmd:MD_DataIdentification>
...
       <gmd:resourceConstraints>
         <gmd:MD_LegalConstraints>
           <gmd:accessConstraints>
             <gmd:MD_RestrictionCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas/resources/C
odelist/gmxCodelists.xml#MD_RestrictionCode"
codeListValue="otherRestrictions">otherRestrictions</gmd:MD_RestrictionCode>
           </gmd:accessConstraints>
...
         </gmd:MD_LegalConstraints>
       </gmd:resourceConstraints>
...
     </gmd:MD_DataIdentification>
   </gmd:identificationInfo>
...
</gmd:MD_Metadata>
```

10.17.2.2 Public access limitations: other restrictions

Number	31
Name	Public access limitations: other restrictions
Definition	Other restrictions and legal terms for accessing and using resources or metadata.
Obligation	• dataset or dataset series: mandatory • service: mandatory
Cardinality	multiple
Example	no limitations

Unlike the element 'Public access limitations: access', this element is defined as free text and all additional limitations may be added into it. These metadata provide information about the type of and reasons for those limitations of public access to data that are not included in the element 'Public access limitations: access'. Using an additional URL link may enable on-line access to documents such as contracts, agreements, licences or additional conditions.

At least one data element must be indicated for public access limitation. In cases where there are no limitations, the element *accessConstraints* must include the value *otherRestrictions*, while the

element *otherConstraints* must include text 'no limitations'.

Technical data

INSPIRE equivalent	Limitations on public access: otherConstraints
Comparison with INSPIRE	equivalent
ISO equivalent	[72] otherConstraints
Comparison with ISO	equivalent
XPath	identificationInfo/*/resourceConstraints/*/otherConstraints
Data type	character string
Domain	free text and/or URL
Implementation instructions	If *otherRestrictions* is the value of *accessConstraints,* than an instance of *otherConstraints* containing limitations to public access should exist. This is because limitations to public access required by the INSPIRE Directive can be set as free text and *otherRestrictions* is an element allowed by the set type of data. Depending on the instance of *MD_Constraints*: • limitation to public access does not need to exist, • there may be one or several instances of *accessConstraints,* which may be linked with one or several instances of *otherRestrictions*, i.e. instance of *MD_LegalConstraints*.

Encoding example

```
<gmd:MD_Metadata...
...
   <gmd:identificationInfo>
     <gmd:MD_DataIdentification>
...
       <gmd:resourceConstraints>
         <gmd:MD_LegalConstraints>
...
           <gmd:otherConstraints>
             <gco:CharacterString>no limitations</gco:CharacterString>
           </gmd:otherConstraints>
         </gmd:MD_LegalConstraints>
       </gmd:resourceConstraints>
```

```
...
      </gmd:MD_DataIdentification>
   </gmd:identificationInfo>
...
</gmd:MD_Metadata>
```

10.18 Responsible organisation

Responsible organisation is defined using the responsible party metadata and role. One or several organisations may be responsible for one data resource. However, the responsible party and its role are expressed in relation to a record related to the responsible organisation. Responsible organisation is specified using the following elements:

- Responsible party
- Responsible party role

10.18.1 Responsible party

Number	32
Name	Responsible party
Definition	Description of the organization responsible for establishment, management, maintenance and distribution of the resource.
Obligation	• dataset or dataset series: mandatory • service: mandatory
Cardinality	multiple
Example	Name of organisation: Sector for Geoinformation Systems, State Geodetic Administration e-mail: infonipp@dgu.hr Contact person: Pero Perić

As a general principle, and especially in cases where data are required to be cited in publications, certain authors' names must be included. If there is a helpdesk or service responsible for a data resource, related information needs to be stated.

Technical data

INSPIRE equivalent	Responsible party
Comparison with INSPIRE	equivalent
ISO equivalent	[29] pointOfContact
Comparison with ISO	equivalent
XPath	identificationInfo/*/pointOfContact
Data type	Class

Domain	*CI_ResponsibleParty<<DataType>>* (see Appendix B) Must contain minimum: name of organisation and e-mail address, while other elements (position of contact, regular mail address, phone number, fax number, web-address etc.) may be documented if there are any available.
Implementation instructions	Each instance of *CI_ResponsibleParty*, or any of its sub-classes, describes the responsible organisation, e-mail address, role of responsible party, contact position, regular mail address, phone number, fax number and web-address.

Encoding example

```
<gmd:MD_Metadata...
...
   <gmd:identificationInfo>
     <gmd:MD_DataIdentification>
...
       <gmd:pointOfContact>
         <gmd:CI_ResponsibleParty>
           <gmd:organisationName>
             <gco:CharacterString>Sector for Geoinformation Systems, State Geodetic
Administration</gco:CharacterString>
           </gmd:organisationName>
           <gmd:contactInfo>
             <gmd:CI_Contact>
               <gmd:address>
                 <gmd:CI_Address>
                   <gmd:electronicMailAddress>
                     <gco:CharacterString>infonipp@dgu.hr</gco:CharacterString>
                   </gmd:electronicMailAddress>
                 </gmd:CI_Address>
               </gmd:address>
             </gmd:CI_Contact>
           </gmd:contactInfo>
           <gmd:role>
             ...(see encoding example for Responsible party role)
           </gmd:role>
         </gmd:CI_ResponsibleParty>
       </gmd:pointOfContact>
...
   </gmd:identificationInfo>
...
```

```
</gmd:MD_Metadata>
```

10.18.2 Responsible party role

Number	33
Name	Responsible party role
Definition	Role the responsible party has.
Obligation	• dataset or dataset series: mandatory • service: mandatory
Cardinality	multiple
Example	custodian

In metadata records, roles and responsibilities occur in different contexts and with different meanings, and it is important not to mix them.

There are no limitations for the number of responsible parties that can be specified to describe different roles and responsibilities. It is recommended to specify several responsible parties, for users to be better informed, which is among the basic principles in the general procedure of responding to requests for information. It is recommended to specify at least four roles: resource point of contact, resource stakeholder, resource custodian and resource distributor. It is recommended, where possible, to document data resource owner(s), for it facilitates dealing with potential licence rights and obligations. It is important to identify responsibility for a data resource, among other things, for citation and resource indication needs. Personal information referring to external associates related to data resource should not be stated without their written agreement.

Technical data

INSPIRE equivalent	Responsible party role
Comparison with INSPIRE	equivalent
ISO equivalent	[379] role
Comparison with ISO	equivalent
XPath	identificationInfo/*/pointOfContact/*/role
Data type	Class
Domain	*CI_RoleCode<<CodeList>>* (see Appendix B)
Implementation instructions	none

Encoding example

```
<gmd:MD_Metadata...
...
    <gmd:identificationInfo>
      <gmd:MD_DataIdentification>
...
        <gmd:pointOfContact>
          <gmd:CI_ResponsibleParty>
            <gmd:organisationName>
              <gco:CharacterString>State Geodetic Administration</gco:CharacterString>
            </gmd:organisationName>
            <gmd:contactInfo>
                ...(see encoding example for Responsible party)
            </gmd:contactInfo>
            <gmd:role>
              <gmd:CI_RoleCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas/resources/
Codelist/gmxCodelists.xml#CI_RoleCode"
codeListValue="custodian">custodian</gmd:CI_RoleCode>
            </gmd:role>
          </gmd:CI_ResponsibleParty>
        </gmd:pointOfContact>
...
    </gmd:identificationInfo>
...
</gmd:MD_Metadata>
```

10.19 Metadata point of contact

Number	34
Name	Metadata point of contact
Definition	Description of the organization responsible for the creation and maintenance of metadata
Obligation	• dataset or dataset series: mandatory • service: mandatory
Cardinality	multiple
Example	Organisation: Sector for Geoinformation Systems, State Geodetic Administration e-mail: infonipp@dgu.hr Role: point of contact Person: Pero Perić

Metadata point of contact must contain the name of organisation, e-mail address and organisation roles. Other elements (position of contact, regular mail address, phone number, fax number, web-address etc.) may be documented if there are any available, but are not mandatory.

Technical data

INSPIRE equivalent	Metadata point of contact
Comparison with INSPIRE	equivalent
ISO equivalent	[8] contact
Comparison with ISO	equivalent
XPath	contact
Data type	Class
Domain	*CI_ResponsibleParty<<DataType>>* (see Appendix B) • organisation • e-mail • role • person
Implementation instructions	INSPIRE restricts *CI_RoleCode<<CodeList>>* to *pointOfContact*.

Encoding example

<gmd:MD_Metadata...

```
...
   <gmd:contact>
     <gmd:CI_ResponsibleParty>
       <gmd:organisationName>
         <gco:CharacterString>Sector for Geoinformation Systems, State Geodetic
Administration</gco:CharacterString>
       </gmd:organisationName>
       <gmd:contactInfo>
         <gmd:CI_Contact>
           <gmd:address>
             <gmd:CI_Address>
               <gmd:electronicMailAddress>
                 <gco:CharacterString>infonipp@dgu.hr</gco:CharacterString>
               </gmd:electronicMailAddress>
             </gmd:CI_Address>
           </gmd:address>
         </gmd:CI_Contact>
       </gmd:contactInfo>
       <gmd:role>
         <gmd:CI_RoleCode>
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas/resources/
Codelist/gmxCodelists.xml#CI_RoleCode"
codeListValue="pointOfContact">pointOfContact</gmd:CI_RoleCode>
       </gmd:role>
     </gmd:CI_ResponsibleParty>
   </gmd:contact>
...
</gmd:MD_Metadata>
```

10.20 Metadata date

Number	35
Name	Metadata date
Definition	Date which specifies when the metadata record was created or updated.
Obligation	• dataset or dataset series: mandatory • service: mandatory
Cardinality	single
Example	2005-03-27

These metadata specify the date when metadata were last updated or were confirmed to be updated, or if they have not been updated, the date of creation.

Technical data

INSPIRE equivalent	Metadata date
Comparison with INSPIRE	equivalent
ISO equivalent	[9] dateStamp
Comparison with ISO	equivalent
XPath	dateStamp
Data type	Class
Domain	*Datum* [ISO 8601]
Implementation instructions	Date encoding is a string whose format is specified in ISO 8601. This class is documented in u ISO/TS 19103.

Encoding example

```
<gmd:MD_Metadata...
...
   <gmd:dateStamp>
     <gco:Date>2005-04-18</gco:Date>
   </gmd:dateStamp>
...
</gmd:MD_Metadata>
```

10.21 Metadata language

Number	36
Name	Metadata language
Definition	Language in which metadata elements are expressed.
Obligation	• dataset or dataset series: mandatory • service: mandatory
Cardinality	single
Example	eng

Language features are not mandatory in the ISO 19115 standard, but are required in the *INSPIRE Metadata Implementing Rules.* In setting metadata, the use of Croatian is presumed, with English as the second language. One metadata record is set in only one language. The three-character code list of languages defined in ISO 639-2 must be used, i.e. *hrv* or *eng.*

Technical data

INSPIRE equivalent	Metadata language
Comparison with INSPIRE	equivalent (limited to Croatian and English)
ISO equivalent	[3] language
Comparison with ISO	equivalent (limited to Croatian and English)
XPath	language
Data type	character string
Domain	Official languages defined by the ISO 639-2 standard.
Implementation instructions	Only three-letter language codes from ISO 639-2 can be used.

Table 10.21.1: List of metadata language codes

Nr.	Name	XML value	Domain code
1	Croatian	hrv	001
2	English	eng	002

Encoding example

<gmd:MD_Metadata...
...

```
   <gmd:identificationInfo>
     <gmd:MD_DataIdentification>
...
       <gmd:language>
         <gmd:LanguageCode codeList="http://www.loc.gov/standards/iso639-
2"codeListValue="hrv">eng</gmd:LanguageCode>
       </gmd:language>
...
     </gmd:MD_DataIdentification>
   </gmd:identificationInfo>
...
</gmd:MD_Metadata>
```

10.22 Service type

Number	37
Name	Service type
Definition	Type of spatial data service.
Obligation	• dataset or dataset series: not applicable. • service: mandatory
Cardinality	single
Example	review

These metadata help in searching available spatial data services. ISO 19115 considers a longer list of possible values, while INSPIRE is limited to the following: discovery, view, download, transformation, invoke and other services.

Technical data

INSPIRE equivalent	Spatial data service type
Comparison with INSPIRE	equivalent
ISO equivalent	[1] serviceType
Comparison with ISO	equivalent
XPath	identificationInfo/*/serviceType
Data type	generic name
Domain	See table List of INSPIRE services
Implementation instructions	One service is listed under only one category.

List of INSPIRE services

Nr.	Name / Role name	XML value	Domain code	Description
1	Discovery	discovery	001	Discovery service allows finding spatial datasets, dataset series and spatial data services on the basis of metadata content and it shows metadata content.
2	View	view	002	View service allows viewing, navigating, zooming in and out, moving or overlapping visible datasets and viewing legends and relevant metadata

				contents.
3	Download	download	003	Download service allows copying spatial datasets or their parts, in order for them to be downloaded and, if feasible, accessed directly.
4	Transformation	transformation	004	Transformation service allows transformation of spatial data resources to achieve greater interoperability.
5	Invoke	invoke	005	Invoke service allows defining both entry and exit of spatial data expected of a spatial service and procedure, or of a combined chain service consisting of several services. This service also allows defining an external interface for web-services of chain procedures or services.
6	Other	other	006	Other services.

Encoding example

```
<gmd:MD_Metadata…
…
   <gmd:identificationInfo>
     <srv:SV_ServiceIdentification>
…
       <srv:serviceType>
         <gco:LocalName>view</gco:LocalName>
       </srv:serviceType>
…
     </srv:SV_ServiceIdentification>
   </gmd:identificationInfo>
</gmd:MD_Metadata>
```

10.23 Coupled resource

Number	38
Name	Coupled resource
Definition	If the data service resource, coupled resource, is identified, where this is relevant, link to the service of spatial dataset(s) is created with a unique resource identifier.
Obligation	• dataset or dataset series: not applicable. • service: conditional; mandatory if there is available link to the dataset related to the service.
Cardinality	multiple
Example	http://cgn.dgu.hr

This metadata element connects a service with a dataset or a dataset series over which the observed service is established. It serves to provide information about the dataset over which the service is established. Metadata for spatial datasets and dataset series are entered into the Croatian NSDI metadata system, as well as metadata for services established over them. A coupled resource must be specified when a service is specified for a dataset or a dataset series that is already registered in the Croatian NSDI metadata system.

Unique Resource Locator (URL) of the dataset over which a service is established can be indicated as Unique Resource Identifier (URI). This element can be identical with the element Unique Resource Identifier for the dataset over which the observed service is established. Also, this element's domain can be identified by code and code space, and a version of it uniquely defining the code.

Technical data

INSPIRE equivalent	Coupled resource
Comparison with INSPIRE	equivalent
ISO equivalent	[9] operatesOn
Comparison with ISO	equivalent, but only implementation by link is supported
XPath	identificationInfo/*/operatesOn
Data type	Class
Domain	Unique resource identifier (URI) or location (URL) *MD_DataIdentification* of the object.
Implementation instructions	Data dictionary for SV_ServiceIdentification defines the role operatesOn over the targeted class MD_DataIdentification. Domain

	value of these metadata is the mandatory code expressed in a character string, most often defined by the data distributor, and the code space expressed in a character string uniquely determining the context of the identification code (e.g. data owner).

Encoding example

```
<gmd:MD_Metadata…
…
   <gmd:identificationInfo>
      <srv:SV_ServiceIdentification>
…
         <srv:operatesOn xlink:href="http://cgn.dgu.hr"/>
      </srv:SV_ServiceIdentification>
…
   </gmd:identificationInfo>
…
</gmd:MD_Metadata>
```

11 Managing metadata

Metadata are created to document a data resource, making it possible, among other things, to:

- discover it,
- access it,
- use it,
- maintain it.

During metadata lifecycle, there are several participants involved in their creation and maintenance. They may vary from time to time, but most frequently they include the following:

- resource provider: party providing a data resource. In the context of Croatian NSDI, the types of data resources are limited to *spatial datasets, dataset series and spatial data services*.

- user: party trying to find, access and use a data resource.

- broker: party mediating between a resource provider and a potential user. In most cases, the broker is a catalogue service.

All the participants above are connected with the following activities:

- publish: data resource provider publishing metadata that describe a resource,

- find: user looking for and finding a data resource on broker's web-page using metadata description,

- bind: by using metadata to discover a data resource, user finally connecting with the resource and using it.
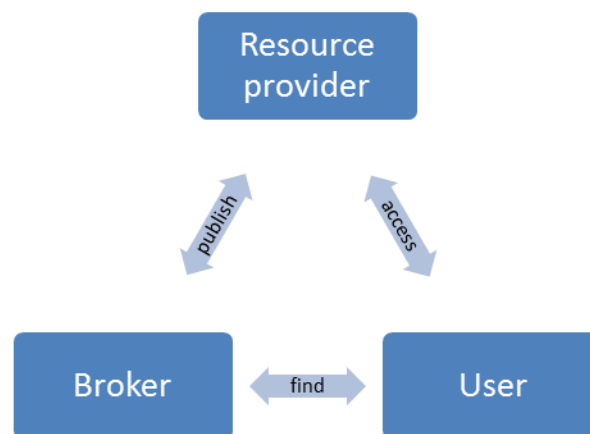
Figure 10.1. The publish-find-bind model

Only updated metadata have value and are used to find and access a data resource. Metadata maintenance is the responsibility of resource provider.

A metadata element's values can be provided in many ways, depending on their nature and the nature of the resource they describe. Some values can be retrieved directly from the resource, while other can be collected manually or retrieved from other metadata model, e.g. OGC Web Service Capabilities transformation. Some examples include:

- retrieved from resource: unique resource identifier, resource locator, geographic extent, resource type, reference date

- collected manually: resource title, resource abstract, lineage, conditions for access and use, conformity, keywords, responsible organisation

- from external model: type of spatial data service, keywords, responsible organisation, resource locator.

Metadata collection is often the responsibility of metadata editors. They apply several ways of retrieving and collecting data and creating relevant metadata values.

12 Croatian NSDI metadata examples

12.1 Examples of Croatian NSDI metadata for spatial dataset and spatial dataset series

Nr.	Element name	Definition	Maximum occurrence (1-single, N-multiple)	Obligation (M-mandatory, C-conditional)	Example (If a metadata element has multiple values, for clarity reasons consecutive numbers are indicated)
1	Resource title	Characteristic, and often unique, name by which the resource is known.	1	M	Register of geographic names
2	Alternative resource title	Abbreviation, acronym, other name or resource title in another language.	N	C	1. CroGeoNames 2. CGN
3	Source abstract	Brief narrative summary of the resource content.	1	M	Register of geographic names contains geographic names on the territory of Croatia from official maps and other original official sources. The Register contains the names of counties, cities/municipalities, inhabited places, UNESCO cultural heritage sites in Croatia, airports, national parks, nature parks and other protected natural areas, sheets of new topographic maps, names from EuroGlobalMap v.3.0. etc. Also, the names of all islands, rivers, lakes, mountains, peaks and other dominant geographic features in line with the scale are included. Data on the position are given in the HTRS96/TM coordinate reference system. UTF8 encoding is used.
4	Resource type	Type of resource described by the metadata.	1	M	dataset
5	Resource locator	Defines the link(s) to the resource and/or the link to additional information about the resource.	N	C	http://cgn.dgu.hr

6	Unique resource identifier	Value uniquely identifying the resource.	N	M	Code: 0010 Code space: hr:nipp:pp Version: 1.0
7	Coordinate reference system	Designates the data resource coordinate (spatial) reference system.	N	M	Code: 004 Code space: hr:nipp:crs Version: 1.0
8	Data format	Format for resource data transfer.	N	M	Format: PDF Version: 1.7
9	Resource language	Language/s used within the resource.	N	C	1. hrv 2. srp 3. ita 4. hun 5. ces
10	Topic category	Topic category is a high-level classification scheme to assist in the grouping and topic-based search of available spatial data resources.	N	M	1. geo-scientific information 2. location
11	Keyword: value	Keyword value is a commonly used word, formalized word or phrase used to describe the subject.	N	M	1. geographic names 2. toponyms 3. oronyms 4. mareonyms 5. names of cities 6. names of inhabited places
12	Keyword: thesaurus	Formally registered thesaurus or a similar authoritative source of keywords.	N	C	1. Title: GEMET - INSPIRE themes, v.1.0, Date: 2008-06-01, Date type: publication
13	Geographic location: westernmost geographic longitude	Westernmost coordinate of the data scope boundary defined by geographic longitude in degrees (positive towards east).	N	M	13,01

14	Geographic location: easternmost geographic longitude	Easternmost coordinate of the data scope boundary defined by geographic longitude in degrees (positive towards east).	N	M	19,45
15	Geographic location: southern-most geographic latitude	Southernmost coordinate of the data scope boundary defined by geographic latitude in degrees (positive towards north).	N	M	41,62
16	Geographic location: northern-most geographic latitude	Northernmost coordinate of the data scope boundary defined by geographic latitude in degrees (positive towards north).	N	M	46,55
17	Temporal extent	Temporal extent covered by the content of the resource.	N	M	2008-05-10 2012-02-01
18	Reference date: date of last revision	Date of last review of the resource, if any.	1	C	2010-04-09
19	Reference date: date of publication	Date of publication of the resource, if any, or date when the resource become official.	N	C	2009-07-19
20	Reference date: date of creation	Date of creation of the resource.	1	C	2008-05-10
21	Update: frequency	Frequency with which modifications are made and data added to the resource after the initial resource has been finished.	1	M	irregular
22	Update: note	Information related to specific requirements of resource maintenance.	1	M	Names for feeding the Register of geographic names are collected continuously. But, updating is done irregularly.
23	Lineage	Statement on process history and/or overall quality of the spatial dataset.	1	M	Geographic names collected from geographic maps and other official sources. Names of geographic features are included corresponding to scale 1:200000.
24	Spatial resolution: scale	Spatial resolution refers to the level of detail of the dataset, while spatial resolution scale specifies the level of detail of data by stating the map scale denominator.	N	C	200000

25	Spatial resolution: distance	Spatial resolution refers to the level of detail of the dataset, while spatial resolution distance specifies the level of detail of data by stating the sample resolution distance.	N	C	5000
26	Conformity: specification	Citing implementation rules or other documents with which the spatial data resource is harmonised.	N	M	Title: INSPIRE Data Specification on Geographical Names - Guidelines v 3.0.1 Date: 2010-05-03 Date type: publication
27	Conformity: explanation	Explanation of conformity.	N	M	Register of geographic names is created within the EuroGeoNames project, implemented in accordance with INSPIRE requirements.
28	Conformity: level	Indication of conformity result.	N	M	yes
29	Conditions of access and use	Conditions for accessing and using the spatial data resource with fees, if applicable.	N	M	no conditions
30	Public access limitations: access	Access limitations are applied to ensure the protection of privacy or intellectual rights, or any other impediments or restrictions to access data re resource.	N	M	other restrictions
31	Public access limitations: other restrictions	Other restrictions and legal terms for accessing and using re resources or metadata.	N	M	no limitations
32	Responsible party	Description of the organization responsible for establishment, management, maintenance and distribution of the re resource.	N	M	Name: Sector for geoinformation systems, State Geodetic Administration e-mail: infonipp@dgu.hr Name of responsible person: Pero Perić Role: Point of contact Telephone: +385-1-1234567 Fax: +385-1-1234568 Point of delivery: Gruška 20 City: Zagreb Postal code: 10000 Country: Croatia Online source: http://www.dgu.hr

33	Responsible party role	Role the responsible party has.	N	M	1. originator 2. owner 3. distributor
34	Metadata point of contact	Description of the organization responsible for the creation and maintenance of metadata	N	M	Name: Sector for geoinformation systems, State Geodetic Administration e-mail: infonipp@dgu.hr Name of responsible person: Pero Perić Role: Point of contact Telephone: +385-1-1234567 Fax: +385-1-1234568 Point of delivery: Gruška 20 City: Zagreb Postal code: 10000 Country: Croatia Online source: http://www.dgu.hr
35	Metadata date	Date which specifies when the metadata record was created or updated.	1	M	2012-11-21
36	Metadata language	Language in which metadata elements are expressed.	1	M	eng

12.2 Examples of metadata for Croatian NSDI spatial data services

Nr.	Element name	Definition	Maximum occurrence (1-single, N-multiple)	Obligation (M-Mandatory, C-conditional)	Example (If a metadata element has multiple values, for clarity reasons consecutive numbers are indicated)
1	Resource title	Characteristic, and often unique, name by which the resource is known.	1	M	Detailed topographic map in scale 1:25000
2	Alternative resource title	Abbreviation, acronym, other name or resource title in another language.	N	C	TK25
3	Source abstract	Brief narrative summary of the resource content.	1	M	First edition of TK25. It covers the whole territory of the Republic of Croatia.
4	Resource type	Type of resource described by the metadata.	1	M	service
5	Resource locator	Defines the link(s) to the resource and/or the link to additional information about the resource.	N	C	http://geoportal.dgu.hr/wms
6	Coordinate reference system	Designates the data resource coordinate (spatial) reference system.	N	M	Code: 004 Code space: hr:nipp:crs: Version: 1.0
7	Keyword: value	Keyword value is a commonly used word, formalized word or phrase used to describe the subject.	N	M	1. Land cover 2. Map access service 3. TK25 4. map 5. topographic map
8	Keyword: thesaurus	Formally registered thesaurus or a similar authoritative source of keywords.	N	C	Ad1) Title: GEMET - INSPIRE themes, v.1.0, Date: 2008-06-01, Date type publication Ad2) 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, Date: 2008-12-03 Date type: publication
9	Geographic location: western - most geographic longitude	Western - most coordinate of the data scope boundary defined by geographic longitude in degrees (positive towards east).	N	C	13,49
10	Geographic location: eastern - most geographic longitude	Eastern - most coordinate of the data scope boundary defined by geographic longitude in degrees (positive towards east).	N	C	19,45
11	Geographic location: southern -most geographic latitude	Southern - most coordinate of the data scope boundary defined by geographic latitude in degrees (positive towards north).	N	C	42,39
12	Geographic location: northern -most geographic latitude	Northern - most coordinate of the data scope boundary defined by geographic latitude in degrees (positive towards north).	N	C	46,55
13	Temporal extent	Temporal extent covered by the content of the resource.	N	M	1996-01-01 2010-01-01
14	Reference date: date of last revision	Date of last review of the resource, if any.	1	C	2011-10-05
15	Reference date: date of publication	Date of publication of the resource, if any, or date when the resource become official.	N	C	2011-10-05
16	Reference date: date of creation	Date of creation of the resource.	1	C	2011-10-05
17	Spatial resolution: scale	Spatial resolution refers to the level of detail of the dataset, while spatial resolution scale specifies the level of detail of data by stating the map scale denominator.	N	C	25000

18	Spatial resolution: distance	Spatial resolution refers to the level of detail of the dataset, while spatial resolution distance specifies the level of detail of data by stating the sample resolution distance.	N	C	2,50
19	Conformity: specification	Citing implementation rules or other documents with which the spatial data resource is harmonised.	N	M	Product specification for TK25
20	Conformity: explanation	Explanation of conformity.	N	M	Data harmonised with cited specification.
21	Conformity: level	Indication of conformity result.	N	M	yes
22	Conditions of access and use	Conditions for accessing and using the spatial data resource with fees, if applicable.	N	M	Rules of Procedure on Determining the Real Costs for using the Records of the State Survey and Real Property Cadastre (Official Gazette 148/08; 75/09)
23	Public access limitations: access	Access limitations are applied to ensure the protection of privacy or intellectual rights, or any other impediments or restrictions to access data resource.	N	M	Licence
24	Public access limitations: other restrictions	Other restrictions and legal terms for accessing and using resources or metadata.	N	M	View service http://geoportal.dgu.hr/wms can be used without limitations.
25	Responsible party	Description of the organization responsible for establishment, management, maintenance and distribution of the resource.	N	M	Name: Sector for geoinformation systems, State Geodetic Administration e-mail: infonipp@dgu.hr Name of responsible person: Pero Perić Role: Point of contact Telephone: +385-1-1234567 Fax: +385-1-1234568 Point of delivery: Gruška 20 City: Zagreb Postal code: 10000 Country: Croatia Online source: http://www.dgu.hr

26	Responsible party role	Role the responsible party has.	N	M	1. owner 2. distributor
27	Metadata point of contact	Description of the organization responsible for the creation and maintenance of metadata	N	M	Name: Sector for geoinformation systems, State Geodetic Administration e-mail: infonipp@dgu.hr Name of responsible person: Pero Perić Role: Point of contact Telephone: +385-1-1234567 Fax: +385-1-1234568 Point of delivery: Gruška 20 City: Zagreb Postal code: 10000 Country: Croatia Online source: http://www.dgu.hr
28	Metadata date	Date which specifies when the metadata record was created or updated.	1	M	2013-05-20
29	Metadata language	Language in which metadata elements are expressed.	1	M	eng
30	Service type	Type of spatial data service.	1	M	OGC WMS
31	Coupled resource	If the data service resource, coupled resource, is identified, where this is relevant, link to the service of spatial dataset(s) is created with a unique resource identifier.	N	C	Code: 0003 Code space: hr:nipp:pp Version: 1.0

13 Appendix A: ISO metadata UML models

13.1 Metadata UML model

Metadata for describing geographic data is defined using an abstract object UML model. Each diagram of the subclass defines a metadata section (UML package) of related entities, data types and code lists.

Entities may have mandatory and/or optional elements and associations. In some cases, optional elements may have mandatory elements.

13.2 Metadata package UML diagrams

Figure 13.1 defines the class MD_Metadata and shows relationships with the other metadata classes which, in aggregate, define metadata for geographic data.
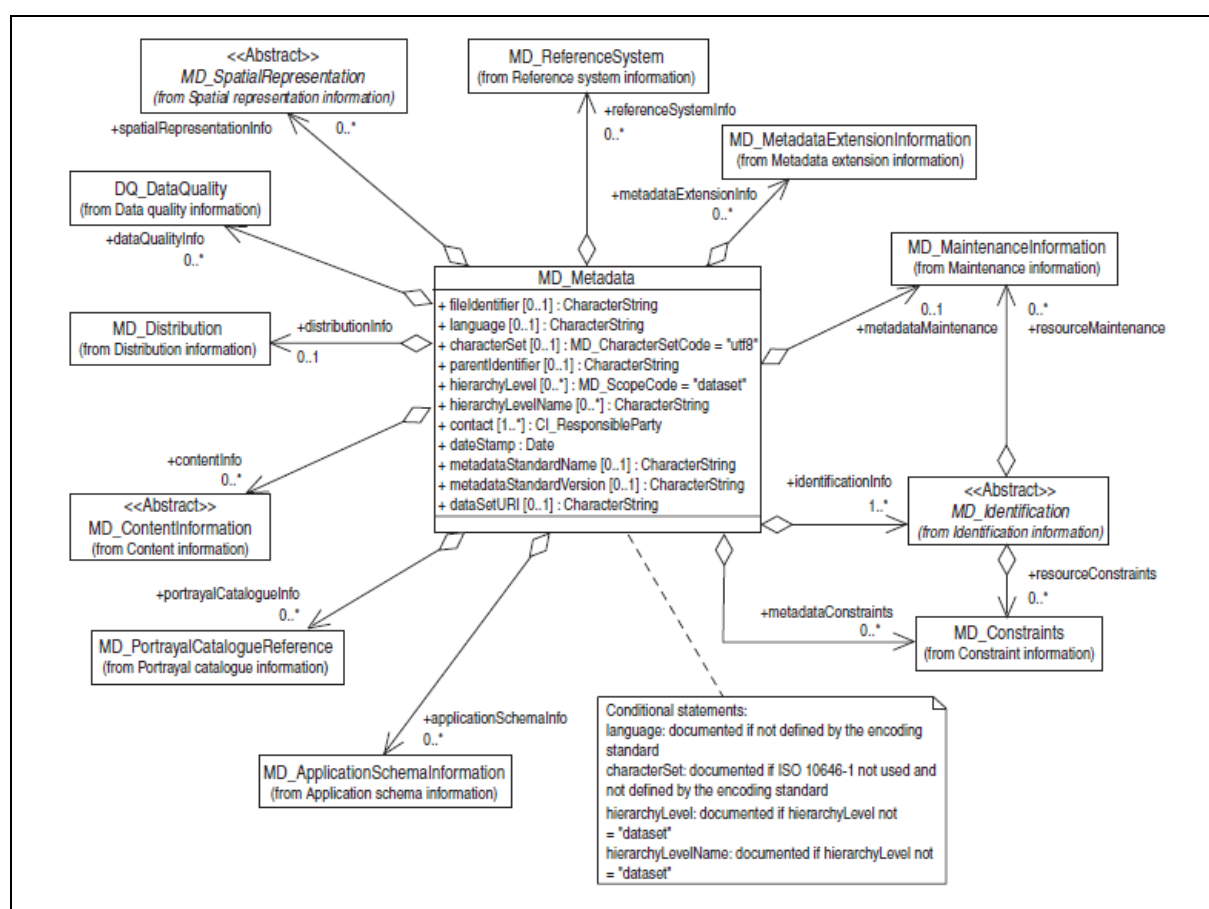
Figure 13.1: Metadata entity set information.

13.3 UML diagram for identification information

Figure 13.2 defines the metadata classes required to identify a resource. It also defines separate specialization sub-classes for identifying data and services.
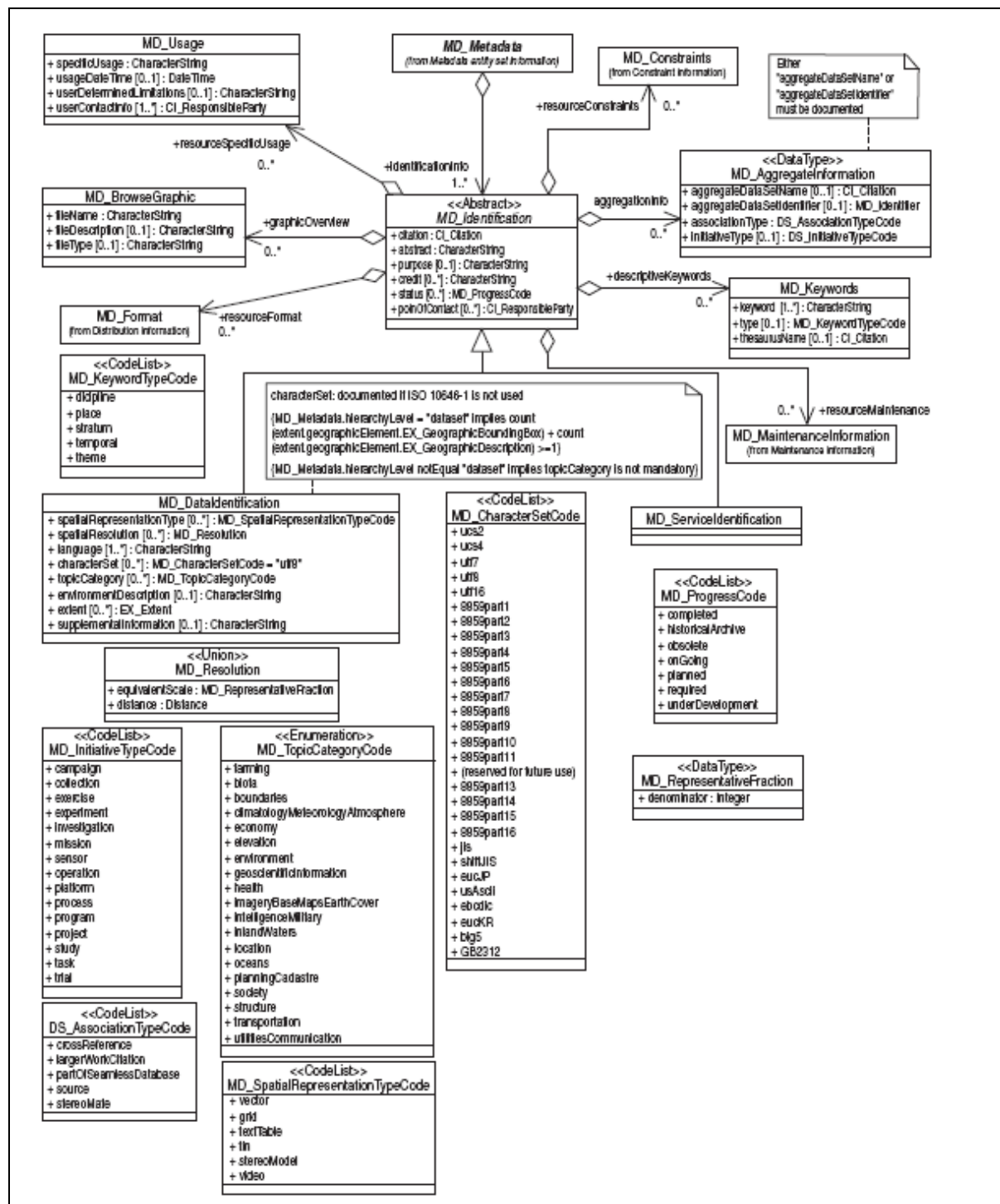
Figure 13.2: Identification information.

13.4 Constraint information

The following figure defines the metadata required for managing rights to information, including restrictions on access and use.
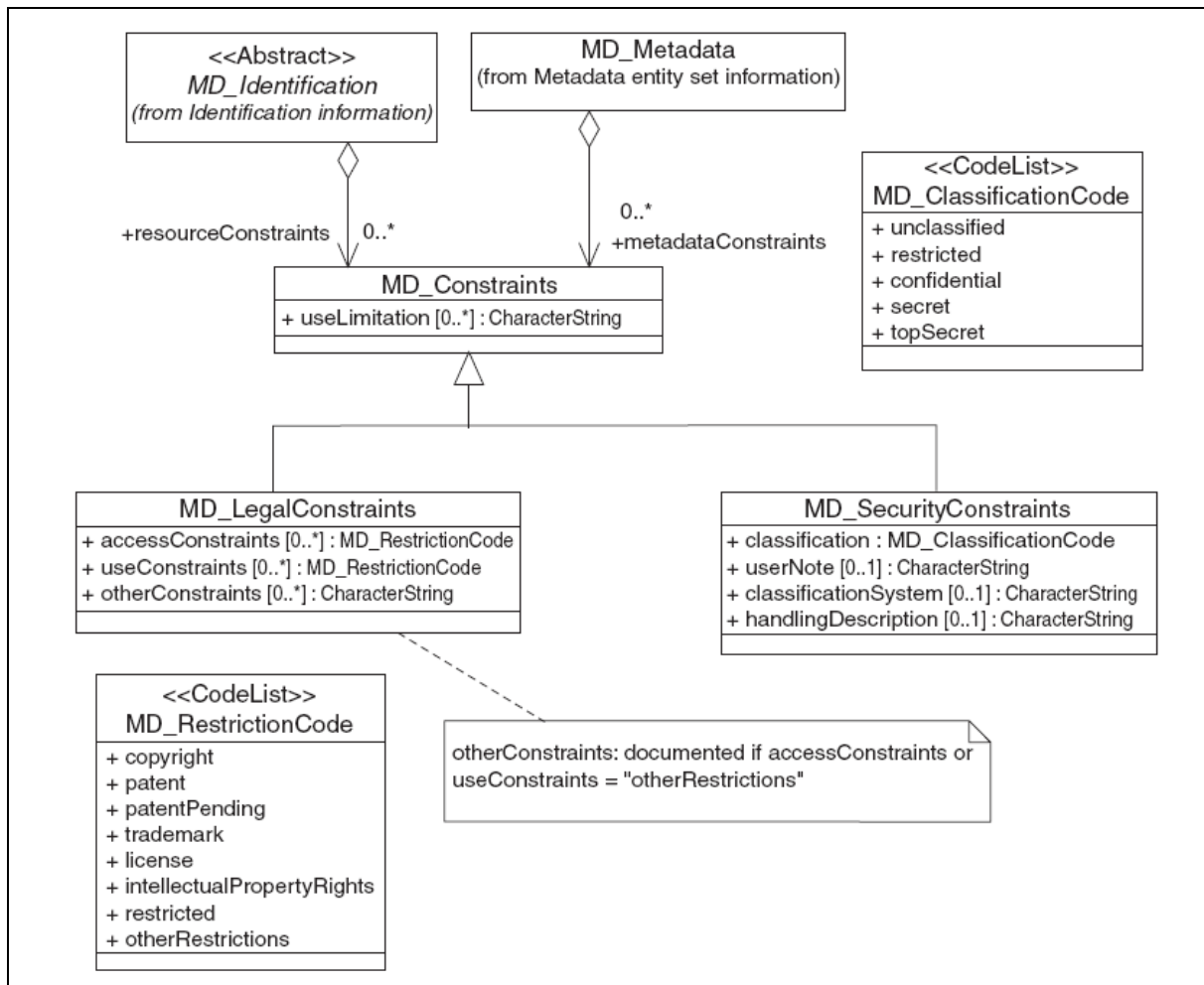
Figure 13.3: Constraint information.

13.5 UML diagram for data quality information

13.5.1 General data quality

The following figure defines the metadata require to give a general assessment of the quality of a resource.
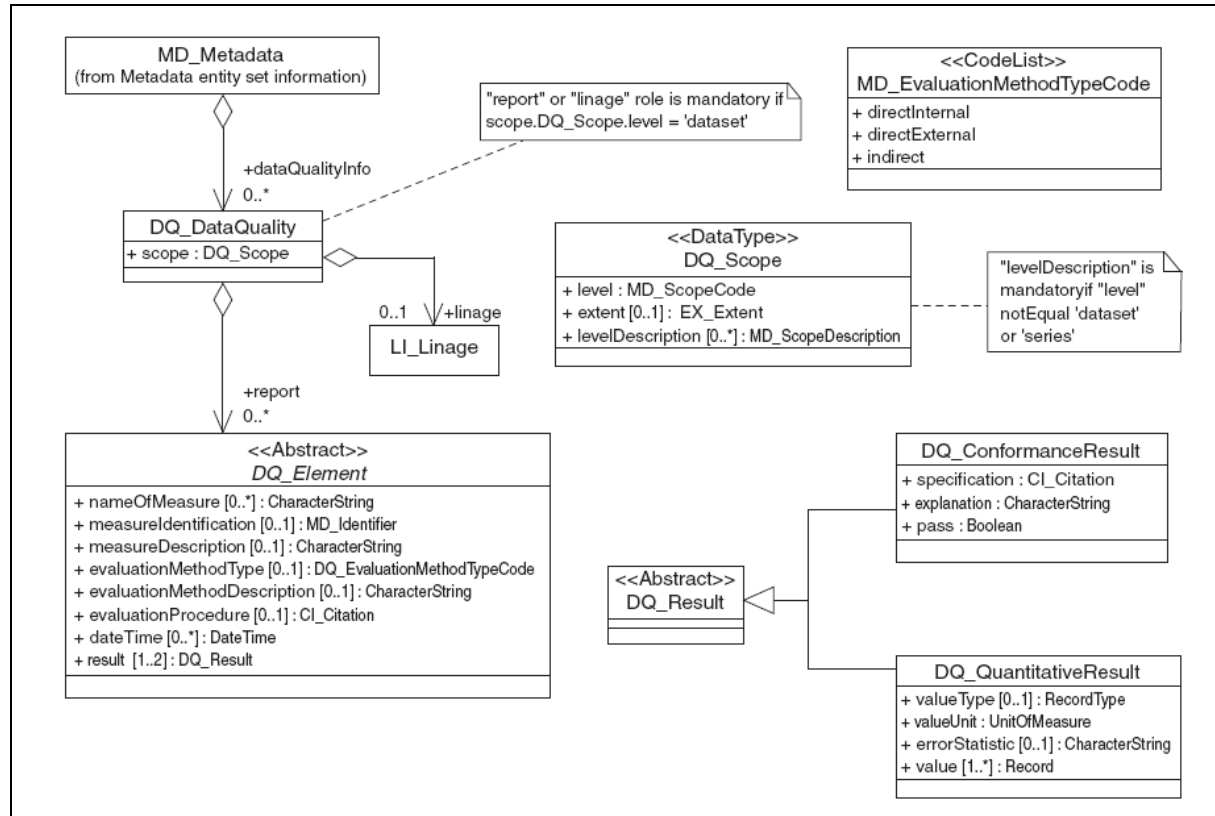
Figure 13.4: Data quality information.

13.5.2 UML diagram for lineage information

The following figure defines the metadata required to describe the resources and production processes used in producing a dataset.
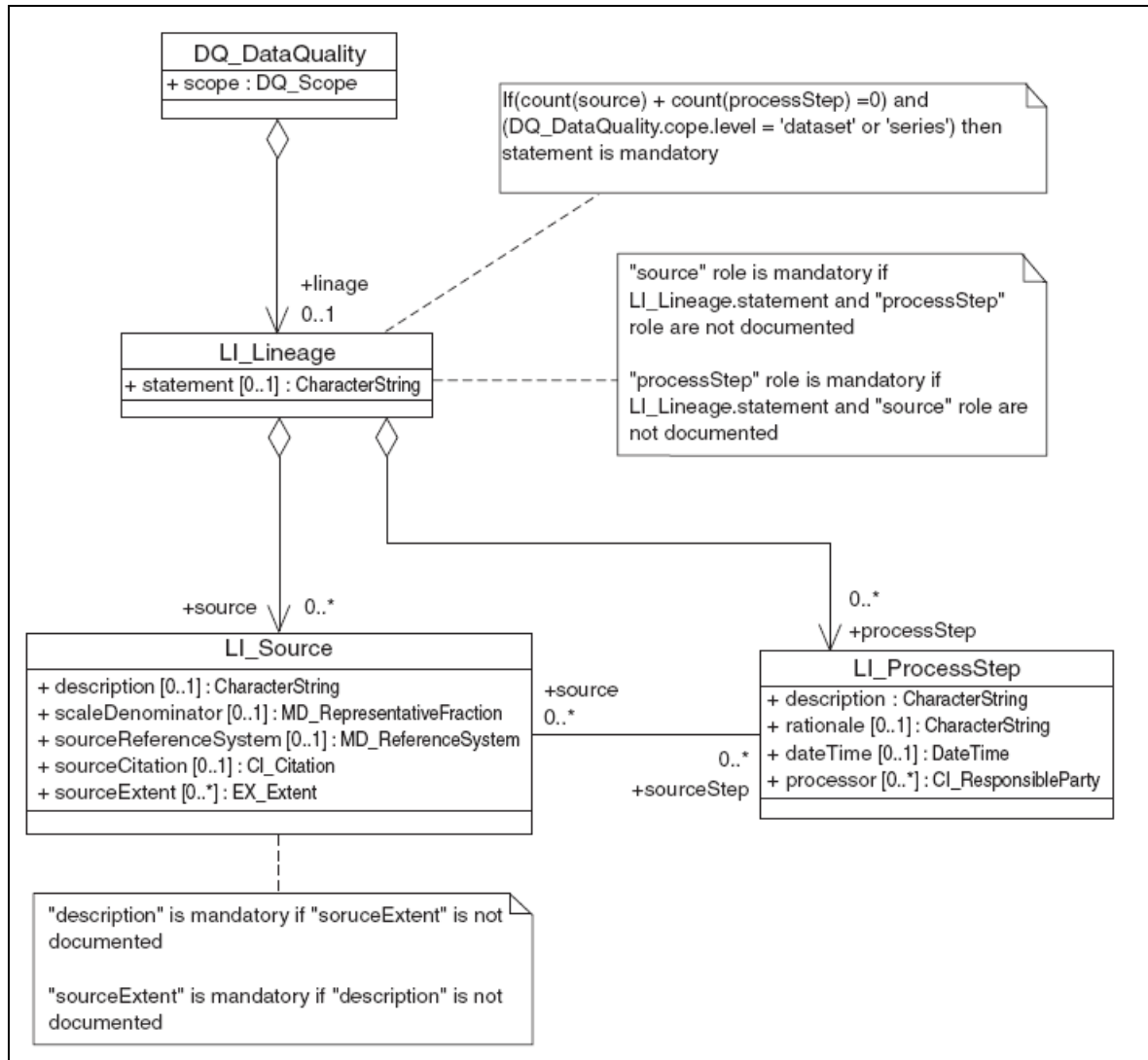
Figure 13.5: Lineage information.

13.5.3 Data quality classes and subclasses

The following figure defines the classes and subclasses of data quality used in the data quality diagram.
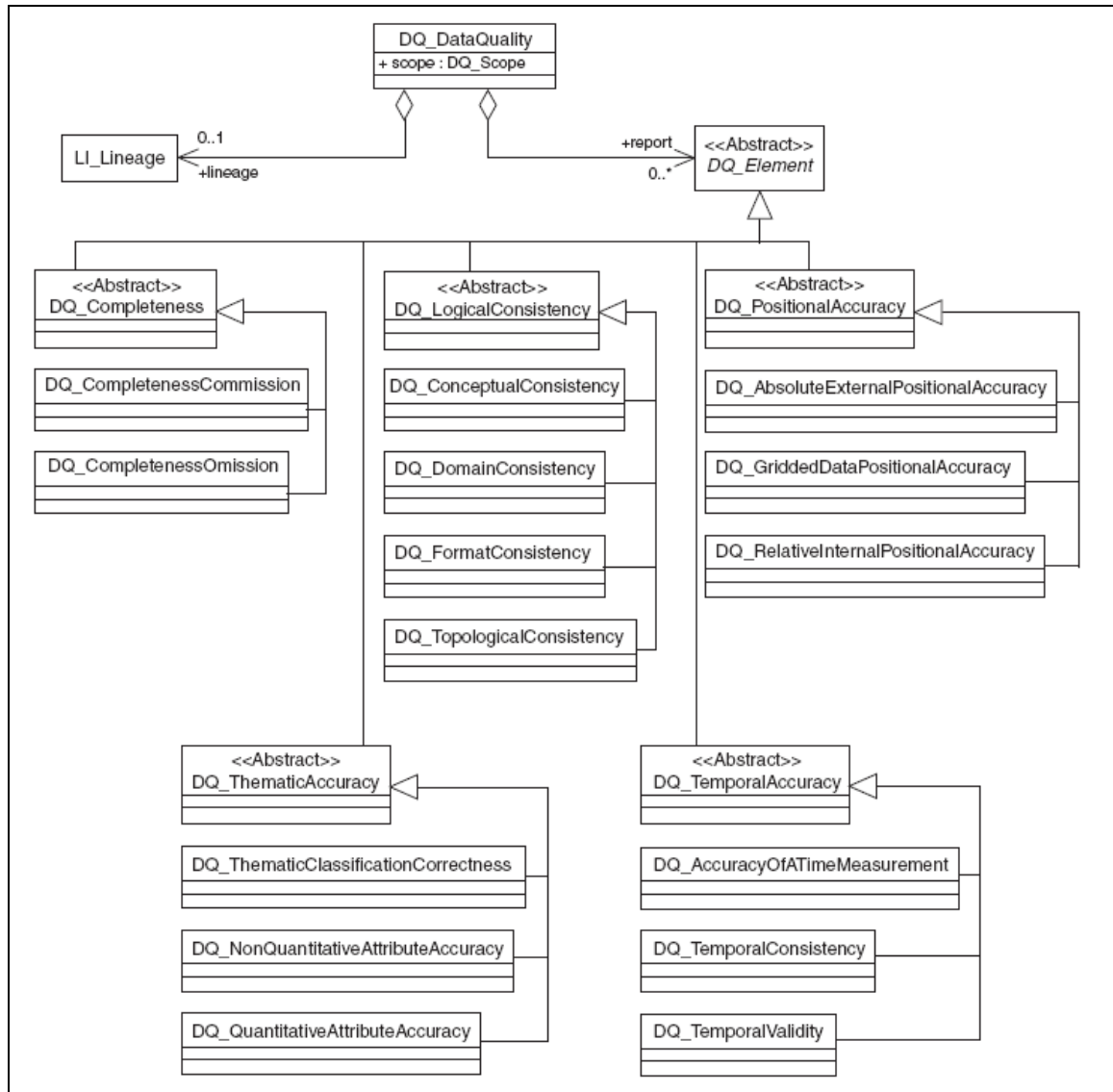
Figure 13.6: Data quality classes and subclasses.

13.6 UML diagram for maintenance information

The following figure defines the metadata required to describe the maintenance and update practices for information.
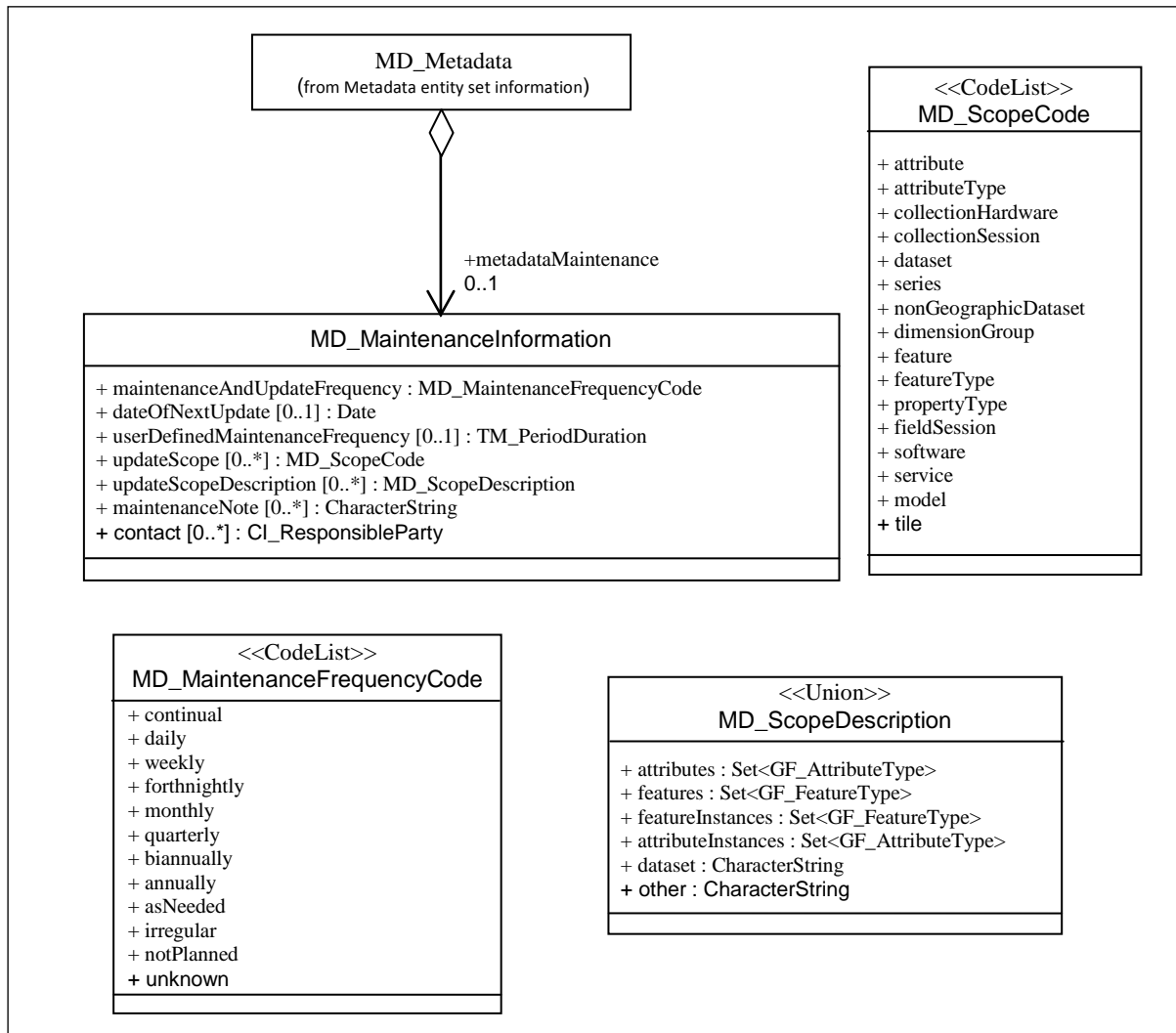
Figure 13.7: Maintenance information.

13.7 UML diagram for spatial representation information

The following figure defines the metadata required to describe the mechanism used to represent spatial information.
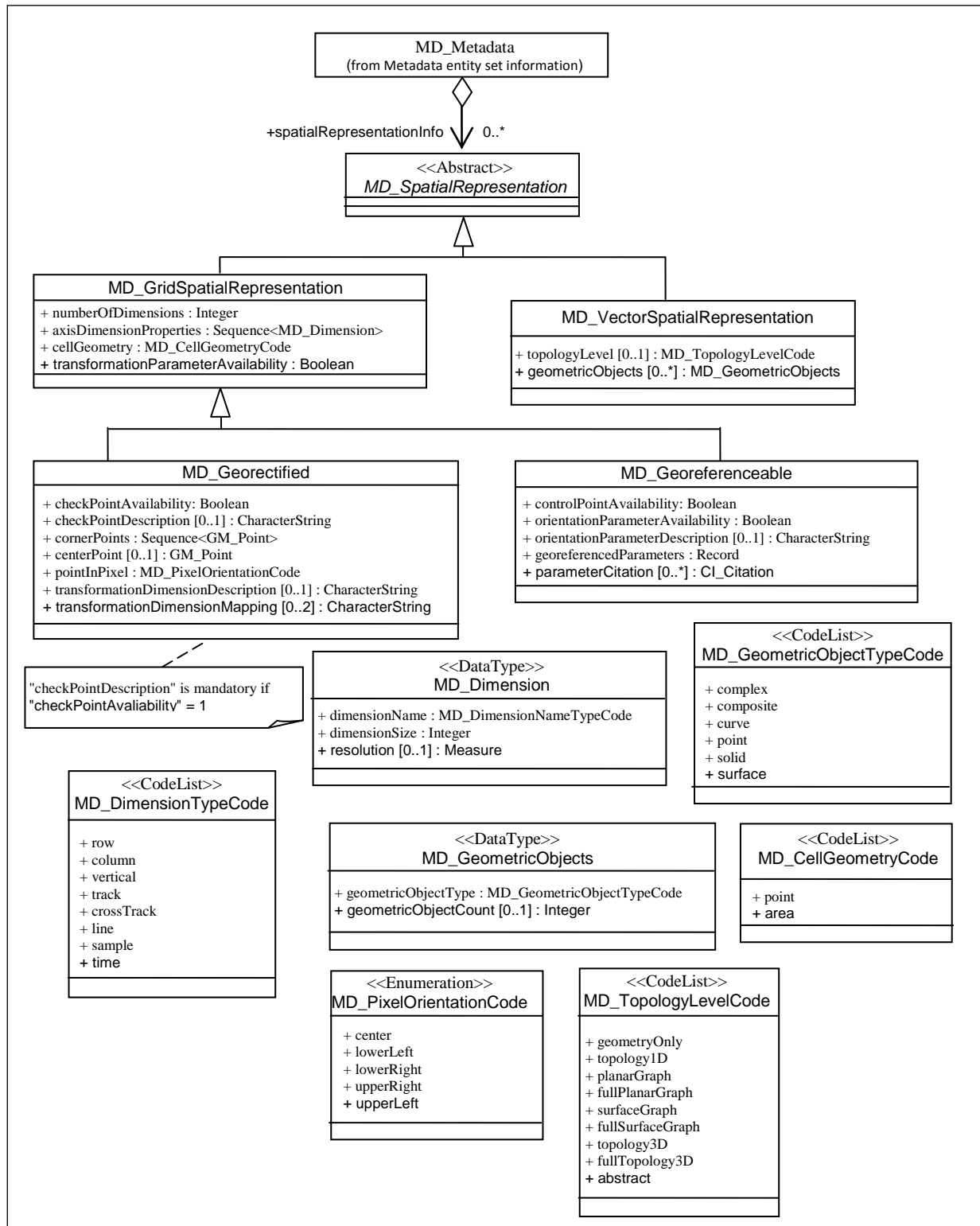
Figure 13.8: Spatial representation information.

13.8 UML diagram for reference system information

The following figure defines the metadata required to describe the spatial and temporal reference system used.
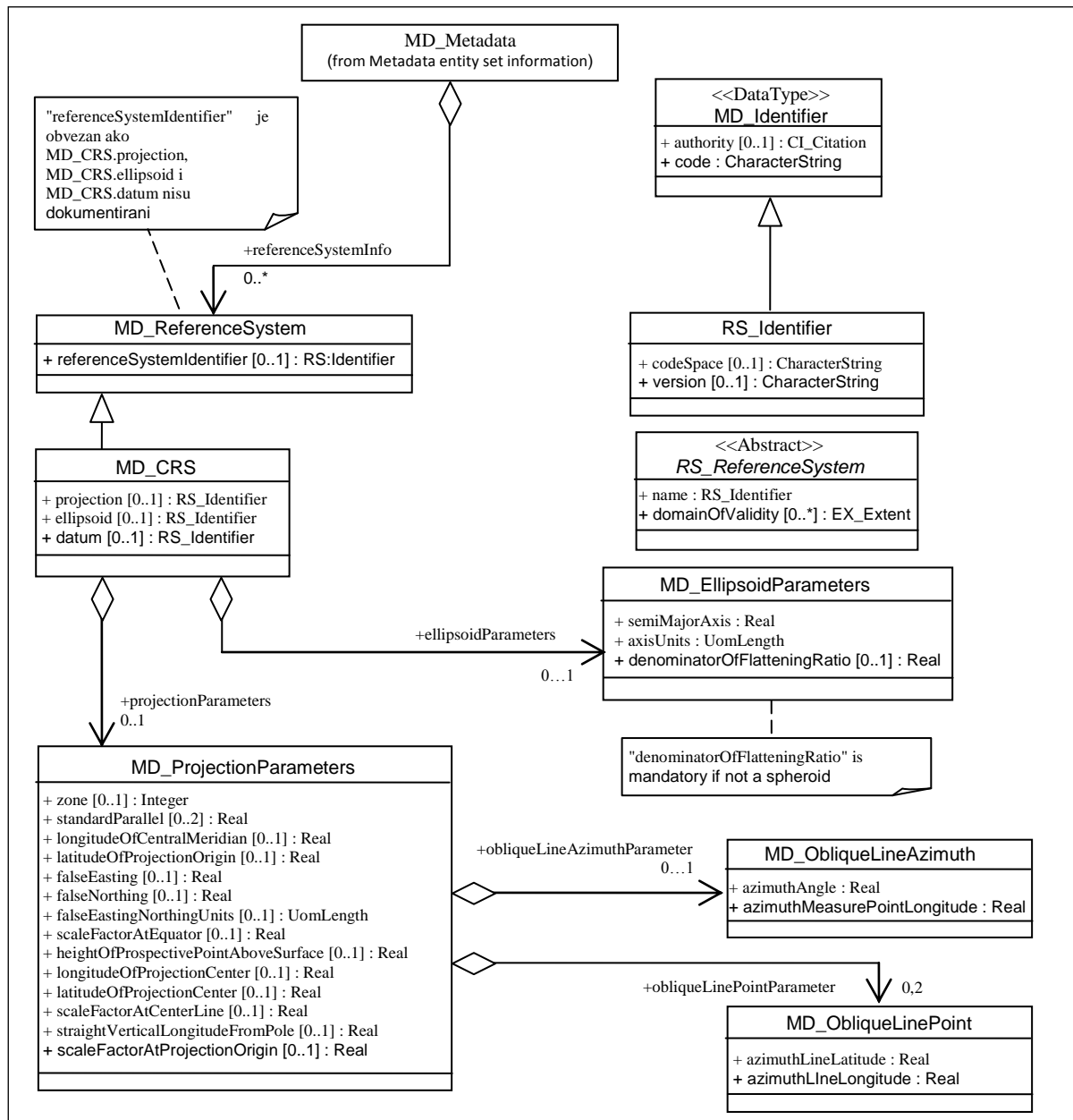
Figure 13.9: Reference system information.

13.9 UML diagram for content information

The following figure defines the metadata about the content of the coverage and the feature catalogue(s) used to define features.
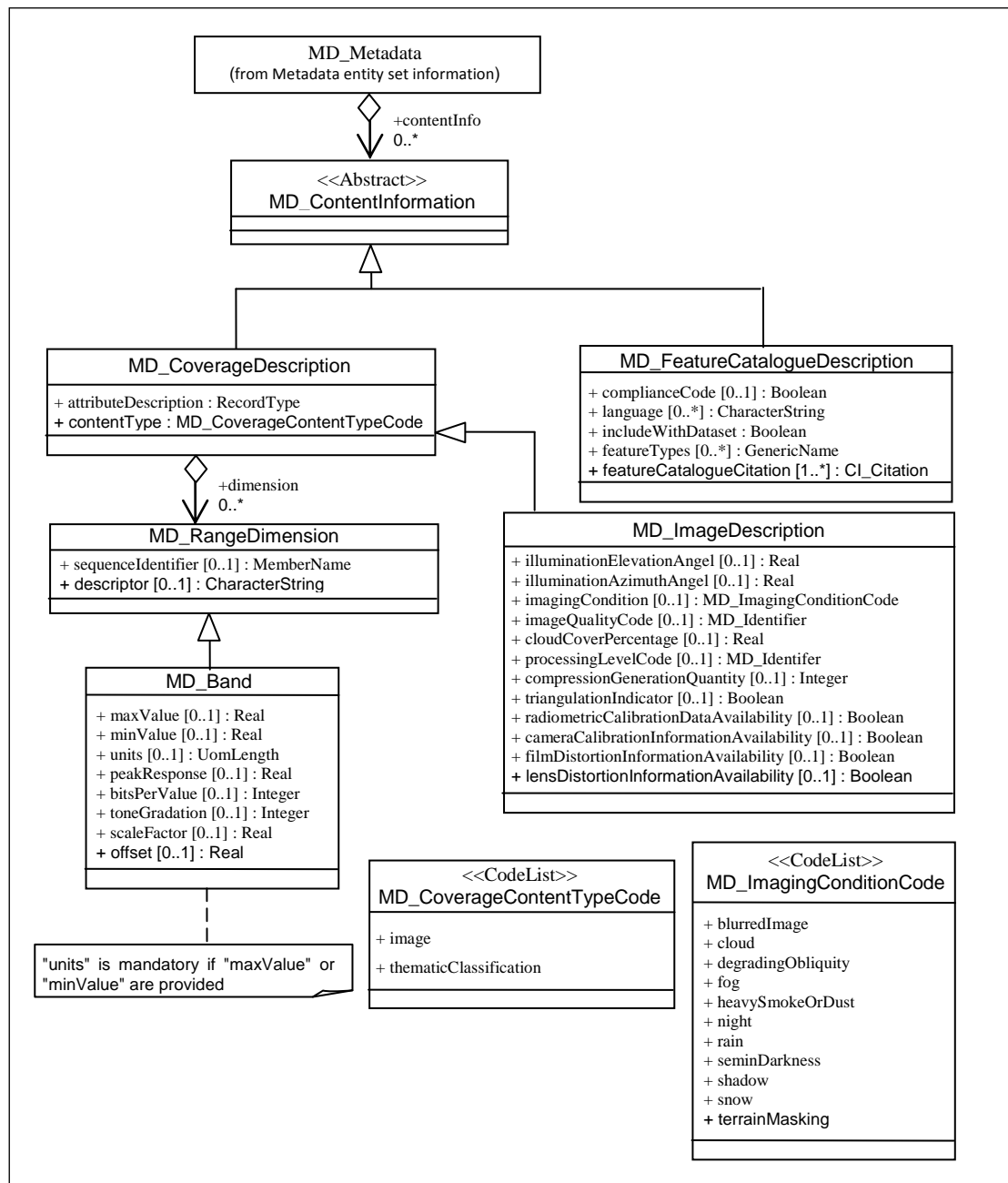
Figure 13.10: Content information.

13.10 UML diagram for portrayal catalogue information

The following figure defines the metadata about the portrayal catalogue used to display data.
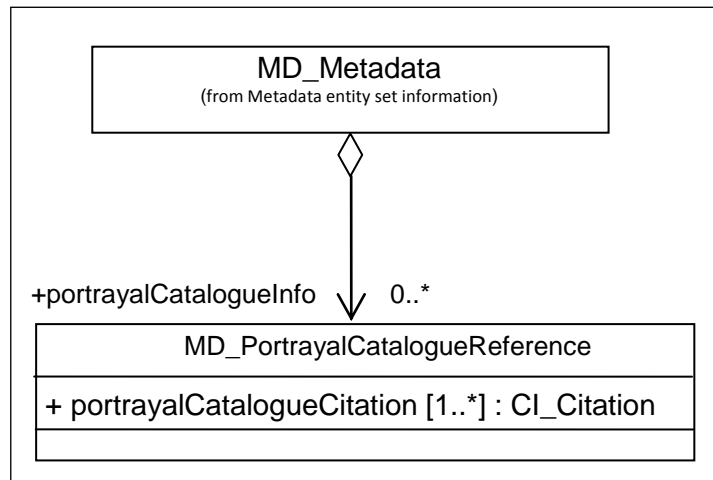
Figure 13.11: Portrayal catalogue information.

13.11 UML diagram for distribution information

The following figure defines the metadata required to access a resource.
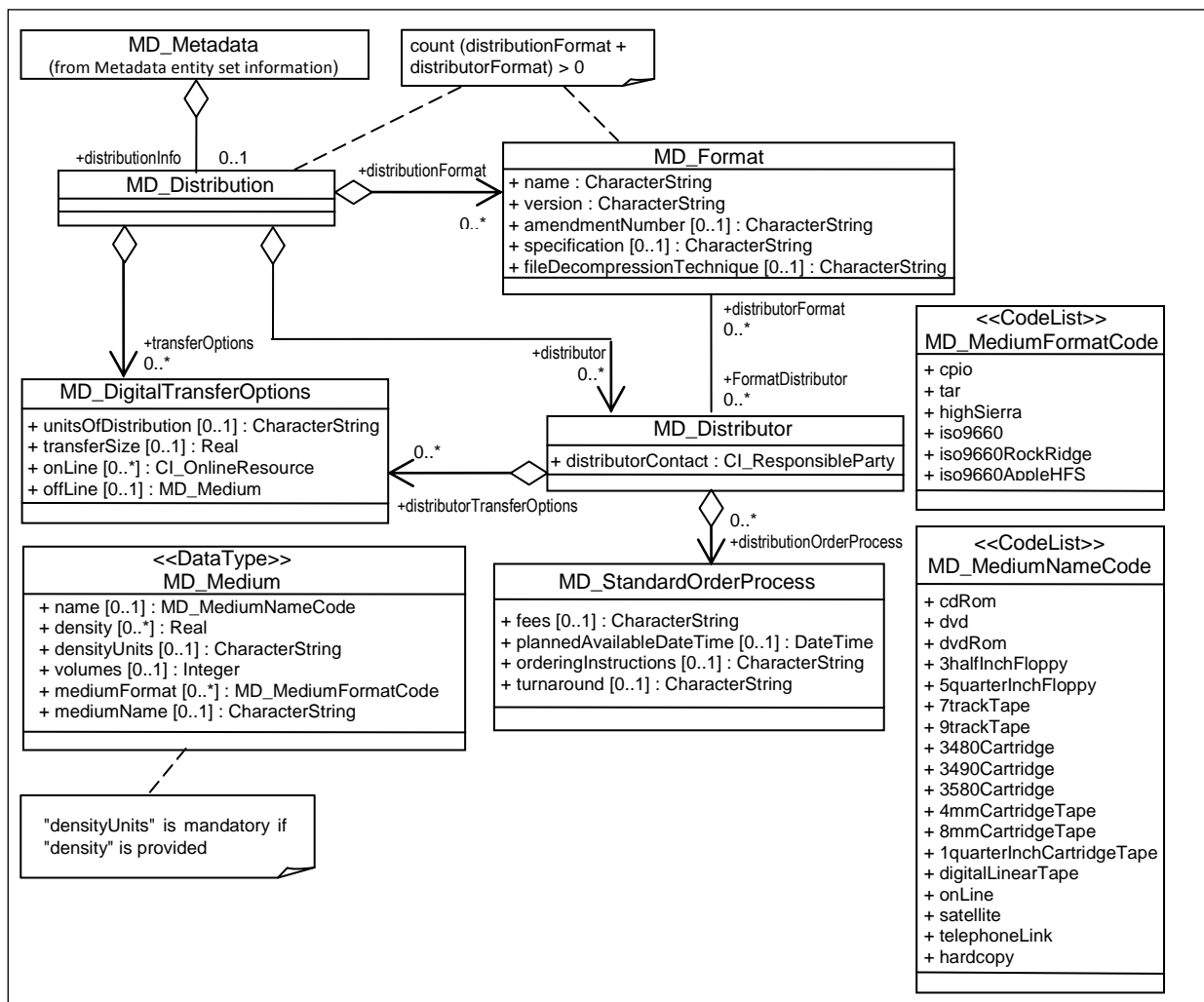
Figure 13.12: Distribution information.

13.12 UML diagram for metadata extension information

The following figure defines the extended metadata elements.
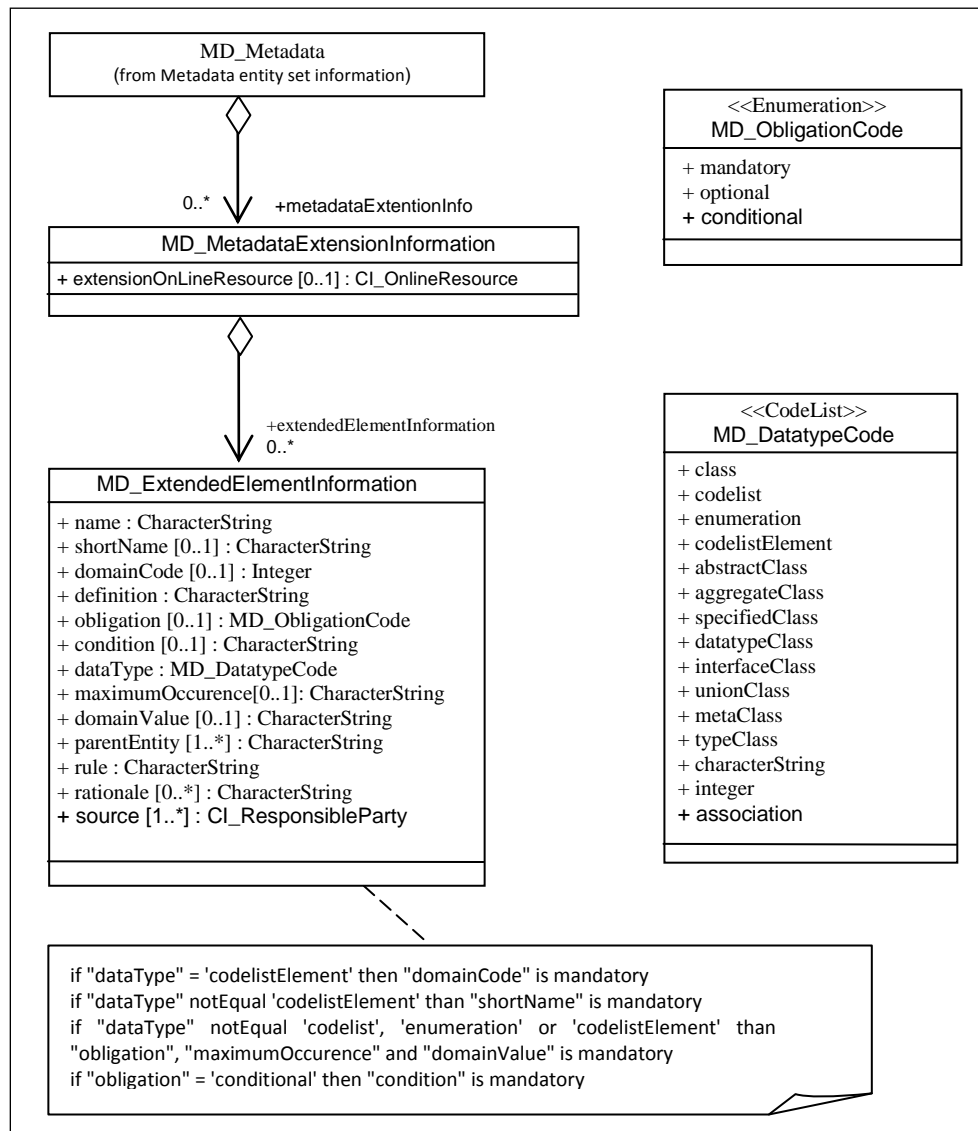
Figure 13.13: Metadata extension information.

13.13 UML diagram for application schema information

The following figure defines the application schema used.
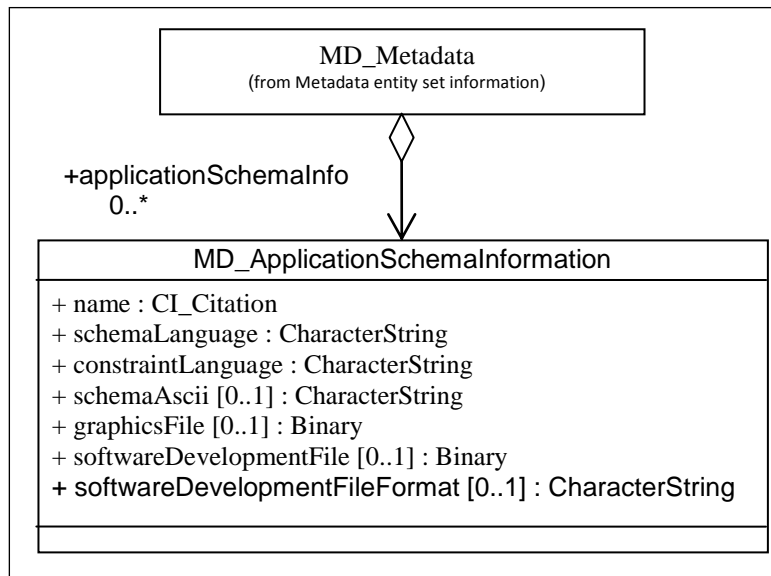
Figure 13.14: Application schema information.

13.14 UML diagram for extent information

The following figure defines the metadata describing the spatial and temporal extent covered by a resource.
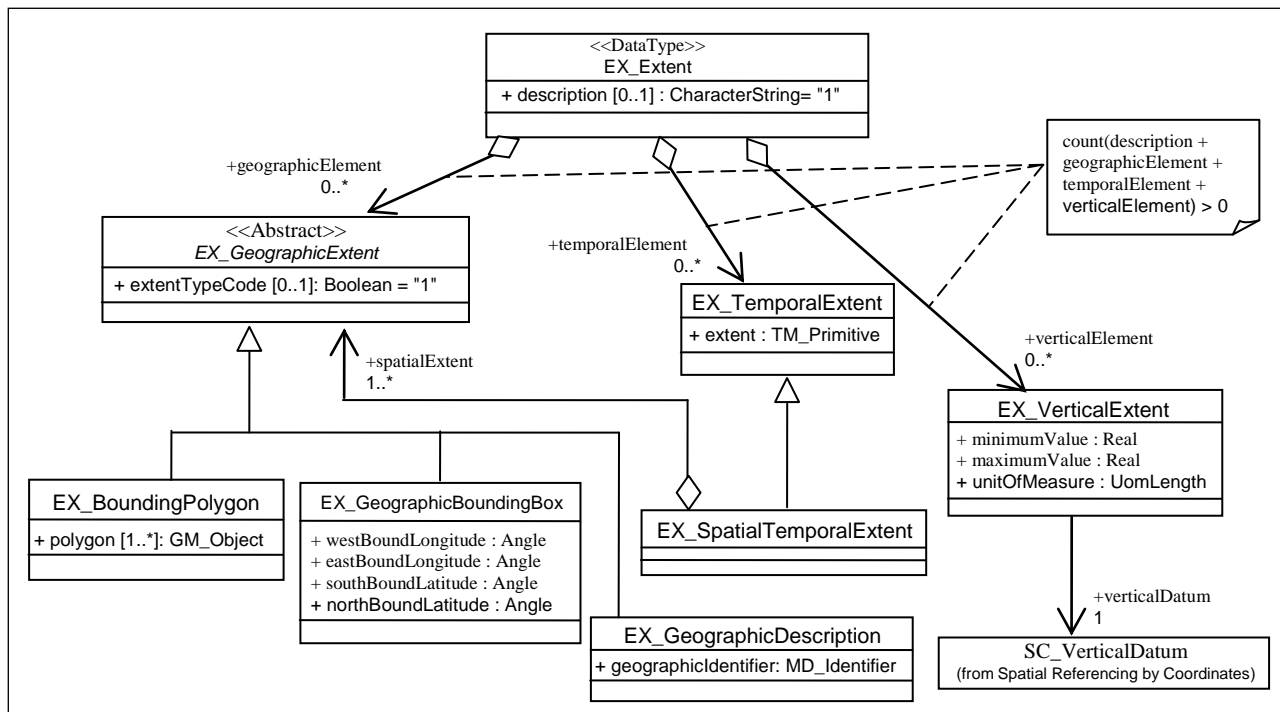
Figure 13.15: Extent information.

13.15 UML diagram for citation and responsible party information

The following figure defines the metadata describing authoritative reference information, including responsible party and contact information.
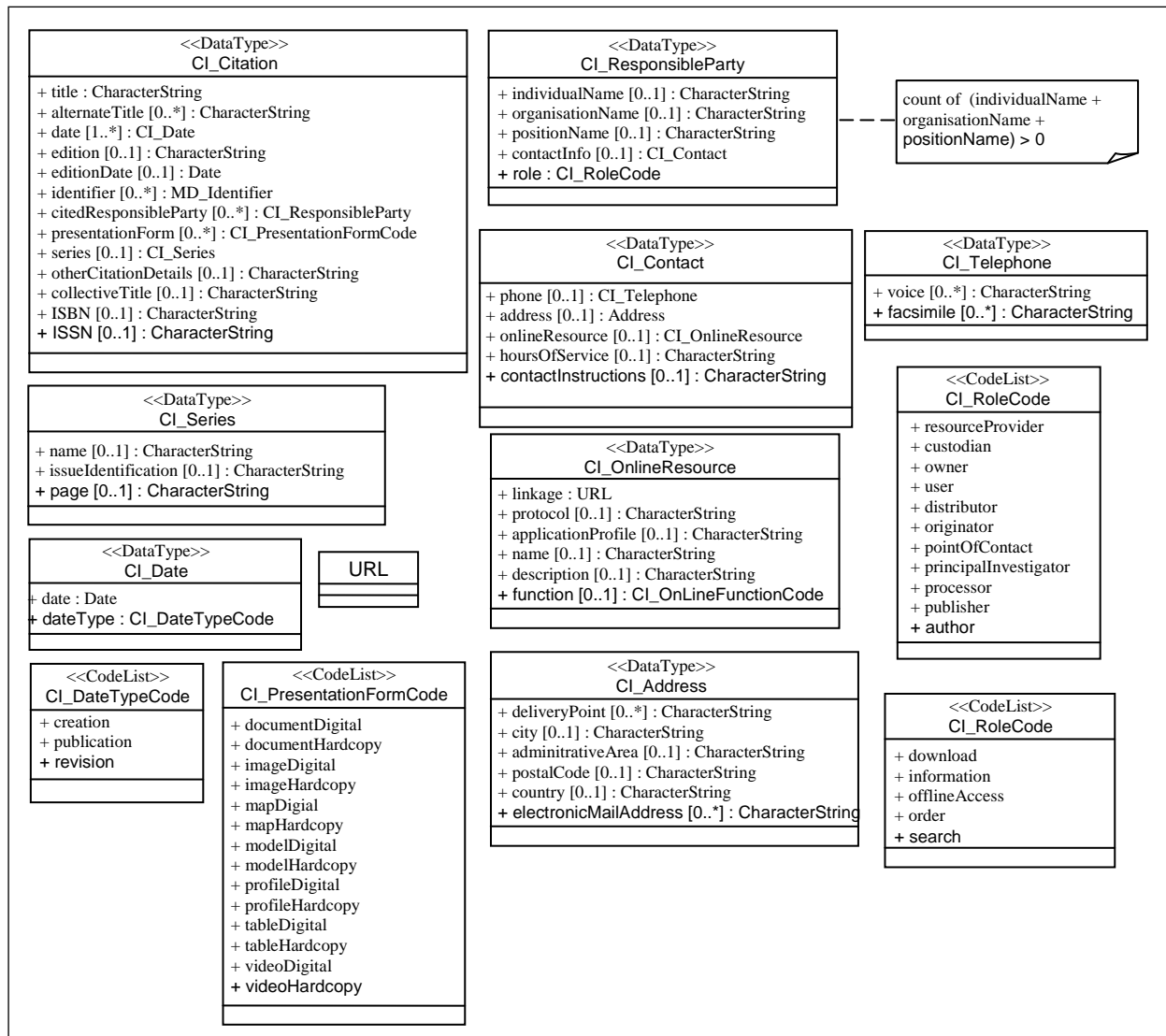
Figure 13.16: Citation and responsible party information.

14 Appendix B: Data Dictionary for Croatian NSDI Metadata

Data dictionary defines metadata schemes elements and entities, uniquely defining the abstract metadata model together with UML diagrams. The dictionary is organised hierarchically to create links and information organisation. This Appendix contains the data dictionary necessary to document Croatian NSDI metadata.

14.1 MD_Identifier<<DataType>>

Nr.	ISO 19115 nr.	Name / Role name	XML value	Definition	Obligation	Maximum occurrence	Data type	Domain
1	**205.**		**MD_Identifier**	**Value that uniquely identifies the object within the scope of names.**	**Use obligation from referencing object**	**Use maximum occurrence from referencing object**	**Class**	**Lines 206-207**
2	206.	Authority	authority	Person or party responsible for maintaining the scope of names.	C	1	Class	CI_Citation <<DataType>>
3	207.	Code	code	Alphanumeric value identifying the instance within the scope of names.	M	1	CharacterString	Free text

14.2 RS_Identifier<<DataType>>

Nr.	ISO 19115 nr.	Name / Role name	XML value	Definition	Obligation	Maximum occurrence	Data type	Domain
1	**208.**		**RS_Identifier**	**Reference system identifier**	**Use obligation from referencing object**	**Use maximum occurrence from referencing object**	**Specified Class (MD_Identifier)**	**Lines 206-207 and 208.1- 208.2**
2	208.1.	Code space	codeSpace	Name or identifier of the person or organisation responsible for the code space.	C	1	CharacterString	Free text
3	208.2	Version	version	Version of the scope of names identifier.	C	1	CharacterString	Free text

14.3 MD_ScopeCode<<CodeList>>

Nr.	Name / Role name	XML value	Domain code	Description
1		MD_ScopeCode	ScopeCd	**Class of information to which the referencing entity applies.**
2	dataset	dataset	001	Information refers to spatial dataset. Spatial dataset is a type of resource consisting of a collection of individual items collected and/or assembled on the basis of existing resource with the specific intention of creating new information. Spatial dataset may include images, audio and other documents. Once formed, dataset defines a unique data record, need to be specified using accompanying documentation and must be maintained in accordance with it. An example of a spatial dataset is a topographic map sheet, scale 1:25000 (TK25), in electronic form or the geographic names database. Spatial dataset may be part of a spatial dataset series. In case a dataset is part of a spatial dataset series, parent-child relations can be defined connecting the dataset with the dataset series.
3	series	series	002	Information refers to spatial dataset series. Spatial dataset series is a collection of spatial datasets created according to the same specification or having similar characteristics, such as the same topic, data of collection, resolution, collection methodology, etc. Examples of spatial dataset series includes: - map sheets in electronic form created according to the same specification (e.g. TK25, DOF5 etc.), - data collected using the same sensor, same methodology and in the same conditions, - aerial photo images in electronic form created on the same flight route with the same sensor, - continuous satellite images in electronic form created with the same sensor on the same path/trajectory. Representing several datasets as a dataset series is a possibility that is used to maintain an overview of data resources. For instance, the whole territory of Croatia is covered with about 11,000 sheets of digital ortho-photo maps, scale 1:5000 (DOF5). Each sheet can be represented as a dataset, but in such case each sheet will have its own metadata record, and searching the metadata catalogue will produce about 11,000 results. If 11,000 datasets are represented as a single dataset series, a single metadata record is created, with a search producing only one result. It needs to be noted, however, that a dataset series does not describe all detailed data specific for a particular DOF5

				sheet. For example, the shooting date will not be the same for about 11,000 sheets, since the plane cannot complete shooting the whole territory of Croatia in a single day, which means that some elements will be different, such as weather conditions, image quality etc. The assessment if each DOF sheet is to be treated as a dataset or a dataset series needs to be made based on the needs of the most important group of data users, and a cost and benefit analysis. In addition, care must be taken to maintain and update metadata.
4	service	service	003	Information refers to options that the service provider provides the entity service user through a set of interfaces, which define conduct, as in the case of use. Spatial data service is the possibility of accessing data that a service provider enables a user through a user interface.

14.4 MD_TopicCategoryCode<<Enumeration>>

Nr.	Name / Role name	XML value	Domain code	Description
1		**MD_TopicCategoryCode**	**TopicCatCd**	**High-level geographic data thematic classification to assist in the grouping and search of available geographic datasets. Can be used to group keywords, as well.** **Listed examples are not exhaustive.** **NOTE: It is understood that there are overlaps between general categories and the user is encouraged to select the one most appropriate.**
2	Farming	farming	001	Rearing of animals and/or cultivation of plants. Examples: agriculture, irrigation, aquaculture, plantations, herding, pests and diseases affecting crops and livestock
3	Biota	biota	002	flora and/or fauna in natural environment Examples: wildlife, vegetation, biological sciences, ecology, wilderness, sea life, wetlands, habitat
4	Boundaries	boundaries	003	legal land descriptions Examples: political and administrative boundaries
5	ClimatologyMeteorologyAtmosphere	climatologyMeteorologyAtmosphere	004	processes and phenomena of the atmosphere Examples: cloud cover, weather, climate, atmospheric conditions, climate change, precipitation
6	Economy	economy	005	economic activities, conditions and employment Examples: production, labour, revenue, commerce, industry, tourism and ecotourism, forestry, fisheries, commercial or subsistence hunting, exploration and exploitation of resources such as minerals, oil and gas

7	Elevation	elevation	006	height above or below sea level Examples: altitude, bathymetry, digital elevation models, slope, derived products
8	Environment	environment	007	environmental resources, protection and conservation Examples: environmental pollution, waste storage and treatment, environmental impact assessment, monitoring environmental risk, nature reserves, landscape
9	Geoscientific information	geoscientificInformation	008	information pertaining to earth sciences Examples: geophysical features and processes, geology, minerals, sciences dealing with the composition, structure and origin of the earth's rocks, risks of earthquakes, volcanic activity, landslides, gravity information, soils, permafrost, hydrogeology, erosion
10	Health	health	009	health, health services, human ecology, and safety Examples: disease and illness, factors affecting health, hygiene, substance abuse, mental and physical health, health services
11	Imagery base maps earth cover	imageryBaseMapsEarthCover	010	base maps Examples: land cover, topographic maps, imagery, unclassified images, annotations
12	Intelligence and military	intelligenceMilitary	011	military bases, structures, activities Examples: barracks, training grounds, military transportation, information collection
13	Inland waters	inlandWaters	012	inland water features, drainage systems and their characteristics Examples: rivers and glaciers, salt lakes, water utilization plans, dams,

			currents, floods, water quality, hydrographical charts
14	Location	location	013	positional information and services Examples: addresses, geodetic networks, control points, postal zones and services, place names
15	Oceans	oceans	014	features and characteristics of salt water bodies (excluding inland waters) Examples: tides, tidal waves, coastal information, reefs
16	Planning cadastre	planningCadastre	015	information used for appropriate actions for future use of the land Examples: land use maps, zoning maps, cadastral surveys, land ownership
17	Society	society	016	characteristics of society and cultures Examples: settlements, anthropology, archaeology, education, traditional beliefs, manners and customs, demographic data, recreational areas and activities, social impact assessments, crime and justice, census information
18	Structure	structure	017	man-made construction Examples: buildings, museums, churches, factories, housing, monuments, shops, towers
19	Transportation	transportation	018	means and aids for conveying persons and/or goods Examples: roads, airports/airstrips, shipping routes, tunnels, nautical charts, vehicle or vessel location, aeronautical charts, railways
20	Utilities communication	utilitiesCommunication	019	energy, water and waste systems and communications infrastructure and services Examples: hydroelectricity, geothermal, solar and nuclear sources of energy, water purification and distribution, sewage collection and

			disposal, electricity and gas distribution, data communication, telecommunication, radio, communication networks

14.5 Classification of spatial data services according to EN ISO 19119 standard

Classification of spatial data services according to the EN ISO 19119 standard from document 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

Nr.	Name / Role name	XML value	Domain code	Description
1	**Geographic human interaction services**	**humanInteractionService**	**100**	**This category comprises the following subcategories:**
2	Catalogue viewer	humanCatalogueViewer	101	Client service that allows a user to interact with a catalogue to locate, browse and manage metadata about geographic data or geographic services.
3	Geographic viewer	humanGeographicViewer	102	Client service that allows a user to view one of more feature collections or coverages.
4	Geographic spreadsheet viewer	humanGeographicSpreadsheetViewer	103	Client service that allows a user to interact with multiple data objects and to request calculations similar to an arithmetic spreadsheet but extended to geographic data.
5	Service editor	humanServiceEditor	104	Client service that allows a user to control geographic processing services.
6	Chain definition editor	humanChainDefinitionEditor	105	Provides user interaction with a chain definition service.
7	Workflow enactment manager	humanWorkflowEnactmentManager	106	Provides user interaction with a workflow enactment service.
8	Geographic feature editor	humanGeographicFeatureEditor	107	Geographic viewer that allows a user to interact with feature data.
9	Geographic symbol editor	humanGeographicSymbolEditor	108	Client service that allows a human to select and manage symbol libraries.

10	Feature generalization editor	humanFeatureGeneralizationEditor	109	Client service that allows a user to modify the cartographic characteristics of a feature or feature collection by simplifying its visualisation, while maintaining its salient elements – the spatial element of simplification.
11	Geographic data structure viewer	humanGeographicDataStructureViewer	110	Client service that allows a user to access part of dataset to see its internal structure.
12	**Geographic model/information management service**	**infoManagementService**	**200**	**This category comprises the following subcategories:**
13	Feature access service	infoFeatureAccessService	201	Service that provides a client access to and management of a feature store.
14	Map access service	infoMapAccessService	202	Service that provides a client access to geographic graphics, i.e. pictures of geographic data.
15	Coverage access service	infoCoverageAccessService	203	Service that provides a client access to and management of a coverage store.
16	Sensor description service	infoSensorDescriptionService	204	Service that provides the description of a coverage sensor, including sensor location and orientation, as well as the sensor's geometric, dynamic and radiometric characteristics for geo-processing purposes.
17	Product access service	infoProductAccessService	205	Service that provides access to and management of a geographic product store.
18	Feature type service	infoFeatureTypeService	206	Service that provides a client to access to and management of a store of feature type definitions.
19	Catalogue service	infoCatalogueService	207	Service that provides discovery and management services on a store of metadata about instances.

20	Registry Service	infoRegistryService	208	Service that provides access to store of metadata about types.
21	Gazetteer service	infoGazetteerService	209	Service that provides access to a directory of instances of a class or classes of real-world phenomena containing some information regarding position.
22	Order handling service	infoOrderHandlingService	210	Service that provides a client with the ability to order products from a provider.
23	Standing order service	infoStandingOrderService	211	Order handling service that allows a user to request that a product over a geographic area be disseminated when it becomes available.
24	**Geographic workflow/task management services**	**taskManagementService**	**300**	**This category comprises the following subcategories:**
25	Chain definition service	chainDefinitionService	301	Service to define a chain and to enable it to be executed by the workflow enactment service.
26	Workflow enactment service	workflowEnactmentService	302	The workflow enactment service interprets a chain and controls the instantiation of services and sequencing of activities.
27	Subscription service	subscriptionService	303	Service to allow clients to register for notification about events.
28	**Geographic processing services – spatial**	**spatialProcessingService**	**400**	**This category comprises the following subcategories:**
29	Coordinate conversion service	spatialCoordinateConversionService	401	Service to change coordinates from one coordinate system to another coordinate system that is related to the same

				datum.
30	Coordinate transformation service	spatialCoordinateTransformationService	402	Service to change coordinates from a coordinate reference system based on one datum to a coordinate reference system based on a second datum.
31	Coverage/vector conversion service	spatialCoverageVectorConversionService	403	Service to change the spatial representation from a coverage schema to a vector schema, or vice versa.
32	Image coordinate conversion service	spatialImageCoordinateConversionService	404	A coordinate transformation or coordinate conversion service to change the coordinate reference system for an image.
33	Rectification service	spatialRectificationService	405	Service for transforming an image into a perpendicular parallel projection and therefore a constant scale.
34	Orthorectification service	spatialOrthorectificationService	406	A rectification service that removes image tilt and displacement due to terrain elevation.
35	Sensor geometry model adjustment service	spatialSensorGeometryModelAdjustmentService	407	Service that adjusts sensor geometry models to improve the match of the image with other images and/or known ground positions.
36	Image geometry model conversion service	spatialImageGeometryModelConversionService	408	Service that converts sensor geometry models into a different but equivalent sensor geometry model.
37	Subsetting service	spatialSubsettingService	409	Service that extracts data from an input in a continuous spatial region either by geographic location or by grid coordinates.
38	Sampling service	spatialSamplingService	410	Service that extracts data from an input using a consistent sampling scheme either by geographic location or by grid

				coordinates.
39	Tiling change service	spatialTilingChangeService	411	Service that changes the tiling of geographic data.
40	Dimension measurement service	spatialDimensionMeasurementService	412	Service to compute dimensions of objects visible in an image or other geodata.
41	Feature manipulation services	spatialFeatureManipulationService	413	Register one feature to another, an image, or another dataset or coordinate set; correcting for relative translation shifts, rotational differences, scale differences, and perspective differences. Verify that all features in the Feature Collection are topologically consistent according to the topology rules of the Feature Collection, and identifies and/or corrects any inconsistencies that are discovered.
42	Feature matching service	spatialFeatureMatchingService	414	Service that determines which features and portions of features represent the same real world entity from multiple data resources, e.g., edge matching and limited conflation.
43	Feature generalisation service	spatialFeatureGeneralizationService	415	Service that reduces spatial variation in a feature collection to increase the effectiveness of communication by counteracting the undesirable effects of data reduction.
44	Route determination service	spatialRouteDeterminationService	416	Service to determine the optimal path between two specified points based on the input parameters and properties contained in the Feature Collection.
45	Positioning service	spatialPositioningService	417	Service provided by a position-providing device to use, obtain and unambiguously interpret position information, and determines whether the results meet the requirements of the use.

46	Proximity analysis service	spatialProximityAnalysisService	418	Given a position or geographic feature, finds all objects with a given set of attributes that are located within a user-specified distance of the position or feature.
47	**Geographic processing services – thematic**	**thematicProcessingService**	**500**	**This category comprises the following subcategories:**
48	Geoparameter calculation service	thematicGoparameterCalculationService	501	Service to derive application-oriented quantitative results that are not available from the raw data itself.
49	Thematic classification service	thematicClassificationService	502	Service to classify regions of geographic data based on thematic attributes.
50	Feature generalisation service	thematicFeatureGeneralizationService	503	Service that generalises feature types in a feature collection to increase the effectiveness of communication by counteracting the undesirable effects of data reduction.
51	Subsetting service	thematicSubsettingService	504	Service that extracts data from an input based on parameter values.
52	Spatial counting service	thematicSpatialCountingService	505	Service that counts geographic features.
53	Change detection service	thematicChangeDetectionService	506	Service to find differences between two datasets that represent the same geographical area at different times.
54	Geographic information extraction services	thematicGeographicInformationExtractionService	507	Services supporting the extraction of feature and terrain information from remotely sensed and scanned images.
55	Image processing service	thematicImageProcessingService	508	Service to change the values of thematic attributes of an image using a mathematical function.

56	Reduced resolution generation service	thematicReducedResolutionGenerationService	509	Service that reduces the resolution of an image.
57	Image Manipulation Services	thematicImageManipulationService	510	Services for manipulating data values in images: changing colour and contrast values, applying various filters, manipulating image resolution, noise removal, 'striping', systematic-radiometric corrections, atmospheric, attenuation, changes in scene illumination, etc.
58	Image understanding services	thematicImageUnderstandingService	511	Services that provide automated image change detection, registered image differencing, significance-of-difference analysis and display, and area-based and model-based differencing.
59	Image synthesis services	thematicImageSynthesisService	512	Services for creating or transforming images using computer-based spatial models, perspective transformations and manipulations of image characteristics to improve visibility, sharpen resolution, and/or reduce the effects of cloud cover or haze.
60	Multiband image manipulation	thematicMultibandImageManipulationService	513	Services that modify an image using the multiple bands of the image.
61	Object detection service	thematicObjectDetectionService	514	Service to detect real-world objects in an image.
62	Geoparsing service	thematicGeoparsingService	515	Service to scan text documents for location-based references, such as a place names, addresses, postal codes, etc., in preparation for passage to a geocoding service.
63	Geocoding service	thematicGeocodingService	516	Service to augment location-based text references with geographic coordinates (or some other spatial reference).

64	Geographic processing services – temporal	temporalProcessingService	600	This category comprises the following subcategories:
65	Temporal reference system transformation service	temporalReferenceSystemTransformationService	601	Service to change the values of temporal instances from one temporal reference system to another temporal reference system.
66	Subsetting service	temporalSubsettingService	602	Service that extracts data from an input in a continuous interval based on temporal position values.
67	Sampling service	temporalSamplingService	603	Service that extracts data from an input using a consistent sampling scheme based on temporal position values.
68	Temporal proximity analysis service	temporalProximityAnalysisService	604	Given a temporal interval or event, find all objects with a given set of attributes that are located within a user-specified interval from the interval or event.
69	Geographic processing services – metadata	metadataProcessingService	700	This category comprises the following subcategories:
70	Statistical calculation service	metadataStatisticalCalculationService	701	Service to calculate the statistics of a dataset.
71	Geographic annotation services	metadataGeographicAnnotationService	702	Services to add ancillary information to an image or a feature in a feature collection.
72	Geographic communication services	comService	800	This category comprises the following subcategories:
73	Encoding service	comEncodingService	801	Service that provides implementation of an encoding rule and provides an interface to encoding and decoding functionality.

74	Transfer service	comTransferService	802	Service that provides implementation of one or more transfer protocols, which allows data transfer between distributed information systems over offline or online communication media.
75	Geographic compression service	comGeographicCompressionService	803	Service that converts spatial portions of a feature collection to and from compressed form.
76	Geographic format conversion service	comGeographicFormatConversionService	804	Service that converts from one geographic data format to another.
77	Messaging service	comMessagingService	805	Service that allows multiple users to simultaneously view, comment about, and request edits of feature collections.
78	Remote file and executable management	comRemoteFileAndExecutableManagement	806	Service that provides access to secondary storage of geographic features as if it were local to the client.

14.6 MD_Format<<DataType>>

Nr.	ISO 19115 nr.	Name / Role name	XML value	Definition	Obligation	Maximum occurrence	Data type	Domain
1	**284.**		**MD_Format**	**Description of the computer language developed to specify data object representation in writing, file, message, storing device or transmission channel.**	**Use obligation from referencing object**	**Use maximum occurrence from referencing object**	**Aggregated Class (MD_Distribution, MD_Identification and MD_Distributor)**	**Lines 285-286**
2	285.	Format name	formatName	Name of the data transfer format.	M	1	CharacterString	Free text
3	286.	Version	version	Format version (date, number etc.)	M	1	CharacterString	Free text

14.7 CI_Citation<<DataType>>

Nr.	ISO 19115 nr.	Name / Role name	XML value	Definition	Obligation	Maximum occurrence	Data type	Domain
1	359.		CI_Citation	Standard resource reference.	Use obligation from referencing object	Use maximum occurrence from referencing object	Class<<DataType>>	Lines 360-373
2	360.	Title	title	Title by which the cited resource is known.	M	1	CharacterString	Free text
3	362.	Date	date	Reference date of the cited resource.	M	N	Class	CI_Date<<DataType>>

14.8 CI_Date<<DataType>>

Nr.	ISO 19115 nr.	Name / Role name	XML value	Definition	Obligation	Maximum occurrence	Data type	Domain
1	393.		CI_Date	Reference date and event used to describe it.	Use obligation from referencing object	Use maximum occurrence from referencing object	Class<<DataType>>	Lines 394-395
2	394.	Date	date	Reference date of the cited resource.	M	1	Class	Date including the values for year, month and day. Encoding characters to represent the date must be in line with the ISO 8601 standard. This class is fully documented in ISO/TS 19103.
3	395.	Data type	dateType	Event to which the reference date refers.	M	1	Class	CI_DateTypeCode<<CodeList>>

14.9 CI_DateTypeCode<<CodeList>>

Nr.	Name / Role name	XML value	Domain code	Description
1		CI_DateTypeCode	DateTypCd	**Identification when the observed event happened**
2	creation	creation	001	Date of creation
3	publication	publication	002	Date of publication
4	revision	revision	003	Date of revision or repeated revision, improvement or supplement

14.10 MD_MaintenanceFrequencyCode<<CodeList>>

Nr.	Name / Role name	XML value	Domain code	Description
1		MD_MaintenanceFrequencyCode	MaintFreqCd	**Frequency with which modifications and deletions are made to the data after it is first produced**
2	continual	continual	001	Data is continually updated
3	daily	daily	002	Data is updated each day
4	weekly	weekly	003	Data is updated on a weekly basis
5	fortnightly	fortnightly	004	Data is updated every two weeks
6	monthly	monthly	005	Data is updated each month
7	quarterly	quarterly	006	Data is updated every three months
8	biannually	biannually	007	Data is updated twice each year
9	annually	annually	008	Data is updated every year
10	as needed	asNeeded	009	Data is updated as deemed necessary
11	irregular	irregular	010	Data is updated in intervals that are uneven in duration
12	not planned	notPlanned	011	There are no plans to update data
13	unknown	unknown	012	Frequency of data update is not known

14.11 DQ_Result <<DataType>>

Nr.	ISO 19115 nr.	Name / Role name	XML value	Definition	Obligation	Maximum occurrence	Data type	Domain
1	128.		DQ_Result	Generalisation of more specific result classes	Use obligation from referencing object	Use maximum occurrence from referencing object	Class <<Abstract>>	
2	129.		DQ_ConformanceResult	Information about the outcome of evaluating the obtained value (or set of values) against a specified acceptable conformance quality level	Use obligation from referencing object	Use maximum occurrence from referencing object	Specified Class (DQ_Result)	Lines 130-132
3	130.	Specification	specification	Citation of product specification or user requirement against which data is being evaluated	M	1	Class	CI_Citation<<DataType>>
4	131.	Explanation	explanation	Explanation of the meaning of conformance for this result	M	1	CharacterString	Free text
5	132.	Pass	pass	Indication of the conformance result, where 0 = fail and 1 = pass	M	1	Boolean	1 = true (yes) 0 = false (no)

14.12 MD_Constraints<<DataType>>

Nr.	ISO 19115 nr.	Name / Role name	XML value	Definition	Obligation	Maximum occurrence	Data type	Domain
1	**67.**		**MD_Constraints**	**Restrictions on the access and use of a resource or metadata**	**Use obligation from referencing object**	**Use maximum occurrence from referencing object**	**Aggregated Class (MD_Metadata and MD_Identification)**	**Line 68**
2	68.	Use limitation	useLimitation	Limitation affection the fitness for use of a resource or metadata. Example, " not to be used for navigation".	C	N	CharacterString	Free text
3	**69.**		**MD_LegalConstraints**	**Restrictions and legal prerequisites for accessing and using a resource or metadata**	**Use obligation from referencing object**	**N**	**Specified Class (MD_Constraints)**	**Lines 70-72 and 68**
4	70.	Access constraints	accessConstraints	Access constraints applied to ensure the protection of privacy or intellectual property, and any special restrictions or limitations on obtaining a resource or metadata	C	N	Class	MD_RestrictionCode <<CodeList>>
5	71.	Use constraints	useConstraints	Constraints applied to ensure the protection of privacy or intellectual property, and any	C	N	Class	MD_RestrictionCode <<CodeList>>

				special restrictions or limitations or warnings on obtaining a resource or metadata				
6	72.	Other constraints	otherConstraints	Other constraints and legal prerequisites for accessing a public resource of metadata	C / accessConstraints or useConstraints equal "otherRestrictions"	N	CharacterString	Free text

14.13 MD_RestrictionCode<<CodeList>>

Nr.	Name / Role name	XML value	Domain code	Description
1		MD_RestrictionCode	RestrictCd	**Limitation(s) placed upon the access or use of data**
2	Copyright	copyright	001	Exclusive right to the publication, production or sale of the rights to a literary, dramatic, musical or artistic work, or to the use of a commercial print or label, granted by law for a specified period of time to an author, composer, artist, distributor.
3	Patent	patent	002	Exclusive right to make, sell, use or license an invention or discovery.
4	Patent pending	patentPending	003	Procured or sold information awaiting a patent.
5	Trademark	trademark	004	Name, symbol or other device identifying a product, officially registered and legally restricted to the use of the owner or manufacturer.
6	License	license	005	Formal permission to do something.
7	Intellectual property rights	intellectualPropertyRights	006	Rights to financial benefit from and control of distribution of non-tangible property that is a result of creativity.
8	Restricted	restricted	007	Withheld from general circulation or disclosure.
9	Other restrictions	otherRestrictions	008	Limitation not listed.

14.14 CI_ResponsibleParty<<DataType>>

Nr.	ISO 19115 nr.	Name / Role name	XML value	Definition	Obligation	Maximum occurrence	Data type	Domain
1	374		CI_ResponsibleParty	Identification in terms of communication with the person(s) and organization(s) related to data.	Use obligation from referencing object	Use maximum occurrence from referencing object	Class <<DataType>>	Lines 375-379
2	375.	Individual name	Individual Name	Name of responsible person (surname, first name, title, all separated).	C / organisationName and positionName not documented?	1	CharacterString	Free text
3	376.	Organization name	organisationName	Name of responsible organization.	C / individualName and positionName not documented?	1	CharacterString	Free text
4	377.	Position name	positionName	Position or role of responsible person.	C / individualName and organisationName not documented?	1	CharacterString	Free text
5	378.	Contact info	contactInfo	Address of responsible person.	C	1	Class	CI_Contact <<DataType>>
6	379.	Role	role	Function performed by responsible party.	M	1	Class	CI_RoleCode <<CodeList>>

14.15 CI_Contact<<DataType>>

Nr.	ISO 19115 nr.	Name / Role name	XML value	Definition	Obligation	Maximum occurrence	Data type	Domain
1	**387.**		**CI_Contact**	**Information required to enable contact with the responsible person or organization**	**Use obligation from referencing object**	**Use maximum occurrence from referencing object**	**Class <<DataType>>**	**Lines 388-392**
2	388.	Phone	phone	Telephone numbers at which the organization or individual may be contacted	C	1	Class	CI_Telephone <<DataType>>
3	389.	Address	address	Physical and e-mail address at which the organization or individual may be contacted	C	1	Class	CI_Address <<DataType>>
4	390.	Online resource	onlineResource	On-line information that can be used to contact the individual or organization	C	1	Class	CI_OnlineResource <<DataType>>
5	391.	Hours of service	hoursOfService	Time period (including time zone) when individuals can contact the organization or individual	C	1	CharacterString	Free text
6	392.	Contact instructions	contactInstructions	Supplemental instructions on how or when to contact the individual or organization	C	1	CharacterString	Free text

14.16 CI_Telephone<<DataType>>

Nr.	ISO 19115 nr.	Name / Role name	XML value	Definition	Obligation	Maximum occurrence	Data type	Domain
1	**407.**		**CI_Telephone**	**Telephone numbers for contacting the responsible individual or organization**	**Use obligation from referencing object**	**Use maximum occurrence from referencing object**	**Class <<DataType>>**	**Lines 408-409**
2	408.	Voice	voice	Telephone number by which individuals can speak to the responsible organization or individual	C	N	CharacterString	Free text
3	409.	Facsimile	facsimile	Telephone number of a facsimile machine for the responsible organization or individual	C	N	CharacterString	Free text

14.17 CI_Address<<DataType>>

Nr.	ISO 19115 nr.	Name / Role name	XML value	Definition	Obligation	Maximum occurrence	Data type	Domain
1	380.		CI_Address	Location of the responsible individual or organization	Use obligation from referencing object	Use maximum occurrence from referencing object	Class <<DataType>>	Lines 381-386
2	381.	Delivery point	deliveryPoint	address line for the location (as described in ISO 11180, Appendix A)	C	N	CharacterString	Free text
3	382.	City	city	City of the location	C	1	CharacterString	Free text
4	383.	Administrative area	administrativeArea	Administrative area, province of the location	C	1	CharacterString	Free text
5	384.	Postal code	postalCode	ZIP or other postal code	C	1	CharacterString	Free text
6	385.	Country	country	Country of the physical address	C	1	CharacterString	ISO 3166-3, other parts may be used
7	386.	E-mail	electronicMailAddress	Address of the electronic mailbox of the responsible organization or individual	C	N	CharacterString	Free text

14.18 CI_OnlineResource<<DataType>>

Nr.	ISO 19115 nr.	Name / Role name	XML value	Definition	Obligation	Maximum occurrence	Data type	Domain
1	396.		CI_OnlineResource	Information about on-line sources from which the dataset, specification, or community profile name and extended metadata elements can be obtained	Use obligation from referencing object	Use maximum occurrence from referencing object	Class <<DataType>>	Lines 397-402
2	397.	Linkage	linkage	location (address) for on-line access using a Uniform Resource Locator address or similar addressing scheme such as http://www.statkart.no/isotc211	M	1	Class	URL (IETF RFC1738 IETF RFC 2056)
3	398.	Protocol	protocol	Connection protocol to be used	C	1	CharacterString	Free text
4	399.	Application profile	applicationProfile	name of an application profile that can be used with the online resource	C	1	CharacterString	Free text
5	400.	Name	name	Name of the online resource	C	1	CharacterString	Free text
6	401.	Description	description	Detailed text description of what the online resource is/does	C	1	CharacterString	Free text
7	402.	Function	function	Code for function performed by the online resource	C	1	Class	CI_OnLineFunctionCode <<CodeList>>

14.19 CI_OnLineFunctionCode <<CodeList>>

Nr.	Name / Role name	XML value	Domain code	Description
1		CI_OnLineFunctionCode	OnFunctCd	**Function performed by the resource**
2	Download	download	001	Online instructions for transferring data from one storage device or system to another.
3	Information	information	002	Online information about the resource.
4	Offline access	offlineAccess	003	Online instructions for requesting the resource from the provider.
5	Order	order	004	Online order process for obtaining the resource.
6	Search	search	005	Online search interface for seeking out information about the resource.

14.20 CI_RoleCode<<CodeList>>

Nr.	Name / Role name	XML value	Domain code	Description
1		CI_RoleCode	RoleCd	**Function performed by the responsible party.**
2	Resource provider	resourceProvider	001	Party that supplies the resource. Person or organisation responsible for the availability of the data resource. Different form data distributor, who actively distributes the data resource at user's request.
3	Custodian	custodian	002	Party that accepts accountability for the data and ensures appropriate care and maintenance of the resource. Person or organisation responsible for care and maintenance of the data resource.
4	Owner	owner	003	Party that owns the resource. Person or organization with the title to intellectual property rights.
5	User	user	004	Party that uses the resource. Person or organization that is, or can be, the key user of the resource.
6	Distributor	distributor	005	Party that distributes the resource. Person or organisation responsible for the distribution of the data resource. Data distributor is not necessarily the owner of data.
7	Originator	originator	006	Party that created the resource. Person of organization that created the data resource. Can be the same as author, but in cases when a data resource is based on other resources, the creator cannot be the author.

8	Point of contact	pointOfContact	007	Party that can be contacted for acquiring knowledge about or acquisition of the data resource. Person or organization that can be contacted to acquire data on the resource.
9	Principal investigator	principalInvestigator	008	Key party responsible for gathering information and conducting research. Key person responsible for gathering information and conducting research resulting in the data resource. Appointed principal investigator or project manager or leading researcher.
10	Processor	processor	009	Party that has processed the data in a manner that the resource has been modified. Person or organization processing the data in the described form. Applicable only if the data has been subsequently processed or modified.
11	Publisher	publisher	010	Party that publishes the resource. Person of organization that published the data resource.
12	author	author	011	Party that authorized the resource. Party that created the resource. More often, the party that published the data resource is listed than the party author of "raw" data. For instance, the person or group of persons or the organization is listed that created the dataset (collected data from multiple resources and created a data resource) or published the reviewing service.

14.21 MD_CharacterSetCode<<CodeList>>

Nr.	Name / Role name	XML value	Domain code	Description
1		MD_CharacterSetCode	CharSetCd	Name of the character coding standard used for the resource.
2	ucs2	ucs2	001	16-bit fixed size Universal Character Set, based on ISO/IEC 10646
3	ucs4	ucs4	002	32-bit fixed size Universal Character Set, based on ISO/IEC 10646
4	utf7	utf7	003	7-bit variable size UCS Transfer Format, based on ISO/IEC 10646
5	utf8	utf8	004	8-bit variable size UCS Transfer Format, based on ISO/IEC 10646
6	utf16	utf16	005	16-bit variable size UCS Transfer Format, based on ISO/IEC 10646
7	8859part1	8859part1	006	ISO/IEC 8859-1, Information technology – 8-bit single-byte coded graphic character sets – Part 1: Latin alphabet No.1
8	8859part2	8859part2	007	ISO/IEC 8859-2, Information technology – 8-bit single-byte coded graphic character sets – Part 2: Latin alphabet No.2
9	8859part3	8859part3	008	ISO/IEC 8859-3, Information technology – 8-bit single-byte coded graphic character sets – Part 3: Latin alphabet No.3
10	8859part4	8859part4	009	ISO/IEC 8859-4, Information technology – 8-bit single-byte coded graphic character sets – Part 4: Latin alphabet No.4
11	8859part5	8859part5	010	ISO/IEC 8859-5, Information technology – 8-bit single-byte coded graphic character sets – Part 5: Latin/Cyrillic alphabet
12	8859part6	8859part6	011	ISO/IEC 8859-6, Information technology – 8-bit single-byte coded graphic character sets – Part 6: Latin/Arabic alphabet
13	8859part7	8859part7	012	ISO/IEC 8859-7, Information technology – 8-bit single-byte coded graphic character sets – Part 7: Latin/Greek alphabet
14	8859part8	8859part8	013	ISO/IEC 8859-8, Information technology – 8-bit single-byte coded graphic character sets – Part 8: Latin/Hebrew alphabet
15	8859part9	8859part9	014	ISO/IEC 8859-9, Information technology – 8-bit single-byte coded graphic character sets – Part 9: Latin alphabet

				No.5
16	8859part10	8859part10	015	ISO/IEC 8859-10, Information technology – 8-bit single-byte coded graphic character sets – Part 10: Latin alphabet No.6
17	8859part11	8859part11	016	ISO/IEC 8859-11, Information technology – 8-bit single-byte coded graphic character sets – Part 11: Latin/Thai alphabet
18	8859part13	8859part13	017	ISO/IEC 8859-13, Information technology – 8-bit single-byte coded graphic character sets – Part 13: Latin alphabet No.7
19	8859part14	8859part14	018	ISO/IEC 8859-14, Information technology – 8-bit single-byte coded graphic character sets – Part 14: Latin alphabet No.8 (Celtic)
20	8859part15	8859part15	019	ISO/IEC 8859-15, Information technology – 8-bit single-byte coded graphic character sets – Part 15: Latin alphabet No.9
21	8859part16	8859part16	020	ISO/IEC 8859-16, Information technology – 8-bit single-byte coded graphic character sets – Part 16: Latin alphabet No.10
22	jis	jis	021	Japanese code set used for electronic transmission
23	shiftJIS	shiftJIS	022	Japanese code set used on MS-DOS based machines
24	eucJP	eucJP	023	Japanese code set used on UNIX based machines
25	usAscii	usAscii	024	United States ASCII code set (ISO 646 US)
26	ebcdic	ebcdic	025	IBM mainframe code set
27	eucKR	eucKR	026	Korean code set
28	big5	big5	027	Traditional Chinese code set used in Taiwan, Hong Kong of China and other areas
29	GB2312	GB2312	028	Simplified Chinese code set

14.22 Croatian NSDI coordinate reference systems

The list of the Croatian NSDI coordinate reference systems is given in Table 14.22.1. It is initial list, and it will be updated with new coordinate reference systems. Proposals for new coordinate reference systems or modifications of the existing data should be sent to infonipp@dgu.hr.

In the table below, the source for EPSG code is *EPSG Geodetic Parameter Registry*, v. 8.2.3, http://www.epsg-registry.org/. In the column "Designation" are defined designations of the coordinate referent systems in line with INSPIRE designations rules from the document *D2.8.I.1 INSPIRE Specification on Coordinate Reference Systems – Guidelines.*

Table 14.22.1: List of the Croatian NSDI coordinate reference systems

Nr.	Name / Role name	Review	Designation	Croatian NSDI code Code space= hr:nipp:crs Version=1.0	EPSG code Code space= urn:ogc:def:crs:EPSG	Description
1	HTRS96/XYZ	Area: HR Dimensions: 3D Projection: no Coordinates: X, Y, Z	HTRS96-XYZ	001	4888 geocentric	Croatian Terrestrial Reference System 1996 with ETRS89 datum, for the area of Croatia. Three-dimensional Cartesian coordinates (X, Y, Z).
2	HTRS96/GRS80_3D	Area: HR Dimensions: 3D Projection: no Coordinates: ϕ, λ, h	HTRS96-GRS80h	002	4889 GeodeticCRS (geographic 3D)	Croatian Terrestrial Reference System 1996 with ETRS89 datum, for the area of Croatia. Three-dimensional geodetic coordinates. Geodetic latitude, longitude and altitude on the GRS80 ellipsoid.
3	HTRS96/GRS80_2D	Area: HR Dimensions: 2D Projection: no Coordinates: ϕ, λ	HTRS96-GRS80	003	4761 GeodeticCRS (geographic 2D)	Croatian Terrestrial Reference System 1996 with ETRS89 datum, for the area of Croatia. Two-dimensional geodetic coordinates. Geodetic latitude and longitude on the GRS80 ellipsoid.

4	**HTRS96/TM**	Area: HR Dimensions: 2D Projection: TM Coordinates: E, N	HTRS96-TM	004	3765 ProjectedCRS	Croatian Terrestrial Reference System 1996, transverse Mercator projection, for cadastral needs and with detailed cartography for the area of Croatia with ETRS89 datum. Two-dimensional (E,N) reference system in the plane of projection with one mapping zone and the central meridian 16.5° east of Greenwich, linear mapping scale along the central meridian is 0.9999, shift eastward 500 000 m.
5	HTRS96/LCC	Area: HR Dimensions: 2D Projection: LCC Coordinates: E, N	HTRS96-LCC	005	3766 ProjectedCRS	Croatian Terrestrial Reference System 1996, vertical Lambert conformal conic projection for the needs of review cartography for the area of Croatia. Two-dimensional reference system in the plane of projection with standard parallels 43°05' and 45°55'.
6	HTRS96/UTM 33N	Area: HR Dimensions: 2D Projection: UTM Coordinates: E, N	HTRS96-UTM33n	006	3767 ProjectedCRS	Croatian Terrestrial Reference System 1996, Universal transverse Mercator projection for zone 33N. Two-dimensional reference system for the area of Croatia, west of 18 ° E, on land and sea.
7	HTRS96/UTM 34N	Area: HR Dimensions: 2D Projection: UTM Coordinates: E, N	HTRS96-UTM34n	007	3768 ProjectedCRS	Croatian Terrestrial Reference System 1996, Universal transverse Mercator projection for zone 34N for the area of Croatia. Two-dimensional reference system for use on the Croatian territory.
8	HDKS1901/XYZ	Area: HR Dimensions: 3D Projection: no Coordinates: X, Y, Z	HDKS1901-XYZ	008		Croatian National Coordinate System 1901 for the area of Croatia with the datum point Hermannskogel. Three-dimensional Cartesian coordinates (X, Y, Z).

9	HDKS1901/Bessel_3D	Area: HR Dimensions: 3D Projection: no Coordinates: φ, λ, h	HDKS1901-BESSELh	009		Croatian National Coordinate System 1901 for the area of Croatia with the datum point Hermannskogel. Three-dimensional geodetic reference system on the ellipsoid Bessel 1841.
10	HDKS1901/Bessel_2D	Area: HR Dimensions: 2D Projection: no Coordinates: φ, λ	HDKS1901-BESSEL	010		Croatian National Coordinate System 1901 for the area of Croatia with the datum point Hermannskogel. Two-dimensional geodetic reference system on the ellipsoid Bessel 1841.
11	**HDKS1901/GK5**	Area: HR Dimensions: 2D Projection: GK5 Coordinates: X, Y	HDKS1901-GK5	011	3907 ProjectedCRS	Croatian National Coordinate System 1901 in the Gauss-Krüger projection, 5th zone for the area of Croatia. Two-dimensional reference system (X, Y) with the following parameters: central meridian 15° east of Greenwich, linear scale along the central meridian is 0.9999, shift eastward 500 000 m, the number of zone is "5".
12	**HDKS1901/GK6**	Area: HR Dimensions: 2D Projection: GK6 Coordinates: X, Y	HDKS1901-GK6	012	3908 ProjectedCRS	Croatian National Coordinate System 1901 in the Gauss-Krüger projection, 6 zone for the area of Croatia. Two-dimensional reference system (X, Y) with the following parameters: central meridian 18° east of Greenwich, linear scale along the central meridian is 0.9999, coordinate shift eastward 500 000 m, the number of zone is "6".
13	**HVRS71**	Area: HR Dimensions: 1D Projection: no Coordinates: H	HVRS71	013	5610 VerticalCRS	Croatian Vertical Reference System 1971 for the area of Croatia. Linked to five mareographs along the Adriatic coast. Normal orthometric heights system.

14	**HVRS1875**	Area: HR Dimensions: 1D Projection: no Coordinates: H	HVRS1875	014		Croatian Vertical Reference System 1875 for the area of Croatia. Used in the former Yugoslavia. Linked to a mareograph in Trieste. Normal orthometric heights system.
15	HDKS1901/GK1630	Area: HR Dimensions: 2D Projection: no Coordinates: X, Y	HDKS1901-GK1630	015		Croatian National Coordinate System 1901 in the Gauss-Krüger projection for the area of Croatia. The territory of Croatia is mapped in one zone with a central meridian 16.5° east of Greenwich, linear mapping scale along the central meridian is 0.9997. This reference system never became official, but was used intensively until the appearance of new official coordinate reference system, HTRS96/TM.
16	HTRS96/TM + HVRS71	Area: HR Dimensions: 2D+1D Projection: TM Coordinates: E, N, H	HTRS96-TM/HVRS71	016		Compound reference system for the area of Croatia. Consists of the two-dimensional (E, N) Croatian Terrestrial Reference System 1996 in transverse Mercator projection and one-dimensional Croatian Vertical Reference System 1971.
17	HTRS96/TM + HVRS1875	Area: HR Dimensions: 2D+1D Projection: TM Coordinates: E, N, H	HTRS96-TM/HVRS1875	017		Compound reference system for the area of Croatia. Consists of the two-dimensional (E, N) Croatian Terrestrial Reference System 1996 in transverse Mercator projection and one-dimensional Croatian Vertical Reference System 1875 (mareograph Trieste).
18	HTRS96/TM + HTRS96/GRS80	Area: HR Dimensions: 2D+1D Projection: TM Coordinates: E, N, h	HTRS96-TM/HTRS96-GRS80h	018		Compound reference system for the area of Croatia. Consists of the two-dimensional (E, N) Croatian Terrestrial Reference System 1996 in transverse Mercator projection and the one-dimensional Ellipsoidal GRS80 Reference System .

19	HTRS96/GRS80 2D + HVRS71	Area: HR Dimensions: 2D+1D Projection: no Coordinates: ϕ, λ, H	HTRS96-GRS80/HVRS71	019		Compound reference system. Consists of the two-dimensional Ellipsoidal Croatian Terrestrial Reference System 1996 using the GRS80 ellipsoid and the one-dimensional Croatian Vertical Reference System 1971.
20	HTRS96/GRS80 2D + HVRS1875	Area: HR Dimensions: 2D+1D Projection: no Coordinates: ϕ, λ, H	HTRS96-GRS80/HVRS1875	020		Compound reference system. Consists of the two-dimensional Ellipsoidal Croatian Terrestrial Reference System 1996 using the GRS80 ellipsoid and the one-dimensional Croatian Vertical Reference System 1875.
21	HDKS1901/GK5 + HVRS1875	Area: HR Dimensions: 2D+1D Projection: TM Coordinates: X, Y, H	HDKS1901-GK5/HVRS1875	021		Compound reference system for the area of Croatia. Consists of the two-dimensional Croatian National Coordinate System 1901 in the Gauss-Krüger projection, 5th zone, and the one-dimensional Croatian Vertical Reference System 1875 (mareograph Trieste).
22	HDKS1901/GK6 + HVRS1875	Area: HR Dimensions: 2D+1D Projection: GK6 Coordinates: X, Y, H	HDKS1901-GK6/HVRS1875	022		Compound reference system for the area of Croatia. Consists of the two-dimensional Croatian National Coordinate System 1901 in the Gauss-Krüger projection, 6th zone, and the one-dimensional Croatian Vertical Reference System 1875 (mareograph Trieste).
23	HDKS1901/GK5 + HVRS71	Area: HR Dimensions: 2D+1D Projection: GKS Coordinates: X, Y, H	HDKS1901-GK5/HVRS71	023		Compound reference system for the area of Croatia. Consists of the two-dimensional Croatian National Coordinate System 1901 in the Gauss-Krüger projection, 5th zone, and the one-dimensional Croatian Vertical Reference System 1971.

24	HDKS1901/GK6 + HVRS71	Area: HR Dimensions: 2D+1D Projection: GKS Coordinates: X, Y, H	HDKS1901-GK6/HVRS71	024		Compound reference system for the area of Croatia. Consists of the two-dimensional Croatian National Coordinate System 1901 in the Gauss-Krüger projection, 6th zone, and the one-dimensional Croatian Vertical Reference System 1971.
25	HDKS1901/Bessel 2D + HVRS1875	Area: HR Dimensions: 2D+1D Projection: no Coordinates: ϕ, λ, H	HDKS1901-BESSEL/HVRS1875	025		Compound reference system for the area of Croatia. Consists of the two-dimensional ellipsoidal Croatian National Coordinate System 1901 using the ellipsoid Bessel 1841 and the one-dimensional Croatian Vertical Reference System 1875 (mareograph Trieste).
26	HDKS1901/Bessel 2D + HVRS71	Area: HR Dimensions: 2D+1D Projection: no Coordinates: ϕ, λ, H	HDKS1901-BESSEL/ HVRS71	026		Compound reference system for the area of Croatia. Consists of the two-dimensional ellipsoidal Croatian National Coordinate System 1901 using the ellipsoid Bessel 1841 and the one-dimensional Croatian Vertical Reference System 1971.
27	HDKS1901/GK5 + HDKS1901/Bessel	Area: HR Dimensions: 2D+1D Projection: GKS Coordinates: X, Y, h	HDKS1901-GK5/HDKS1901-BESSELh	027		Compound reference system for the area of Croatia. Consists of the two-dimensional Croatian National Coordinate System 1901 in the Gauss-Krüger projection, 5th zone, and the one-dimensional ellipsoidal system using the ellipsoid Bessel 1841.
28	HDKS1901/GK6 + HDKS1901/Bessel	Area: HR Dimensions: 2D+1D Projection: GK6 Coordinates: X, Y, h	HDKS1901-GK6/HDKS1901-BESSELh	028		Compound reference system for the area of Croatia. Consists of the two-dimensional Croatian National Coordinate System 1901 in the Gauss-Krüger projection, 6th zone, and the ellipsoidal system with datum HDKS1901 using the ellipsoid Bessel 1841.

29	HDKS1901/GK1630 + HVRS71	Area: HR Dimensions: 2D+1D Projection: no Coordinates: X, Y, H	HDKS1901-GK1630/HVRS71	029		Compound reference system for the area of Croatia with one mapping zone which consists two-dimensional Croatian National Coordinate System 1901 in the Gauss-Krüger projection with the central meridian 16.5 ° east of Greenwich and linear scale mapping along the central meridian 0.9996 and Croatian height reference system 1875 (tide gauge in Trieste).
30	HDKS1901/GK1630 + HVRS1875	Area: HR Dimensions: 2D+1D Projection: no Coordinates: X, Y, H	HDKS1901-GK1630/HVRS1875	030		Compound reference system for the area of Croatia. Consists of the two-dimensional Croatian National Coordinate System 1901 in the Gauss-Krüger projection with a central meridian 16.5° east of Greenwich, linear mapping scale along the central meridian and the Croatian Vertical Reference System 1875 linked to the Trieste mareograph.
31	**ETRS89/XYZ**	Area: Europe Dimensions: 3D Projection: no Coordinates: X, Y, Z	ETRS89-XYZ	031	4936 GeodeticCRS (geocentric)	European Terrestrial Reference System 1989 for the territory of Europe. Pan-European Terrestrial Reference System with the ETRS89 datum and 3D Cartesian coordinates.
32	**ETRS89/GRS80 3D**	Area: Europe Dimensions: 3D Projection: no Coordinates: φ, λ, h	ETRS89-GRS80h	032	4937 GeodeticCRS (geographic 3D)	European Terrestrial Reference System 1989 for the territory of Europe. Pan-European Terrestrial Reference System with the ETRS89 datum and 3D GRS80 ellipsoidal coordinates.
33	ETRS89/GRS80_2D	Area: Europe Dimensions: 2D Projection: no Coordinates: φ, λ	ETRS89-GRS80	033	4258 GeodeticCRS (geographic 2D)	European Terrestrial Reference System 1989 for the territory of Europe. Pan-European Terrestrial Reference System with the ETRS89 datum and two-dimensional GRS80 ellipsoidal coordinates.

34	**ETRS89/TM33**	Area: Europe (part of Croatia) Dimensions: 3D Projection: TM Coordinates: E, N	ETRS89-TM33	034	3045	European Terrestrial Reference System 1989, Transverse Mercator Projection. Pan-European Terrestrial Reference System with the ETRS89 datum and two-dimensional coordinates (E, N) in the plane of projection.
35	**ETRS89/TM34**	Area: Europa (part of Croatia) Dimensions: 3D Projection: TM Coordinates: E, N	ETRS89-TM34	035	3046	European Terrestrial Reference System 1989, Transverse Mercator Projection, 34 zone (area of Croatia) from 18° to 24° east from Greenwich. Pan-European Terrestrial Reference System with the ETRS89 datum and two-dimensional coordinates in the plane of projection. ETRS89-TMzn, where the zn is zone mark from 26 to 39 with according EPSG codes from 3038 to 3051.
36	**EVRF2000/NH**	Area: Europe Dimensions: 1D Projection: no Coordinates: H	EVRF2000-NH	036	5730 VerticalCRS	European Vertical Reference Frame 2000. Pan-European Normal Orthometric Heights System. Heights according to the mareograph in Amsterdam (NAP), based on UELN_95/98 levelling network..
37	**EVRF2007/NH**	Area: Europe Dimensions: 1D Projection: no Coordinates: H	EVRF2007-NH	037		European Vertical Reference Frame 2007. Pan-European Normal Orthometric Heights System. Heights according to the mareograph in Amsterdam (NAP), based on UELN_2008 levelling network.
38	**EVRF2007/CP**	Area: Europe Dimensions: 1D Projection: no Coordinates: GN	EVRF2007-CP	038		European Vertical Reference Frame 2007. Pan-European Geopotential Heights System. Heights according to the mareograph in Amsterdam (NAP), based on UELN_2008 levelling network.

39	**EVRF2000/CP**	Area: Europe Dimensions: 1D Projection: no Coordinates: GN	EVRF2000-CP	039		European Vertical Reference Frame 2000. Pan-European Geopotential Heights System. Heights according to the mareograph in Amsterdam (NAP), based on UELN_95/98 levelling network..
40	**ETRS89/LCC**	Area: Europe Dimensions: 2D Projection: LCC Coordinates: E, N	ETRS89-LCC	040	3034 ProjectedCRS	European Terrestrial Reference System 1989, Lambert Conformal Conic Projection. Pan-European Terrestrial Reference System with the ETRS89 datum and 2D coordinates in the plane of projection.
41	**ETRS89/LAEA**	Area: Europe Dimensions: 2D Projection: LAEA Coordinates: E, N	ETRS89-LAEA	041	3035 ProjectedCRS	European Terrestrial Reference System 1989, Lambert Azimuthal Equal Area Projection. Pan-European Terrestrial Reference System with the ETRS89 datum and 2D coordinates in the plane of projection.
42	ETRS89 + EVRF2000/NH	Area: Europe Dimensions: 2D+1D Projection: no Coordinates: φ, λ, H	ETRS89/EVRF2000-NH	042	7409 CompoundCRS	Compound reference system for the area of Europe. Consists of the two-dimensional European Terrestrial Reference System 1989 in relation to the GRS80 ellipsoid and European Vertical Reference Frame 2000.
43	ETRS89 + EVRF2007/NH	Area: Europe Dimensions: 2D+1D Projection: no Coordinates: φ, λ, H	ETRS89/EVRF2007-NH	043	7423 CompoundCRS	Compound reference system for the area of Europe. Consists of the two-dimensional European Terrestrial Reference System 1989 in relation to the GRS80 ellipsoid and European Vertical Reference Frame 2000.
44	ETRS90/XYZ	Area: Europe Dimensions: 3D Projection: no Coordinates: X, Y, Z	ETRS90-XYZ	044		European Terrestrial Reference System 1990 for the territory of Europe. Pan-European Terrestrial Reference System with three-dimensional Cartesian coordinates.

45	ETRS91/XYZ	Area: Europe Dimensions: 3D Projection: no Coordinates: X, Y, Z	ETRS91-XYZ	045		European Terrestrial Reference System 1991 for the territory of Europe. Pan-European Terrestrial Reference System with three-dimensional Cartesian coordinates.
46	ETRS92/XYZ	Area: Europe Dimensions: 3D Projection: no Coordinates: X, Y, Z	ETRS92-XYZ	046		European Terrestrial Reference System 1992 for the territory of Europe. Pan-European Terrestrial Reference System with three-dimensional Cartesian coordinates.
47	ETRS93/XYZ	Area: Europe Dimensions: 3D Projection: no Coordinates: X, Y, Z	ETRS93-XYZ	047		European Terrestrial Reference System 1993 for the territory of Europe. Pan-European Terrestrial Reference System with three-dimensional Cartesian coordinates.
48	ETRS94/XYZ	Area: Europe Dimensions: 3D Projection: no Coordinates: X, Y, Z	ETRS94-XYZ	048		European Terrestrial Reference System 1994 for the territory of Europe. Pan-European Terrestrial Reference System with three-dimensional Cartesian coordinates.
49	ETRS96/XYZ	Area: Europe Dimensions: 3D Projection: no Coordinates: X, Y, Z	ETRS96-XYZ	049		European Terrestrial Reference System 1996 for the territory of Europe. Pan-European Terrestrial Reference System with three-dimensional Cartesian coordinates.
50	ETRS97/XYZ	Area: Europe Dimensions: 3D Projection: no Coordinates: X, Y, Z	ETRS97-XYZ	050		European Terrestrial Reference System 1997 for the territory of Europe. Pan-European Terrestrial Reference System with three-dimensional Cartesian coordinates.

51	ETRS2000/XYZ	Area: Europe Dimensions: 3D Projection: no Coordinates: X, Y, Z	ETRS2000-XYZ	051		European Terrestrial Reference System 2000 for the territory of Europe. Pan-European Terrestrial Reference System with three-dimensional Cartesian coordinates.
52	ITRF88/XYZ	Area: Global Dimensions: 3D Projection: no Coordinates: X, Y, Z	ITRF88-XYZ	052	4910 GeodeticCRS (geocentric)	International Terrestrial Reference Frame 1988 for the area of the Earth. Three-dimensional Cartesian coordinate system.
53	ITRF89/XYZ	Area: Global Dimensions: 3D Projection: no Coordinates: X, Y, Z	ITRF89-XYZ	053	4911 GeodeticCRS (geocentric)	International Terrestrial Reference Frame 1989 for the area of the Earth. Three-dimensional Cartesian coordinate system.
54	ITRF90/XYZ	Area: Global Dimensions: 3D Projection: no Coordinates: X, Y, Z	ITRF90-XYZ	054	4912 GeodeticCRS (geocentric)	International Terrestrial Reference Frame 1990 for the area of the Earth. Three-dimensional Cartesian coordinate system.
55	ITRF91/XYZ	Area: Global Dimensions: 3D Projection: no Coordinates: X, Y, Z	ITRF91-XYZ	055	4913 GeodeticCRS (geocentric)	International Terrestrial Reference Frame 1991 for the area of the Earth. Three-dimensional Cartesian coordinate system.
56	ITRF92/XYZ	Area: Global Dimensions: 3D Projection: no Coordinates: X, Y, Z	ITRF92-XYZ	056	4914 GeodeticCRS (geocentric)	International Terrestrial Reference Frame 1992 for the area of the Earth. Three-dimensional Cartesian coordinate system.

57	ITRF93/XYZ	Area: Global Dimensions: 3D Projection: no Coordinates: X, Y, Z	ITRF93-XYZ	057	4915 GeodeticCRS (geocentric)	International Terrestrial Reference Frame 1993 for the area of the Earth. Three-dimensional Cartesian coordinate system.
58	ITRF94/XYZ	Area: Global Dimensions: 3D Projection: no Coordinates: X, Y, Z	ITRF94-XYZ	058	4916 GeodeticCRS (geocentric)	International Terrestrial Reference Frame 1994 for the area of the Earth. Three-dimensional Cartesian coordinate system.
59	ITRF96/XYZ	Area: Global Dimensions: 3D Projection: no Coordinates: X, Y, Z	ITRF96-XYZ	059	4917 GeodeticCRS (geocentric)	International Terrestrial Reference Frame 1996 for the area of the Earth. Three-dimensional Cartesian coordinate system.
60	ITRF97/XYZ	Area: Global Dimensions: 3D Projection: no Coordinates: X, Y, Z	ITRF97-XYZ	060	4918 GeodeticCRS (geocentric)	International Terrestrial Reference Frame 1997 for the area of the Earth. Three-dimensional Cartesian coordinate system.
61	ITRF2000/XYZ	Area: Global Dimensions: 3D Projection: no Coordinates: X, Y, Z	ITRF2000-XYZ	061	4919 GeodeticCRS (geocentric)	International Terrestrial Reference Frame 2000 for the area of the Earth. Three-dimensional Cartesian coordinate system.
62	ITRF2005/XYZ	Area: Global Dimensions: 3D Projection: no Coordinates: X, Y, Z	ITRF2005-XYZ	062	4896 GeodeticCRS (geocentric)	International Terrestrial Reference Frame 2005 for the area of the Earth. Three-dimensional Cartesian coordinate system.

63	ITRF2008/XYZ	Area: Global Dimensions: 3D Projection: no Coordinates: X, Y, Z	ITRF2008-XYZ	063		International Terrestrial Reference Frame 2008 for the area of the Earth. Three-dimensional Cartesian coordinate system.
64	WGS84/XYZ	Area: Global Dimensions: 3D Projection: no Coordinates: X, Y, Z	WGS84-XYZ	064		World Geodetic System 1984 for whole Earth (global). Three-dimensional ellipsoid coordinates.
65	**WGS84/3D**	Area: Global Dimensions: 3D Projection: no Coordinates: φ, λ, h	WGS84h	065	4979 GeodeticCRS (geographic 3D)	World Geodetic System 1984 for the area of the Earth (global). Three-dimensional ellipsoidal coordinates (φ, λ, h) in relation to the WGS84 ellipsoid.
66	WGS84/2D	Area: Global Dimensions: 2D Projection: no Coordinates: φ, λ	WGS84	066	4326 GeodeticCRS (geographic 2D)	World Geodetic System 1984 for the area of the Earth (global). Two-dimensional ellipsoidal coordinates (φ, λ) in relation to the WGS84 ellipsoid.
67	**WGS84/UTM 33N**	Area: Global (part of Croatia) Dimensions: 2D Projection: UTM Coordinates: E, N	WGS84-UTM33N	067	32633 ProjectedCRS	World Geodetic System 1984 for the area of the Earth in the Universal Transverse Mercator Projection for zone 33N. Two-dimensional coordinates in the plane of projection.
68	**WGS84/UTM34N**	Area: Global (part of Croatia) Dimensions: 2D Projection: UTM Coordinates: E, N	WGS84-UTM34N	068	32634 ProjectedCRS	World Geodetic System 1984 for the area of the Earth in the Universal Transverse Mercator Projection for zone 34N. Two-dimensional coordinates in the plane of projection.

| 69 | WGS84/Pseudo-Mercator

(Spherical Mercator, Mercator_1SP_Google, WGS84, Simple Mercator, Google Maps Global Mercator, WGS84 Web Mercator - Auxiliary Sphere) | Area: Global
Dimensions: 2D
Projection: Mercator
Coordinates: E, N | WGS84-PSEUDOMERCATOR | 069 | 3857
ProjectedCRS | Mercator projection with respect to the sphere. Use Google, OpenLayers, GeoServer, MapServer, OpenStreetMap, Bing, Yahoo, etc.
INSPIRE view service uses the code of pyramidal sharing of displayed data in a different scales for data in last scale. of standards for the data in the last scale.
For the modified reference systems are given codes: 7094, 7483, 900913. |
| 70 | CRS:84
(WGS84/2D) | Area: Global
Dimensions: 2D
Projection: no
Coordinates: ϕ, λ | CRS:84 | 070 | | World Geodetic System 1984 for the area of the Earth (global). Two-dimensional coordinates in respect of WGS84 ellipsoid. INSPIRE View service (WGS 84) for data beyond continental Europe. |

Document D2.8.I.1 *INSPIRE Specification on Coordinate Reference Systems - Guidelines* specifies besides the usual coordinates types also coordinates:
• LAT - depth of the sea floor, where they present significant tidal amplitude (D),
• MSL - depth of the seabed in the maritime areas without significant tidal amplitude (D), in the open ocean in waters with depths greater than 200 m (D),
• ISA - coordinates the pressure in the free atmosphere (P),
• PFO - coordinates of the oceans pressure (P).

The following coordinate reference systems for view service are recommended (*Technical Guidance for the implementation of INSPIRE View Services, v.3.0*):
    • Geographic ETRS89 (EPSG: 4258)   - continental Europe,
    • WGS 84 (World) (EPSG: 4326)   - small resolutions data,
    • WGS 84 (CRS: 84)   - data outside of continental Europe.