****

**GeoPlatform Profile of ISO 19115-1**

**DRAFT Revision 1**

**July 13, 2016**

**Prepared by:**

Image Matters LLC

201 Loudoun St, SW

Leesburg, Virginia 20186

**Prepared for:**

Federal Geographic Data Committee (FGDC),

National Geospatial Profile Initiative (NGPI),

Geospatial Platform Technical Support

**Document Management History**

**Document Location**

| Online Location |
| --- |
| Location: This document is not currently available online. |

**Revision History**

| Version Number | Version Date | Summary of Changes | Team/Author |
| --- | --- | --- | --- |
| 1.0 | 7/2016 | First Draft | Kurt Buehler, Jena Hanes, Stephane Fellah |
| 1.1 | 2/2017 | Formatting |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

**Approvals**

This document requires the approval of the following persons:

| Name | Contact Info | Date |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  |  |  |

Table of Contents

[1. Introduction 1](#_Toc475660675)

[1.1. Purpose 1](#_Toc475660676)

[1.2. Scope 2](#_Toc475660677)

[1.3. Conformance with ISO Standards 2](#_Toc475660678)

[1.4. The Geoplatform Profile 4](#_Toc475660679)

[1.4.1. Additions 5](#_Toc475660680)

[1.4.2. Deprecation 6](#_Toc475660681)

[1.4.3. Specifications 7](#_Toc475660682)

[1.4.4. Other Modifications 7](#_Toc475660683)

[2. Conceptual Model Overview 8](#_Toc475660684)

[2.1. Metadata dependencies 8](#_Toc475660685)

[2.2. Metadata fundamentals 9](#_Toc475660686)

[2.3. Metadata application information 10](#_Toc475660687)

[2.3.1. Metadata application information: Data dictionary 11](#_Toc475660688)

[3. Resource metadata class diagrams and data dictionaries by package 12](#_Toc475660689)

[3.1. Introduction 12](#_Toc475660690)

[3.2. Metadata information (MD\_Metadata) 13](#_Toc475660691)

[3.2.1. Metadata schema 13](#_Toc475660692)

[3.2.2. MD\_Metadata: Data dictionary 15](#_Toc475660693)

[3.2.3. Metadata scope: Metadata about metadata 17](#_Toc475660694)

[3.2.3.1. Metadata scope: Data dictionary 17](#_Toc475660695)

[3.2.3.2. Metadata scope: MD\_ScopeCode <<CodeList>> 18](#_Toc475660696)

[3.3. Identification information (MD\_Identification) 19](#_Toc475660697)

[3.3.1. General 19](#_Toc475660698)

[3.3.2. Identification information: Data dictionary 21](#_Toc475660699)

[3.3.2.1. MD\_DataIdentification 23](#_Toc475660700)

[3.3.2.1.1. MD\_LayerIdentification 24](#_Toc475660701)

[3.3.2.1.2. MD\_MapIdentification 24](#_Toc475660702)

[3.3.2.2. Keyword information: Data Dictionary 24](#_Toc475660703)

[3.3.2.3. MD\_KeywordClass 25](#_Toc475660704)

[3.3.2.4. MD\_RepresentativeFraction 25](#_Toc475660705)

[3.3.2.5. MD\_Resolution 26](#_Toc475660706)

[3.3.2.6. MD\_Usage 26](#_Toc475660707)

[3.3.2.7. MD\_AssociatedResource 27](#_Toc475660708)

[3.3.2.8. MD\_Concept 27](#_Toc475660709)

[3.3.2.9. TM\_Duration 27](#_Toc475660710)

[3.3.3. Identification information code lists 28](#_Toc475660711)

[3.3.3.1. DS\_AssociationType <<CodeList>> 29](#_Toc475660712)

[3.3.3.2. DS\_InitiativeTypeCode <<CodeList>> 29](#_Toc475660713)

[3.3.3.3. MD\_KeywordTypeCode <<CodeList>> 30](#_Toc475660714)

[3.3.3.4. MD\_ProgressCode <<CodeList>> 30](#_Toc475660715)

[3.3.3.5. MD\_SpatialRepresentationTypeCode <<CodeList>> 31](#_Toc475660716)

[3.3.3.6. MD\_TopicCategoryCode << Enumeration>> 31](#_Toc475660717)

[3.4. Constraint information (MD\_Constraints) 34](#_Toc475660718)

[3.4.1. General 34](#_Toc475660719)

[3.4.2. Constraint information: Data dictionaries 35](#_Toc475660720)

[3.4.2.1. MD\_LegalConstraints 35](#_Toc475660721)

[3.4.2.2. MD\_SecurityConstraints 36](#_Toc475660722)

[3.4.2.3. MD\_Releasability 36](#_Toc475660723)

[3.4.3. Constraint information codelists 36](#_Toc475660724)

[3.4.3.1. MD\_ClassificationCode <<CodeList>> 36](#_Toc475660725)

[3.4.3.2. MD\_RestrictionCode <<CodeList>> 37](#_Toc475660726)

[3.5. Lineage information (LI\_Lineage) 38](#_Toc475660727)

[3.5.1. Lineage information: Data dictionary 39](#_Toc475660728)

[3.5.1.1. LI\_ProcessStep 39](#_Toc475660729)

[3.5.1.2. LI\_Source 40](#_Toc475660730)

[3.6. Maintenance information (MD\_MaintenanceInformation) 41](#_Toc475660731)

[3.6.1. Maintenance information: Data dictionary 42](#_Toc475660732)

[3.6.2. MD\_MaintenanceFrequencyCode <<CodeList>> 42](#_Toc475660733)

[3.7. Spatial representation information (MD\_SpatialRepresentation) 44](#_Toc475660734)

[3.7.1. Spatial representation information: Data dictionary 45](#_Toc475660735)

[3.7.1.1. MD\_GridSpatialRepresentation 45](#_Toc475660736)

[3.7.1.2. MD\_Georectified 45](#_Toc475660737)

[3.7.1.3. MD\_Georeferenceable 46](#_Toc475660738)

[3.7.1.4. MD\_VectorSpatialRepresentation 46](#_Toc475660739)

[3.7.1.5. MD\_Dimension 48](#_Toc475660740)

[3.7.1.6. MD\_GeometricObjects 48](#_Toc475660741)

[3.7.2. Spatial representation codelists and enumerations 48](#_Toc475660742)

[3.7.2.1. MD\_GeometricObjectTypeCode <<CodeList>> 48](#_Toc475660743)

[3.7.2.2. MD\_DimensionNameTypeCode <<CodeList>> 49](#_Toc475660744)

[3.7.2.3. MD\_CellGeometryCode <<CodeList>> 50](#_Toc475660745)

[3.7.2.4. MD\_TopologyLevelCode <<CodeList>> 50](#_Toc475660746)

[3.7.2.5. MD\_PixelOrientationCode <<enumeration>> 50](#_Toc475660747)

[3.8. Reference system information (MD\_ReferenceSystem) 51](#_Toc475660748)

[3.8.1. Reference system information: Data dictionary 52](#_Toc475660749)

[3.8.2. MD\_ReferenceSystemTypeCode <<CodeList>> 52](#_Toc475660750)

[3.9. Content information (MD\_ContentInformation) 55](#_Toc475660751)

[3.9.1. Content information: Data dictionary 57](#_Toc475660752)

[3.9.1.1. MD\_FeatureCatalogueDescription 57](#_Toc475660753)

[3.9.1.2. MD\_FeatureCatalogue 57](#_Toc475660754)

[3.9.1.3. MD\_CoverageDescription 58](#_Toc475660755)

[3.9.1.4. MD\_ImageDescription 58](#_Toc475660756)

[3.9.1.5. MD\_AttributeGroup 59](#_Toc475660757)

[3.9.1.6. MD\_RangeDimension 59](#_Toc475660758)

[3.9.1.7. MD\_SampleDimension 60](#_Toc475660759)

[3.9.1.8. MD\_Band 61](#_Toc475660760)

[3.9.1.9. MD\_FeatureTypeInfo 61](#_Toc475660761)

[3.9.2. Content information codelists 61](#_Toc475660762)

[3.9.2.1. MD\_CoverageContentTypeCode <<CodeList>> 61](#_Toc475660763)

[3.9.2.2. MD\_ImagingConditionCode <<CodeList>> 62](#_Toc475660764)

[3.10. Portrayal catalogue information (MD\_PortrayalCatalogueReference) 63](#_Toc475660765)

[3.10.1. Portrayal catalogue information: Data dictionary 63](#_Toc475660766)

[3.11. Distribution information (MD\_Distribution) 64](#_Toc475660767)

[3.11.1. Distribution information: Data dictionary 65](#_Toc475660768)

[3.11.1.1. MD\_DigitalTransferOptions 65](#_Toc475660769)

[3.11.1.2. MD\_Distributor 66](#_Toc475660770)

[3.11.1.3. MD\_Format 66](#_Toc475660771)

[3.11.1.4. MD\_Medium 67](#_Toc475660772)

[3.11.1.5. MD\_StandardOrderProcess 67](#_Toc475660773)

[3.11.2. MD\_MediumFormatCode <<CodeList>> 68](#_Toc475660774)

[3.12. Metadata extension information (MD\_MetadataExtensionInformation) 69](#_Toc475660775)

[3.12.1. Metadata extension information: Data dictionary 70](#_Toc475660776)

[3.12.1.1. MD\_ExtendedElementInformation 70](#_Toc475660777)

[3.12.1.2. MD\_DataTypeCode <<CodeList>> 72](#_Toc475660778)

[3.12.1.3. MD\_ObligationCode <<enumeration>> 73](#_Toc475660779)

[3.13. Application schema information (MD\_ApplicationSchemaInformation) 74](#_Toc475660780)

[3.13.1. Application schema information: Data dictionary 75](#_Toc475660781)

[3.14. Service metadata information 76](#_Toc475660782)

[3.14.1.1. SV\_OperationMetadata 80](#_Toc475660783)

[3.14.1.2. SV\_OperationChainMetadata 80](#_Toc475660784)

[3.14.1.3. SV\_Parameter 81](#_Toc475660785)

[3.14.1.4. SV\_CoupledResource 81](#_Toc475660786)

[3.14.2. Service metadata information codelists and enumerations 82](#_Toc475660787)

[3.14.2.1. SV\_CouplingType <<CodeList>> 82](#_Toc475660788)

[3.14.2.2. DCPList <<CodeList>> 82](#_Toc475660789)

[3.14.2.3. SV\_ParameterDirection <<enumeration>> 82](#_Toc475660790)

[4. Extent, Citation, and Language-characterset localisation information 83](#_Toc475660791)

[4.1. Extent information (EX\_Extent) 83](#_Toc475660792)

[4.1.1. Extent information: Data dictionaries 84](#_Toc475660793)

[4.1.1.1. EX\_GeographicExtent 84](#_Toc475660794)

[4.1.1.2. EX\_BoundingPolygon 84](#_Toc475660795)

[4.1.1.3. EX\_GeographicBoundingBox 85](#_Toc475660796)

[4.1.1.4. EX\_GeographicDescription 85](#_Toc475660797)

[4.1.1.5. EX\_TemporalExtent 85](#_Toc475660798)

[4.1.1.6. EX\_SpatialTemporalExtent 86](#_Toc475660799)

[4.1.1.7. EX\_VerticalExtent 86](#_Toc475660800)

[4.1.2. Extent information: related classes 86](#_Toc475660801)

[4.1.2.1. GM\_Object 86](#_Toc475660802)

[4.1.2.2. TM\_Primitive 86](#_Toc475660803)

[4.1.2.3. SC\_VerticalCRS 86](#_Toc475660804)

[4.2. Citation information 87](#_Toc475660805)

[4.2.1. Citation information: data dictionaries 89](#_Toc475660806)

[4.2.2. CI\_Responsibility 89](#_Toc475660807)

[4.2.3. CI\_Party 90](#_Toc475660808)

[4.2.3.1. CI\_Individual 90](#_Toc475660809)

[4.2.3.2. CI\_Organisation 90](#_Toc475660810)

[4.2.3.3. CI\_Contact 90](#_Toc475660811)

[4.2.3.4. CI\_Address 91](#_Toc475660812)

[4.2.4. Citation information: data types and codelists 91](#_Toc475660813)

[4.2.4.1. CI\_Date <<DataType>> 93](#_Toc475660814)

[4.2.4.2. CI\_Series <<DataType>> 93](#_Toc475660815)

[4.2.4.3. CI\_OnlineResource <<DataType>> 93](#_Toc475660816)

[4.2.4.4. CI\_Telephone <<DataType>> 94](#_Toc475660817)

[4.2.4.5. CI\_TelephoneTypeCode <<CodeList>> 95](#_Toc475660818)

[4.2.4.6. CI\_DateTypeCode <<CodeList>> 95](#_Toc475660819)

[4.2.4.7. CI\_PresentationFormCode <<CodeList>> 95](#_Toc475660820)

[4.2.4.8. CI\_RoleCode <<CodeList>> 96](#_Toc475660821)

[4.2.4.9. CI\_OnLineFunctionCode <<CodeList>> 97](#_Toc475660822)

[4.3. Language-characterset localisation information 98](#_Toc475660823)

[4.3.1. Multilingual support for free text fields: Free text metadata elements 98](#_Toc475660824)

[4.3.2. Free text metadata elements: Data dictionaries 99](#_Toc475660825)

[4.3.2.1. LocalisedCharacterString 99](#_Toc475660826)

[4.3.2.2. PT\_Locale 99](#_Toc475660827)

[4.3.2.2.1. LanguageCode <<CodeList>> 100](#_Toc475660828)

[4.3.2.2.2. CountryCode <<CodeList>> 100](#_Toc475660829)

[4.3.2.2.3. MD\_CharacterSetCode <<CodeList>> 100](#_Toc475660830)

[4.3.3. Management of localised strings 100](#_Toc475660831)

[4.3.3.1. PT\_LocaleContainer 101](#_Toc475660832)

[5. Other commonly-used classes: MD\_Identifier, URI, MD\_Scope, MD\_BrowseGraphic 102](#_Toc475660833)

[5.1. Commonly-used classes: data dictionaries 103](#_Toc475660834)

[5.1.1. MD\_Scope <<DataType>> 103](#_Toc475660835)

[5.1.2. MD\_ScopeDescription 103](#_Toc475660836)

[5.1.3. MD\_Identifier <<DataType>> 104](#_Toc475660837)

[5.1.4. MD\_BrowseGraphic 104](#_Toc475660838)

[6. Externally-referenced classes 105](#_Toc475660839)

[6.1. Introduction 105](#_Toc475660840)

[6.1.1. Date and DateTime information 105](#_Toc475660841)

[6.1.2. Distance, angle, measure, number, record, recordType, scale and UomLength information 105](#_Toc475660842)

[6.1.3. PeriodDuration and temporal primitive information 106](#_Toc475660843)

[6.1.4. Point and Object information 106](#_Toc475660844)

[6.1.5. Set and Sequence information 106](#_Toc475660845)

[6.1.6. Type name information 106](#_Toc475660846)

[6.1.7. Vertical coordinate reference system information 106](#_Toc475660847)

[6.1.8. Internet protocol standards 106](#_Toc475660848)

# Introduction

## Purpose

It is generally accepted as good practice to identify a resource with a Unique Resource Identifier (URI). The URI allows cross-linkage of resources, is readable by machines, and it supports the proper development of the semantic web. The unambiguous identification of resources with URIs allows one to reach resources outside of the current document. While some changes in 19115-1 from ISO 19115:2003 address this concern, working with the standard as it stands can be cumbersome and many issues remain. Additionally, linkage between datasets, services, layers, and maps is difficult to establish and maintain in the given schema. This profile is primarily concerned with either establishing a URI where it was not already present or for placing the URI front and center. It also seeks to address the absence of linkage and similar issues between datasets, services, layers, and maps; the profile works to establish relationships between these data types by ensuring they have clear and concise identification and location information. Finally, the profile aims to correspond with SKOS so as to make use of established, controlled vocabularies and better enable semantic search.

A URI is globally unique and can be used as a reference by other resources. This unique identification system allows machines to represent this relation and to add additional links to the same resource; it is fundamental to the proper funciton of the semantc web. To address the need for this globally unique identifier, this profile includes the following URI elements: an ***identifier*** element to the MD\_Identification class and to the CI\_Party class; an ***ontologyURI*** element to MD\_FeatureTypeInfo; and a ***uri*** element to the CI\_Citation class. So that services are clearly documented and include a URI, the element ***serviceDocumentation*** (of type CI\_OnlineResource) has been added to the SV\_ServiceIdentification class.

ISO 19115-1 provides two specified classes of *MD\_Identification*, MD\_DataIdentification and SV\_ServiceIdentification. This profile augments ISO 19115-1 with two additional specified classes: MD\_LayerIdentification and MD\_MapIdentification (see subclauses 3.3.2.1.1 and 3.3.2.1.2). These additional classes are introduced to capture layer and map metadata. Maps and layers are not datasets or services but rather representation techniques for data and, as such, need to be represented separately. To allow reference to these different types, SV\_ServiceIdentification ***operatesOn*** domain is modified to associate with any specified class of *MD\_Idenfication* (see clause 0). Additionally, so that metadata may be identified as describing a map or layer, the code list MD\_ScopeCode used to describe the attribute ***resourceScope*** has been supplanted with ***map***, ***mapDocument***, and ***layer***.

In the same effort of achieving improved linkage between resources, this profile makes modifications to the Citation information classes: CI\_OnlineResource additions include the elements ***mimeType***, ***format,*** *and* ***representationTechnique***; CI\_OnlineResource recommendations for ***name*** (use the title of the resource), ***applicationProfile*** (use to differentiate between sets of metadata elements),and ***protocolRequest*** (not recommended to be used, see subclause 4.2.4.3); and the addition of ***apiDocument*** to the CI\_OnLineFunctionCode code list (see subclause 4.2.4.9). Finally, the profile raises from optional the ***address*** element of CI\_Contact and the ***electronicMailAddress*** element of CI\_Address. This ensures an email address is provided for any cited resource, and thus enables automation of contact of the party responsible for the metadata information. The full details and UML diagram for these changes can be found in subclause 4.2.

This profile seeks to correspond with SKOS, which used to define controlled vocabularies (code lists, taxonomies, thesauri, etc.) and thus introduces a new element of the MD\_Keywords class, ***concept***, which is defined by a new class, MD\_Concept (see subclause 3.3.2.8). Because each instance of ***concept*** has a URI, inclusion here favours reusability of such controlled vocabularies and access to well-defined semantics of concepts. It additionally enables semantic search. The new MD\_Concept class has the following elements and attributes: ***conceptIdentifier***, ***preferredLabel***, ***alternateLabel***, and ***description***. When ***concept*** is used, ***keyword*** should be used to refer to the preferredLabel of a SKOS Concept, MD\_Keywords: ***type*** should refer to the concept type, and MD\_KeywordClass: ***ontology*** should be used for concept scheme. Since it is possible that a ***concept*** can have multiple classifications (produced by inference or referring to equivalent class in other ontologies), the profile raises the maximum occurance of MD\_Keywords: ***keywordClass*** from one to allow multiple instances of MD\_KeywordClass for a single ***concept***.

To enable even better semantic search, the attribute ***type*** (when referring to concept type) should use the appropriate code in the KeywordTypeCodes code list. In this profile, five new KeywordTypeCodes have been added: ***audience***, ***subject***, ***community***, ***function***, and ***domain***. Their inclusion will be useful in evaluating the fitness of use for items in the registry. To accommodate additional types that are not defined in the KeywordTypeCodes list, the element ***ontology*** should be used to refer to a class or concept that is defined either in an ontology or concept scheme.

## Scope

## Conformance with ISO Standards

Normative references: For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IETF RFC 3986:2005 *Uniform Resource Identifier (URI): Generic Syntax*

ISO 639 (all parts), *Code for the representation of names of languages*

ISO 3166 (all parts), *Codes for the representation of names of countries and their subdivisions*

ISO 4217:2001, *Codes for the representation of currencies and funds*

ISO 8601:2004, *Data elements and interchange formats – Information interchange – Representation of dates and times*

ISO/IEC 10646-1:2011, *Information technology ― Universal Multiple-Octet Coded Character Set (UCS) ― Part 1: Architecture and Basic Multilingual Plane*

ISO/TS 19103:2005, *Geographic information ― Conceptual schema language*

ISO 19106:2004, *Geographic information ― Profiles*

ISO 19107:2003, *Geographic information ― Spatial schema*

ISO 19108:2002, *Geographic information ― Temporal schema*

ISO 19109:2005, *Geographic information ― Rules for application schema*

ISO 19110:2005, *Geographic information ― Methodology for feature cataloguing*

ISO 19111:2007, *Geographic information ― Spatial referencing by coordinates*

ISO 19111-2:2009, *Geographic information ― Spatial referencing by coordinates – Part 2: Extension for parametric values*

ISO 19112:2003, *Geographic information ― Spatial referencing by geographic identifiers*

ISO 19119, *Geographic information — Services*

ISO 19157: Geographic information ― Data Quality

## The Geoplatform Profile

An overview of the metadata requirements of the Geoplatform Profile is provided in the following sections.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Class / CodeList** | **Name / Role Name** | **Obligation / Minimum** | **Changes** | **Implementation Details** |
| MD\_Concept |  |  | added class with elements ***conceptIdentifier***, ***preferredLabel***, ***alternateLabel***, and ***description*** | 3.3.2.8 |
| MD\_LayerIdentification |  |  | added a new specified class of *MD\_Identification* with ***layerName, dataset,*** and ***style*** elements | 3.3.2.1.1 |
| MD\_MapIdentification |  |  | added a new specified class of *MD\_Identification* with ***dataset*** and ***layer*** elements | 3.3.2.1.2 |
| MD\_Identification | identifier | [1] | added URI identifier | 3.3.2 |
| MD\_Keywords | concept | [0..\*] | added element of type MD\_Concept | 3.3.2.2 |
| MD\_Keywords | keywordClass | [0..\*] | raised maximum occurance from 1 | 3.3.2.2 |
| MD\_FeatureTypeInfo | ontologyURI | [0..1] | added URI to refer to the concept denoting the feature type | 3.9.1.9 |
| SV\_ServiceIdentification | operatesOn | [0..\*] | associated with abstract MD\_Identification class | **Error! Reference source not found.** |
| SV\_ServiceIdentification | serviceDocumentation | [1] | added element of type CI\_OnlineResource | 0 |
| CI\_Citation | uri | [1] | added URI identifier | 4.2.1 |
| CI\_Party | identifier | [1] | added URI identifier | 4.2.3 |
| CI\_Contact | address | [1] | raised from optional in ISO 19115-1 | 4.2.3.3 |
| CI\_Address | electronicMailAddress | [1] | raised from optional in ISO 19115-1 | 4.2.3.4 |
| CI\_OnlineResource | mimeType | [0..1] | added Character String to provide the mime type of the online resource | 4.2.4.3 |
| CI\_OnlineResource | format | [0..1] | added element of type MD\_Format | 4.2.4.3 |
| CI\_OnlineResource | representationTechnique | [0..1] | added element of type URI | 4.2.4.3 |
| CI\_OnlineResource | protocolRequest | [0..1] | deprecated | 4.2.4.3 |
| CI\_OnlineResource | applicationProfile | [0..1] | specified to be used to differentiate between sets of metadata elements | 4.2.4.3 |
| CI\_OnlineResource | name | [0..1] | specified as title | 4.2.4.3 |
| MD\_ScopeCode | map |  | added to code list | 3.2.3.2 |
| MD\_ScopeCode | mapDocument |  | added to code list | 3.2.3.2 |
| MD\_ScopeCode | layer |  | added to code list | 3.2.3.2 |
| MD\_KeywordTypeCode | audience |  | added to code list | 3.3.3.3 |
| MD\_KeywordTypeCode | subject |  | added to code list | 3.3.3.3 |
| MD\_KeywordTypeCode | community |  | added to code list | 3.3.3.3 |
| MD\_KeywordTypeCode | function |  | added to code list | 3.3.3.3 |
| MD\_KeywordTypeCode | domain |  | added to code list | 3.3.3.3 |
| CI\_OnLineFunctionCode | apiDocument |  | added to code list | 4.2.4.9 |

### Additions

Classes:

MD\_Concept

MD\_LayerIdentification

MD\_MapIdentification

Elements/Attributes:

MD\_Identification: identifier (URI)

MD\_LayerIdentification: layerName (CharacterString / Free text)

MD\_LayerIdentification: dataset (CI\_OnlineResource)

MD\_LayerIdentification: style (CI\_OnlineResource)

MD\_MapIdentification: dataset (CI\_OnlineResource)

MD\_MapIdentification: layer (CI\_OnlineResource)

MD\_Keywords: concept (MD\_Concept)

MD\_Concept: conceptIdentifier (URI)

MD\_Concept: preferredLabel (CharacterString / Free text)

MD\_Concept: alternatateLabel (CharacterString / Free text)

MD\_Concept: description (CharacterString / Free text)

MD\_FeatureTypeInfo: ontologyURI (URI)

SV\_ServiceIdentification: serviceDocumentation (CI\_OnlineResource)

CI\_Citation: uri (URI)

CI\_Party: identifier (URI)

CI\_OnlineResource: mimeType

CI\_OnlineResource: format (MD\_Format)

CI\_OnlineResource: representationTechnique (URI)

Code List Codes:

MD\_ScopeCode: layer

MD\_ScopeCode: map

MD\_ScopeCode: mapDocument

MD\_KeywordTypeCode: audience

MD\_KeywordTypeCode: subject

MD\_KeywordTypeCode: community

MD\_KeywordTypeCode: function

MD\_KeywordTypeCode: domain

CI\_OnlineFunctionCode: apiDocument

### Deprecation

This profile of ISO 19115-1 is precluding the use of the optional attribute CI\_OnlineResource: protocolRequest.

### Specifications

CI\_OnlineResource: name

To be used specifically to refer to the title of the online resource.

CI\_OnlineResource: applicationProfile

Should be used to differentiate between different sets of metadata elements such as NMIS, INSPIRE profile. An application profile consists of a set of metadata elements, policies, and guidelines defined for a particular application. Examples of application profiles would be DCAT-AP, NMIS 2.2 profiles. Both of these profiles define the set of valid metadata elements, policies, and guidelines to use the metadata elements.

### Other Modifications

MD\_Keywords: keywordClass

This profile raises the maximum occurrence of keywordClass from one to allow multiple instances of the MD\_KeywordClass.

CI\_Contact/address/CI\_Address/electronicMailAddress

CI\_Contact.address.CI\_Address.electronicMailAddress has been rasied from optional so as to ensure the inclusion of an email address.

# Conceptual Model Overview

# Metadata dependencies

The conceptual model overview of this profile is that of the base standard ISO 19115-1 and it utilizes concepts defined in several other standards’ packages. Figure 1 illustrates the ISO/TC 211 packages upon which ISO 19115-1 (and this profile) is dependent.



Figure 1 — Metadata dependencies

## Metadata fundamentals

ISO 19115-1 uses 14 packages to define and provide: Metadata application information, Metadata information, Identification information, Constraint information, Lineage information, Maintenance information, Spatial representation information, Reference system information, Content information, Portrayal catalogue information, Distribution information, Metadata extension information, Metadata application shema information, and Service metadata information. Additional packages may be used to provide supplementary metadata: Extent information, Citation information (which includes Responsible party information), and Language-characterset localisation information. Individual packages may be used alone to meet specific use case requirements but a minimum of the Metadata and Identification information packages must be used when providing a complete metadata set (Figure 2). This profile does not make any changes to these minimum requirements or to the fundamental overview.



Figure 2 — Metadata fundamentals

## Metadata application information

Unlike of ISO 19115-1 this profile seeks to include maps and layers as resource entities as described in Figure 3. The data dictionary is located in subclause 2.3.1. The resources and services to which MD\_Metadata applies is provided in subclause 3.2.3.2, MD\_ScopeCode <<CodeList>> which includes the additions of ***layer***, ***map***, and ***mapDocument***.



Figure 3 — Metadata application

### Metadata application information: Data dictionary

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| *DS\_Resource* | an identifiable asset or means that fulfils a requirement | Use obligation from referencing object | Use maximum occurrence from referencing object | Class <<Abstract>> |
|  |
| *Role name:* | resource has related metadata | M | N | Association / MD\_Metadata (3.2.2) |
| has |
| *Role name:* | resource is a component of an aggregate resource | O | N | Association / DS\_Aggregate (2.3.1) |
| partOf |
| DS\_DataSet | identifiable collection of data | Use obligation from referencing object | Use maximum occurrence from referencing object | Specified Class (DS\_Resource) |
| SV\_Service | capability which a service provider entity makes available to a service user entity through a set of interfaces that define a behavior | Use obligation from referencing object | Use maximum occurrence from referencing object | Specified Class (DS\_Resource) |
| DS\_Layer | representation of a dataset in a form used by a map | Use obligation from referencing object | Use maximum occurrence from referencing object | Specified Class (DS\_Resource) |
| DS\_Map | representation of an aggregate of layers | Use obligation from referencing object | Use maximum occurrence from referencing object | Specified Class (DS\_Resource) |
| *DS\_Aggregate* | collection of resources | Use obligation from referencing object | Use maximum occurrence from referencing object | Specified Class (DS\_Resource) <<Abstract>> |
| *Role name:* | aggregate is composed of multiple resources | M | N | Association / DS\_Resource (2.3.1) |
| composedOf |
| DS\_OtherAggregate | collection of resource associated through unspecified means | Use obligation from referencing object | Use maximum occurrence from referencing object | Specified Class (DS\_Aggregate) |
| DS\_StereoMate | collection of image datasets covering the same subject from different perspectives providing a stereo view | Use obligation from referencing object | Use maximum occurrence from referencing object | Specified Class (DS\_OtherAggregate) |
| DS\_Initiative | collection of associated resources related by their participation in a common initiative | Use obligation from referencing object | Use maximum occurrence from referencing object | Specified Class (DS\_Aggregate) |
| DS\_Series | collection of resource related by a common heritage adhering to a common specification | Use obligation from referencing object | Use maximum occurrence from referencing object | Specified Class (DS\_Aggregate) |
| DS\_Platform | collection of associated resources produced from the same sensor platform | Use obligation from referencing object | Use maximum occurrence from referencing object | Specified Class (DS\_Series) |
| DS\_Sensor | collection of associated resources produced by the same sensor | Use obligation from referencing object | Use maximum occurrence from referencing object | Specified Class (DS\_Series) |
| DS\_ProductionSeries | collection of associated resources produced to the same production specification | Use obligation from referencing object | Use maximum occurrence from referencing object | Specified Class (DS\_Series) |

# Resource metadata class diagrams and data dictionaries by package

# Introduction

Metadata UML diagrams and data dictionaries are provided for those classes, elements, data types, and code lists that are united in a package. Those packages that are modified by this profile include: Metadata information (MD\_ScopeCode); Identification information (MD\_Identification, MD\_LayerIdentification, MD\_MapIdentification, MD\_Keywords, MD\_Concept, and MD\_KeywordTypeCode); Content information (MD\_FeatureTypeInfo); Service metadata information (SV\_ServiceIdentification); and, Citation information (CI\_Citation, CI\_Party, CI\_Contact, CI\_Address, CI\_OnlineResource, and CI\_OnlineFunctionCode). All other packages and minimum requirements are retained and remain unchanged; the UML diagrams and data dictionaries are provided here for reference. As is the case with ISO 19115-1, optional classes may have elements that become mandatory when the optional element is used.

# Metadata information (MD\_Metadata)

## Metadata schema

The MD\_Metadata package defines the schema for describing the complete metadata about a resource and metadata about the metadata itself.

Full metadata is provided by MD\_Metadata and an aggregate of 12 additional metadata classes as specified in Figure 4. The DQ\_DataQuality class is defined in ISO 19157. The data dictionary for Figure 4 is provided in subclause 3.2.2.

To allow the identification of metadata as that of a ***map, mapDocument,*** or a ***layer***, these terms have been added to the MD\_ScopeCode code list. The code ***map*** should be used to refer to a map that has a georeferencing that is exploitable by GIS software while ***mapDocument*** is to be used to describe a map that does not have a georeferencing system that is exploitable by GIS systems (such as an artistic or schematic map).

This profile of ISO 19115-1 makes no other changes to this schema nor to the scope; the UML diagrams in Figures 4 and 5, and the corresponding data dictionaries, are provided for reference.



Figure 1 — Metadata schema classes

## MD\_Metadata: Data dictionary

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| MD\_Metadata | root entity which defines metadata about a resource or resources | M | Use maximum occurrence from referencing object if referenced from DS\_Resource | Class |
| metadataIdentifier | unique Identifier for this metadata record | O | 1 | Class / MD\_Identifier (5.1.3) |
| defaultLocale | language and character set used for documenting metadata | C / not defined by encoding and UTF-8 not used? | 1 | Class / PT\_Locale (4.3.2.2) |
| parentMetadata | identification of the parent metadata record | C / If there is an upper level object | 1 | Class / CI\_Citation (4.2.1) |
| contact | party responsible for the metadata information | M | N | Class / CI\_Responsibility (4.2.2) |
| dateInfo | date(s) associated with the metadata | M | N | Class / CI\_Date (4.2.4.1) |
| Note: “creation” date must be provided others may be also be provided |
| metadataStandard | citation for the standard to which the metadata conforms | O | N | Class / CI\_Citation (4.2.1) |
| NOTE: metadata standard citations should include an identifier |
| metadataProfile | citation for the profile(s) of the metadata standard to which the metadata conforms | O | N | Class / CI\_Citation (4.2.1) |
| NOTE: metadata profile citations should include an identifier |
| alternativeMetadataReference | reference to alternative metadata, e.g Dublin Core, FGDC, or metadata in a non-ISO standard for the same resource | O | N | Class / CI\_Citation (4.2.1) |
| otherLocale | provides information about alternatively used localised character strings | O | N | Class / PT\_Locale (4.3.2.2) |
| metadataLinkage | online location where the metadata is available | O | N | Class / CI\_OnlineResource (4.2.4.3) |
| *Role name*:  spatialRepresentationInfo | digital representation of spatial information in the resource | O | N | Association / MD\_Spatial  Representation  <<Abstract>> (3.7.1) |
| *Role name:*  referenceSystemInfo | description of the spatial and temporal reference systems used in the resource | O | N | Association / MD\_Reference  System (3.8.1) |
| *Role name*:  metadataExtensionInfo | information describing metadata extensions | O | N | Association / MD\_Metadata  ExtensionInformation (3.12.1) |
| *Role name*:  identificationInfo | basic information about the resource(s) to which the metadata applies | M | N | Association / MD\_Identification (3.3.2) <<Abstract>>  Note: Caution should be taken regarding the use of multiple instances of MD\_Identification. |
|  |  |
| *Role name*:  contentInfo | information about feature and coverage characteristics | O | N | Association / MD\_ContentInformation <<Abstract>> (3.9.1) |
| *Role name*: | information about the distributor of and options for obtaining the resource(s) | O | N | Association / MD\_Distribution (3.11.1) |
| distributionInfo |
| **Name / Role name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| *Role name*: | overall assessment of quality of a resource(s) | O | N | Association / DQ\_DataQuality  (ISO 19157) |
| dataQualityInfo |
| *Role name*:  portrayalCatalogueInfo | information about the catalogue of rules defined for the portrayal of a resource(s) | O | N | Association / MD\_PortrayalCatalogueReference (3.10.1) |
|  |
| *Role name:*  metadataConstraints | restrictions on the access and use of metadata | O | N | Association / MD\_Constraints (3.4.2) |
| *Role name:*  applicationSchemaInfo | information about the conceptual schema of a resource | O | N | Association / MD\_ApplicationSchema  Information (3.13.1) |
| *Role name:*  metadataMaintenance | information about the frequency of metadata updates, and the scope of those updates | O | 1 | Association / MD\_Maintenance  Information (3.6.1) |
| *Role name:*  resourceLineage | information about the provenance, source(s), and/or the production process(es) applied to the resource | O | N | Association / LI\_Lineage (3.5.1) |
| *Role name:*  metadataScope | the scope/type of resource for which metadata is provided | C / Metadata is about a resource other than a dataset? | N | Association / MD\_MetadataScope (3.2.3.1) |

## Metadata scope: Metadata about metadata

The MD\_Metadata class contains attributes providing information about the metadata as specified in Figure 5.



Figure 2 — Metadata on metadata classes

## Metadata scope: Data dictionary

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| MD\_MetadataScope | information about the scope of the resource | Use obligation from referencing object | Use maximum occurrence from referencing object | Class |
| resourceScope | code for the scope | M  Default = “dataset” | 1 | Class / MD\_ScopeCode <<CodeList>>  (3.2.3.2) |
| name | description of the scope | O | 1 | CharacterString / Free text |

## Metadata scope: MD\_ScopeCode <<CodeList>>

| **Concept name (English)** | **Code** | **Definition** |
| --- | --- | --- |
| MD\_ScopeCode |  | class of information to which the referencing entity applies |
| attribute | attribute | information applies to the attribute value |
| attributeType | attributeType | information applies to the characteristic of a feature |
| collectionHardware | collectionHardware | information applies to the collection hardware class |
| collectionSession | collectionSession | information applies to the collection session |
| dataset | dataset | information applies to the dataset |
| series | series | information applies to the series |
| nonGeographicDataset | nonGeographicDataset | information applies to non-geographic data |
| dimensionGroup | dimensionGroup | information applies to a dimension group |
| feature | feature | information applies to a feature |
| featureType | featureType | information applies to a feature type |
| propertyType | propertyType | information applies to a property type |
| fieldSession | fieldSession | information applies to a field session |
| software | software | information applies to a computer program or routine |
| service | service | information applies to a capability which a service provider entity makes available to a service user entity through a set of interfaces that define a behaviour, such as a use case |
| model | model | information applies to a copy or imitation of an existing or hypothetical object |
| tile | tile | information applies to a tile, a spatial subset of geographic data |
| metadata | metadata | information applies to metadata |
| initiative | initiative | information applies to an initiative |
| sample | sample | information applies to a sample |
| document | document | information applies to a document |
| repository | repository | information applies to a repository |
| aggregate | aggregate | information applies to an aggregate resource |
| product | product | metadata describing an ISO 19131 data product specification |
| collection | collection | information applies to an unstructured set |
| coverage | coverage | information applies to a coverage |
| application | application | information resource hosted on a specific set of hardware and accessible over a network |
| map | map | information applies to a digitally-available map |
| mapDocument | mapDocument | information applies to a map document whose georeferencing is not directly exploitable by GIS software |
| layer | layer | information applies to a layer |

# Identification information (MD\_Identification)

## General

As mentioned in subclause 1.1 of this document, this profile seeks to address the absence of linkage (URIs) or linkage issues present in ISO 19115-1 so that the metadata properly supports the semantic web. Specifically, MD\_Identification: ***identifier*** puts the URI of the resource in a clear, accessible location. To support proper linkage of layers and maps, this profile includes two new specified classes of *MD\_Identification*: MD\_LayerIdentification (3.3.2.1.1) and MD\_MapIdentification (3.3.2.1.2).

This profile also includes a new class, MD\_Concept (3.3.2.2), to define the type of a new element, ***concept***, of the MD\_Keyword class. Additionally, the maximum occurrence of MD\_Keyword: ***keywordClass*** is raised from one to allow multiple instances of the MD\_KeywordsClass for a single ***concept***.

Also mentioned in subclause 1.1, the profile includes five new KeywordTypeCodes: ***audience***, ***subject***, ***community***, ***function***, and ***domain***.

These changes are reflected in the UML class diagrams for Identification information and the associated code lists (Figures 6 and 7). The data dictionaries are provided in subclauses 3.3.2 to 3.3.2.8 and 3.3.3.1 to 3.3.3.6.

Figure 3 — Identification information classes

## Identification information: Data dictionary

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum Occurrence** | **Data Type / Domain** |
| *MD\_Identification* | basic information required to uniquely identify a resource or resources | Use obligation from referencing object | Use maximum occurrence from referencing object | Aggregated Class (MD\_Metadata)  <<Abstract>> |
| Note: Caution regarding the use of multiple instances of this class. |
| citation | citation for the resource | M | 1 | Class / CI\_Citation (4.2.1) |
| abstract | brief narrative summary of the resource | M | 1 | CharacterString / Free text |
| identifier | the URI of the resource (effort should be done to make it resolvable) | M | 1 | URI (6.1.8) |
| purpose | summary of the intentions with which the resource was developed | O | 1 | CharacterString / Free text |
| credit | recognition of those who contributed to the resource | O | N | CharacterString / Free text |
| status | status of the resource | O | N | Class / MD\_ProgressCode <<CodeList>> (3.3.3.4) |
|  |
| pointOfContact | identification of, and means of communication with, person(s) and organisation(s) associated with the resource | O | N | Class / CI\_Responsibility (4.2.2) |
| spatialRepresentationType | method used to spatially represent geographic information | O | N | Class / MD\_SpatialRepresentationTypeCode <<CodeList>> (3.3.3.5) |
| spatialResolution | factor which provides a general understanding of the density of spatial data in the resource or describes the range of resolutions in which a digital resource may be used | O | N | Class / MD\_Resolution <<Union>> (3.3.2.5) |
| NOTE: this element should be repeated when describing upper and lower range |  |
| temporalResolution | smallest resolvable temporal period in a resource | O | N | Class / TM\_Duration (3.3.2.9) |
| topicCategory | main theme(s ) of the resource | C / is metadataScope/ resourceScope equal “dataset” or “series”? | N | Class / MD\_TopicCategoryCode <<Enumeration>> (3.3.3.6) |
| extent | spatial and temporal extent of the resource | C / is metadataScope/ resourceScope equal “dataset”? if yes, either extent.geographic | N | Class / EX\_Extent (4.1.1) |
| Element.EX\_ |  |
| GeographicBoundingBox or extent.geographic |  |
| Element.EX\_ |  |
| Geographic |  |
| Description is required |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum Occurrence** | **Data Type / Domain** |
| additionalDocumentation | other documentation associated with the resource (e.g. related articles, publications, user guides, data dictionaries) | O | N | Class / CI\_Citation (4.2.1) |
| processingLevel | code that identifies the level of processing in the producers coding system of a resource e.g. NOAA level 1B | O | 1 | Class / MD\_Identifier <<DataType>> (5.1.3) |
| *Role name:* | information about the frequency of resource updates, and the scope of those updates | O | N | Association / MD\_MaintenanceInformation (3.6.1) |
| resourceMaintenance |
| *Role name:* | graphic that illustrates the resource(s) (should include a legend for the graphic) | O | N | Association / MD\_BrowseGraphic (5.1.4) |
| graphicOverview |
| *Role name:* | description of the format of the resource(s) | O | N | Association / MD\_Format (3.11.1.3) |
| resourceFormat |
| *Role name:* | category keywords, their type, and reference source | O | N | Association / MD\_Keywords (3.3.2.2) |
| descriptiveKeywords |
| *Role name:* | basic information about specific application(s) for which the resource(s) has/have been or is being used by different users | O | N | Association / MD\_Usage (3.3.2.6) |
| resourceSpecificUsage |
| *Role name:* | information about constraints which apply to the resource(s) | O | N | Association / MD\_Constraints (3.4.2) |
| resourceConstraints |
| *Role name:* | associated resource information | O | N | Association / MD\_AssociatedResource |
| associatedResource | (3.3.2.7) |

## MD\_DataIdentification

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum Occurrence** | **Data Type / Domain** |
| MD\_DataIdentification | information required to identify a resource | Use obligation from referencing object | Use maximum occurrence from referencing object | Specified Class (MD\_Identification) |
| defaultLocale | language and character set used within the resource | C / language used in resource? | 1 | Class / PT\_Locale (4.3.2.2) |
| otherLocale | alternate localised language(s) and character set (s) used within the resource | O | N | Class / PT\_Locale (4.3.2.2) |
| environmentDescription | description of the resource in the producer’s processing environment, including items such as the software, the computer operating system, file name, and size | O | 1 | CharacterString / Free text |
| supplementalInformation | any other descriptive information about the resource | O | 1 | CharacterString / Free text |

## MD\_LayerIdentification

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum Occurrence** | **Data Type / Domain** |
| MD\_LayerIdentification | information required to identify a resource | Use obligation from referencing object | Use maximum occurrence from referencig object | Specified Class (MD\_Identification) |
| dataset | the dataset associated with the layer | M | 1 | Class / CI\_OnlineResource (4.2.4.3) |
| layerName | request identifier of the layer used by the map service | O | 1 | CharacterString / Free text |
| style | the method by which a dataset is represented in the layer | O | N | Class / CI\_OnlineResource (4.2.4.3) |

## MD\_MapIdentification

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum Occurrence** | **Data Type / Domain** |
| MD\_MapIdentification | information required to identify a resource | Use obligation from referencing object | Use maximum occurrence from referencig object | Specified Class (MD\_Identification) |
| layer | the layer(s) of which a map is comprised | O | N | Class / CI\_OnlineResource (4.2.4.3) |
| dataset | the dataset(s) to which the map refers | O | N | Class / CI\_OnlineResource (4.2.4.3) |

## Keyword information: Data Dictionary

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum Occurrence** | **Data Type / Domain** |
| MD\_Keywords | keywords, their type and reference source | Use obligation from referencing object | Use maximum occurrence from referencing object | Aggregated Class (MD\_Identification) |
| NOTE: When the resource described is a service, one instance of MD\_Keyword shall refer to the service taxonomy defined in the International Standard ISO 19119 |
| keyword | commonly used word(s) or formalised word(s) or phrase(s) used to describe the subject | M | N | CharacterString / Free text |
| type | subject matter used to group similar keywords | O | 1 | Class / MD\_KeywordTypeCode <<CodeList>> (3.3.3.3) |
|  |
| thesaurusName | name of the formally registered thesaurus or a similar authoritative source of keywords | O | 1 | Class / CI\_Citation (4.2.1) |
| concept | idea or notion or unit of thought | O | N | Class / MD\_Concept (3.3.2.8) |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Role name:* | association of a MD\_Keywords instance with a MD\_KeywordClass to provide user-defined categorization of groups of keywords that extend or are orthogonal to the standardized KeywordTypeCodes and are associated with an ontology that allows additional semantic query processing | O | N | Class / MD\_KeywordClass (3.3.2.3) |
| keywordClass | NOTE: The thesaurus citation specifies a collection of instances from some ontology, but is not an ontology. It might be a list of places that include rivers, mountains, counties and cities. There might be a Laconte county, the city of Laconte, the Laconte River, and Mt. Laconte; when searching it is useful for the user to be able to restrict the search to only rivers. |  |

## MD\_KeywordClass

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum Occurrence** | **Data Type / Domain** |
| MD\_KeywordClass | specification of a class to categorize keywords in a domain-specific vocabulary that has a binding to a formal ontology | Use obligation from referencing object | Use maximum occurrence from referencing object | Aggregated Class (MD\_Keywords) |
|  |
| className | character string to label the keyword category in natural language | M | 1 | CharacterString / Free text |
| conceptIdentifier | URI of concept in the ontology specified by the next element (ontology) and labeled by the previous element (className). | O | 1 | Class / URI (6.1.8) |
| ontology | a reference that binds the keyword class to a formal conceptualization of a knowledge domain for use in semantic processing | M | 1 | Class / CI\_Citation (4.2.1) |
| NOTE: Keywords in the associated MD\_Keywords keyword list must be within the scope of this ontology |  |

## MD\_RepresentativeFraction

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum Occurrence** | **Data Type / Domain** |
| MD\_RepresentativeFraction | derived from ISO 19103 Scale where MD\_Representative | Use obligation from referencing object | Use maximum occurrence from referencing object | Class <<DataType>> |
| Fraction.denominator = 1 / Scale. |  |
| measure And Scale.targetUnits = Scale.sourceUnits |  |
| denominator | the number below the line in a vulgar fraction | M | 1 | Integer / Integer > 0 |

## MD\_Resolution

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum Occurrence** | **Data Type / Domain** |
| MD\_Resolution | level of detail expressed as a scale factor, a distance or an angle | Use obligation from referencing object | Use maximum occurrence from referencing object | Class <<Union>> |
|  |
| equivalentScale | level of detail expressed as the scale of a comparable hardcopy map or chart | C / distance, vertical, angularDistance, or levelOfDetail not documented? | 1 | Class / MD\_RepresentativeFraction <<DataType>> (3.3.2.4) |
| distance | horizontal ground sample distance | C / equivalentScale, vertical, angularDistance, or levelOfDetail not documented? | 1 | Class / Distance (6.1.2) |
| vertical | vertical sampling distance | C / distance, equivalentScale, angularDistance, or levelOfDetail not documented? | 1 | Class / Distance (6.1.2) |
| angularDistance | angular sampling measure | C / distance, equivalentScale, vertical, or levelOfDetail not documented? | 1 | Class / Angle (6.1.2) |
| levelOfDetail | brief textual description of the spatial resolution of the resource | C / distance, equivalentScale or vertical not documented? | 1 | CharacterString / Free text |

## MD\_Usage

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum Occurrence** | **Data Type / Domain** |
| MD\_Usage | brief description of ways in which the resource(s) is/are currently or has been used | Use obligation from referencing object | Use maximum occurrence from referencing object | Aggregated Class (MD\_Identification) |
| specificUsage | brief description of the resource and/or resource series usage | M | 1 | CharacterString / Free text |
| usageDateTime | date and time of the first use or range of uses of the resource and/or resource series | O | N | Class / TM\_Primitive (4.1.2.2) |
| userDeterminedLimitations | applications, determined by the user for which the resource and/or resource series is not suitable | O | 1 | CharacterString / Free text |
| userContactInfo | identification of and means of communicating with person(s) and organisation(s) using the resource(s) | O | N | Class / CI\_Responsibility (4.2.2) |
| response | response to the user-determined limitations | O | N | CharacterString / Free text |
| e.g.. “this has been fixed in version x” |  |
| additionalDocumentation | publications that describe usage of data | O | N | Class / CI\_Citation (4.2.1) |
| identifiedIssues | citation of a description of known issues associated with the resource along with proposed solutions if available | O | N | Class / CI\_Citation (4.2.1) |

## MD\_AssociatedResource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum Occurrence** | **Data Type / Domain** |
| MD\_AssociatedResource | associated resource information | Use obligation from referencing object | Use maximum occurrence from referencing object | Aggregated Class (MD\_Identification) |
| name | citation information about the associated resource | C / if metadataReference not documented? | 1 | Class / CI\_Citation (4.2.1) |
|  |
| associationType | type of relation between the resources | M | 1 | Class / DS\_AssociationTypeCode <<CodeList>> (3.3.3.1) |
| initiativeType | type of initiative under which the associated resource was produced | O | 1 | Class / DS\_InitiativeTypeCode <<CodeList>> (3.3.3.1) |
| metadataReference | reference to the metadata of the associated resource | C / if name not documented? | 1 | Class / CI\_Citation (4.2.1) |

## MD\_Concept

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| MD\_Concept | idea or notion or unit of thought | Use obligation from referencing object |  | Class |
| conceptIidentifier | the URI of the concept (effort should be done to make it resolvable) | M | 1 | URI |
| preferredLabel | the preferred label of the concept | M | 1 | CharacterString / Free Text |
| alternateLabel | other labels of the concept; may be used for parallel language versions of the label | O | N | CharacterString / Free Text |
| description | the definition of the concept; may be repeated for parallel language versions of the definition | O | N | CharacterString / Free Text |

## TM\_Duration

TM\_Duration: duration of time as specified by ISO 8601. This class is fully documented in ISO 19108.

## Identification information code lists

The Identification package uses the codelists specified in Figure 7. The data dictionaries for these codelists are located in subclauses 3.3.3.1. to 3.3.3.6. Note this profile provides additional codes to the MD\_KeywordTypeCode code list.

**Figure 4 — Identification information codelists**

## DS\_AssociationType <<CodeList>>

| **Concept name (English)** | **Code** | **Definition** |
| --- | --- | --- |
| DS\_AssociationTypeCode |  | justification for the correlation of two resources |
| crossReference | crossReference | reference from one resource to another |
| largerWorkCitation | largerWorkCitation | reference to a master resource of which this one is a part |
| partOfSeamlessDatabase | partOfSeamlessDatabase | part of same structured set of data held in a computer |
| stereoMate | stereoMate | part of a set of imagery that when used together, provides three-dimensional images |
| isComposedOf | isComposedOf | reference to resources that are parts of this resource |
| collectiveTitle | collectiveTitle | common title for a collection of resources NOTE: title identifies elements of a series collectively, combined with information about what volumes are available at the source cite |
| series | series | associated through a common heritage such as produced to a common product specification |
| dependency | dependency | associated through a dependency |
| revisionOf | revisionOf | resource is a revision of associated resource |

## DS\_InitiativeTypeCode <<CodeList>>

| **Concept name (English)** | **Code** | **Definition** |
| --- | --- | --- |
| DS\_InitiativeTypeCode |  | type of aggregation activity in which resources are related |
| campaign | campaign | series of organized planned actions |
| collection | collection | accumulation of resources assembled for a specific purpose |
| exercise | exercise | specific performance of a function or group of functions |
| experiment | experiment | process designed to find if something is effective or valid |
| investigation | investigation | search or systematic inquiry |
| mission | mission | specific operation of a data collection system |
| sensor | sensor | device or piece of equipment which detects or records |
| operation | operation | action that is part of a series of actions |
| platform | platform | vehicle or other support base that holds a sensor |
| process | process | method of doing something involving a number of steps |
| program | program | specific planned activity |
| project | project | organized undertaking, research, or development |
| study | study | examination or investigation |
| task | task | piece of work |
| trial | trial | process of testing to discover or demonstrate something |

## MD\_KeywordTypeCode <<CodeList>>

| **Concept name (English)** | **Code** | **Definition** |
| --- | --- | --- |
| MD\_KeywordTypeCode |  | methods used to group similar keywords |
| discipline | discipline | keyword identifies a branch of instruction or specialized learning |
| place | place | keyword identifies a location |
| stratum | stratum | keyword identifies the layer(s) of any deposited substance or levels within an ordered system |
| temporal | temporal | keyword identifies a time period related to the resource |
| theme | theme | keyword identifies a particular subject or topic |
| dataCentre | dataCentre | keyword identifies a repository or archive that manages and distributes data |
| featureType | featureType | keyword identifies a resource containing or about a collection of feature instances with common characteristics |
| instrument | instrument | keyword identifies a device used to measure or compare physical properties |
| platform | platform | keyword identifies a structure upon which an instrument is mounted |
| process | process | keyword identifies a series of actions or natural occurrences |
| project | project | keyword identifies an endeavour undertaken to create or modify a product or service |
| service | service | keyword identifies an activity carried out by one party for the benefit of another |
| product | product | keyword identifies a type of product |
| subTopicCategory | subTopicCategory | refinement of a topic category for the purpose of geographic data classification |
| taxon | taxon | keyword identifies a taxonomy of the resource |
| audience | audience | keyword identifies the intended audience for the resource |
| subject | subject | keyword identifies a person or thing that plays a central role in the resource |
| community | community | keyword identifies a community of interest related to the resource |
| function | function | keyword identifies the function for which the resource is intended (e.g. navigation, information, targeting, etc.) |
| domain | domain | keyword identifies a generalization of the topic concept used when defining a topic that is outside of the current MD\_TopicCategoryCode scheme |

## MD\_ProgressCode <<CodeList>>

| **Concept name (English)** | **Code** | **Definition** |
| --- | --- | --- |
| MD\_ProgressCode |  | status of the resource |
| completed | completed | has been completed |
| historicalArchive | historicalArchive | stored in an offline storage facility |
| obsolete | obsolete | no longer relevant |
| onGoing | onGoing | continually being updated |
| planned | planned | fixed date has been established upon or by which the resource will be created or updated |
| required | required | needs to be generated or updated |
| underDevelopment | underDevelopment | currently in the process of being created |
| final | final | progress concluded and no changes will be accepted |
| pending | pending | committed to, but not yet addressed |
| retired | retired | item is no longer recommended for use. It has not been superseded by another item |
| superseded | superseded | replaced by new |
| tentative | tentative | provisional changes likely before resource becomes final or complete |
| valid | valid | acceptable under specific conditions |
| accepted | accepted | agreed to by sponsor |
| notAccepted | notAccepted | rejected by sponsor |
| withdrawn | withdrawn | removed from consideration |
| proposed | proposed | suggested that development needs to be undertaken |
| deprecated | deprecated | resource superseded and will become obsolete, use only for historical purposes |

## MD\_SpatialRepresentationTypeCode <<CodeList>>

| **Concept name (English)** | **Code** | **Definition** |
| --- | --- | --- |
| MD\_SpatialRepresentationTypeCode |  | method used to represent geographic information in the resource |
| vector | vector | vector data are used to represent geographic data |
| grid | grid | grid data are used to represent geographic data |
| textTable | textTable | textual or tabular data are used to represent geographic data |
| tin | tin | triangulated irregular network |
| stereoModel | stereoModel | three-dimensional view formed by the intersecting homologous rays of an overlapping pair of images |
| video | video | scene from a video recording |

## MD\_TopicCategoryCode << Enumeration>>

| **Concept name (English)** | **Code** | **Definition** |
| --- | --- | --- |
| MD\_TopicCategoryCode |  | high-level geographic data thematic classification to assist in the grouping and search of available geographic data sets. Can be used to group keywords as well. Listed examples are not exhaustive. NOTE: It is understood there are overlaps between general categories and the user is encouraged to select the one most appropriate. |
| farming | farming | rearing of animals and/or cultivation of plants  Examples: agriculture, irrigation, aquaculture, plantations, herding, pests and diseases affecting crops and livestock |
| biota | biota | flora and/or fauna in natural environment  Examples: wildlife, vegetation, biological sciences, ecology, wilderness, sealife, wetlands, habitat |
| boundaries | boundaries | legal land descriptions, maritime boundaries  Examples: political and administrative boundaries, territorial seas, EEZ, port security zones |
| climatologyMeteorologyAtmosphere | climatologyMeteorologyAtmosphere | processes and phenomena of the atmosphere  Examples: cloud cover, weather, climate, atmospheric conditions, climate change, precipitation |
| economy | economy | 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 |
| elevation | elevation | height above or below a vertical datum  Examples: altitude, bathymetry, digital elevation models, slope, derived products |
| environment | environment | environmental resources, protection and conservation  Examples: environmental pollution, waste storage and treatment, environmental impact assessment, monitoring environmental risk, nature reserves, landscape |
| geoscientificInformation | geoscientificInformation | 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 |
| health | health | health, health services, human ecology, and safety  Examples: disease and illness, factors affecting health, hygiene, substance abuse, mental and physical health, health services |
| imageryBaseMapsEarthCover | imageryBaseMapsEarthCover | base maps  Examples: land cover, topographic maps, imagery, unclassified images, annotations |
| intelligenceMilitary | intelligenceMilitary | military bases, structures, activities  Examples: barracks, training grounds, military transportation, information collection |
| inlandWaters | inlandWaters | inland water features, drainage systems and their characteristics  Examples: rivers and glaciers, salt lakes, water utilization plans, dams, currents, floods, water quality, hydrologic information |
| location | location | positional information and services  Examples: addresses, geodetic networks, control points, postal zones and services, place names |
| oceans | oceans | features and characteristics of salt water bodies (excluding inland waters) Examples: tides, tsunamis, coastal information, reefs |
| planningCadastre | planningCadastre | information used for appropriate actions for future use of the land  Examples: land use maps, zoning maps, cadastral surveys, land ownership |
| society | society | 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 |
| structure | structure | man-made construction  Examples: buildings, museums, churches, factories, housing, monuments, shops, towers |
| transportation | transportation | 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 |
| utilitiesCommunication | utilitiesCommunication | 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 |
| extraTerrestrial | extraTerrestrial | region more than 100 km above the surface of the Earth |
| disaster | disaster | Information related to disasters  Examples: site of the disaster, evacuation zone, disaster-prevention facility, disaster relief activities |

# Constraint information (MD\_Constraints)

## General

No changes to the Constraint information have been made in this profile. The UML class diagram (Figure 8) and data dictionaries have been provided here for reference.



Figure 5 — Constraint information classes

## Constraint information: Data dictionaries

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data Type / Domain** |
| 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) |
| useLimitation | limitation affecting the fitness for use of the resource or metadata. eg, “not to be used for navigation” | O | N | CharacterString / Free text |
| constraintApplicationScope | spatial and/or temporal extent and or level of the application of the constraint restrictions | O | 1 | Class / MD\_Scope (5.1.1) |
| graphic | graphic /symbol indicating the constraint e.g. | O | N | Class / MD\_BrowseGraphic (5.1.4) |
| 88x31.png |  |
| reference | citation for the limitation or constraint | O | N | Class / CI\_Citation |
| e.g. copyright statement, licence agreement, etc | (4.2.1) |
| releasability | information concerning the parties to whom the resource can or cannot be released | O | 1 | Class / MD\_Releasability (3.4.2.3) |
| responsibleParty | party responsible for the resource constraints | O | N | Class / CI\_Responsibility (4.2.2) |

## MD\_LegalConstraints

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data Type / Domain** |
| MD\_LegalConstraints | restrictions and legal prerequisites for accessing and using the resource or metadata | Use obligation from referencing object | N | Specified Class (MD\_Constraints) |
| accessConstraints | access constraints applied to assure the protection of privacy or intellectual property, and any special restrictions or limitations on obtaining the resource or metadata | C/ useConstraints or otherConstraints, or useLimitation or releasability not exist? | N | Class / MD\_RestrictionCode <<CodeList>> (3.4.3.2) |
|  |
| useConstraints | constraints applied to assure the protection of privacy or intellectual property, and any special restrictions or limitations or warnings on using the resource or metadata | C/ accessConstraints or otherConstraints or useLimitation or releasability not exist? | N | Class / MD\_RestrictionCode <<CodeList>> (3.4.3.2) |
|  |
| otherConstraints | other restrictions and legal prerequisites for accessing and using the resource or metadata | C/ accessConstraints or useConstraints or useLimitation or releasability not exist and accessConstraints or useConstraints = "otherRestrictions"? | N | CharacterString / Free text |

## MD\_SecurityConstraints

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data Type / Domain** |
| MD\_SecurityConstraints | handling restrictions imposed on the resource or metadata for national security or similar security concerns | Use obligation from referencing object | Use maximum occurrence from referencing object | Specified Class (MD\_Constraints) |
| classification | name of the handling restrictions on the resource or metadata | M | 1 | Class / MD\_ClassificationCode |
| <<CodeList>> (3.4.3.1) |
| userNote | explanation of the application of the legal constraints or other restrictions and legal prerequisites for obtaining and using the resource or metadata | O | 1 | CharacterString / Free text |
| classificationSystem | name of the classification system | O | 1 | CharacterString / Free text |
| handlingDescription | additional information about the restrictions on handling the resource or metadata | O | 1 | CharacterString / Free text |

## MD\_Releasability

| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| --- | --- | --- | --- | --- |
| MD\_Releasability | information about resource release constraints | Use obligation from referencing object | Use maximum occurrence from referencing object | Class |
| addressee | party to which the release statement applies | C / statement not exist? | N | Class / CI\_Responsibility (4.2.2) |
| statement | release statement | C / addressee not exist? | 1 | CharacterString / free text |
| disseminationConstraints | component in determining releasability | O | N | Class / MD\_RestrictionCode <<CodeList>> (3.4.3.2) |

## Constraint information codelists

## MD\_ClassificationCode <<CodeList>>

| **Concept name (English)** | **Code** | **Definition** |
| --- | --- | --- |
| MD\_ClassificationCode |  | name of the handling restrictions on the resource |
| unclassified | unclassified | available for general disclosure |
| restricted | restricted | not for general disclosure |
| confidential | confidential | available for someone who can be entrusted with information |
| secret | secret | kept or meant to be kept private, unknown, or hidden from all but a select group of people |
| topSecret | topSecret | of the highest secrecy |
| sensitiveButUnclassified | SBU | although unclassified, requires strict controls over its distribution |
| forOfficialUseOnly | forOfficialUseOnly | unclassified information that is to be used only for official purposes determined by the designating body |
| protected | protected | compromise of the information could cause damage |
| limitedDistribution | limitedDistribution | desimination limited by designating body |

## MD\_RestrictionCode <<CodeList>>

| **Concept name (English)** | **Code** | **Definition** |
| --- | --- | --- |
| MD\_RestrictionCode |  | limitation(s) placed upon the access or use of the data |
| copyright | copyright | 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 |
| patent | patent | government has granted exclusive right to make, sell, use or license an invention or discovery |
| patentPending | patentPending | produced or sold information awaiting a patent |
| trademark | trademark | a name, symbol, or other device identifying a product, officially registered and legally restricted to the use of the owner or manufacturer |
| licence | licence | formal permission to do something |
| intellectualPropertyRights | intellectualPropertyRights | rights to financial benefit from and control of distribution of non-tangible property that is a result of creativity |
| restricted | restricted | withheld from general circulation or disclosure |
| otherRestrictions | otherRestrictions | limitation not listed |
| unrestricted | unrestricted | no constraints exist |
| licenceUnrestricted | licenceUnrestricted | formal permission not required to use the resource |
| licenceEndUser | licenceEndUser | formal permission required for a person or an entity to use the resource and that may differ from the person that orders or purchases it |
| licenceDistributor | licenceDistributor | formal permission required for a person or an entity to commercialize or distribute the resource |
| private | private | protects rights of individual or organisations from observation, intrusion, or attention of others |
| statutory | statutory | prescribed by law |
| confidential | confidential | not available to the public contains information that could be prejudicial to a commercial, industrial, or national interest |
| sensitiveButUnclassified | SBU | although unclassified, requires strict controls over its distribution. |
| in-confidence | in-confidence | with trust |

# Lineage information (LI\_Lineage)

No changes to the Lineage information have been made in this profile. The UML class diagram (Figure 9) and data dictionaries have been provided here for reference.



Figure 6 — Lineage information classes

## Lineage information: Data dictionary

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data Type / Domain** |
| LI\_Lineage | information about the events or source data used in constructing the data specified by the scope or lack of knowledge about lineage | Use obligation from referencing object | Use maximum occurrence from referencing object | Aggregated Class (MD\_Metadata) |
| statement | general explanation of the data producer’s knowledge about the lineage of a resource | O | 1 | CharacterString / Free text |
| scope | type of resource and/or extent to which the lineage information applies | O | 1 | Class / MD\_Scope (5.1.1) |
| additionalDocumentation | A resource (e.g. a publication) that describes the whole process to generate this resource (e.g. a dataset) | O | N | Class / CI\_Citation (4.2.1) |
| *Role name:* | information about events in the life of a resource specified by the scope | C / LI\_Lineage.statement and source role not documented? | N | Association / LI\_ProcessStep (3.5.1.1) |
| processStep |
| *Role name:* | information about the source data used in creating the data specified by the scope | C / LI\_Lineage.statement and processStep role are documented? | N | Association / LI\_Source (3.5.1.2) |
| source |

## LI\_ProcessStep

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | | **Obligation / Condition** | **Maximum occurrence** | **Data Type / Domain** |
| LI\_ProcessStep | | information about an event or transformation in the life of a resource including the process used to maintain the resource | Use obligation from referencing object | Use maximum occurrence from referencing object | Aggregated Class (LI\_Lineage and LI\_Source) |
| description | | description of the event, including related parameters or tolerances | M | 1 | CharacterString / Free text |
| rationale | | requirement or purpose for the process step | O | 1 | CharacterString / Free text |
| stepDateTime | | date, time, range or period of process step | O | 1 | Class / TM\_Primitive (4.1.2.2) |
| processor | | identification of, and means of communication with, person(s) and organisation(s) associated with the process step | O | N | Class / CI\_Responsibility (4.2.2) |
| reference | | process step documentation | O | N | Class / CI\_Citation (4.2.1) |
| scope | | type of resource and/or extent to which the process step applies | O | 1 | Class / MD\_Scope (5.1.1) |
| *Role name:* | | information about the source data used in creating the data specified by the scope | O | N | Association / LI\_Source (3.5.1.2) |
| source | |

## LI\_Source

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role name** | **Definition** | **Obligation / Condition** | **Maximum Occurrence** | **Data type / Domain** |
| LI\_Source | information about the resource used in creating the resource specified by the scope | Use obligation from referencing object | Use maximum occurrence from referencing object | Aggregated Class (LI\_Lineage and LI\_Source) |
| description | detailed description of the source | C / | 1 | CharacterString / Free text |
| scope not provided? |
| sourceSpatialResolution | spatial resolution expressed as a scale factor, a distance, an angle or a level of detail | O | 1 | Class / MD\_Resolution (3.3.2.5) |
| sourceReferenceSystem | spatial reference system used by the source | O | 1 | Class / MD\_ReferenceSystem (3.8.1) |
| sourceCitation | recommended reference to be used for the source | O | 1 | Class / CI\_Citation (4.2.1) |
| sourceMetadata | reference to metadata for the source | O | N | Class / CI\_Citation (4.2.1) |
| scope | type and/or extent of the source | C/description not provided? | 1 | Class / MD\_Scope (5.1.1) |
| *Role name:* | information about a process step in which this source was used | O | N | Association / LI\_ProcessStep (3.5.1.1) |
| sourceStep |

# Maintenance information (MD\_MaintenanceInformation)

No changes to the Maintenance information have been made in this profile. The UML class diagram (Figure 10) and data dictionaries have been provided here for reference.



Figure 7 — Maintenance information classes

## Maintenance information: Data dictionary

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| MD\_MaintenanceInformation | information about the scope and frequency of updating | Use obligation from referencing object | Use maximum occurrence from referencing object | Aggregated Class (MD\_Metadata and MD\_Identification) |
| maintenanceAndUpdate Frequency | frequency with which changes and additions are made to the resource after the initial resource is completed | C / userDefinedMaintenanceFrequency not provided? | 1 | Class / MD\_MaintenanceFrequencyCode <<CodeList>> () |
| maintenanceDate | date information associated with maintenance of resource | O | N | Class / CI\_Date (4.2.4.1) |
| userDefinedMaintenance  Frequency | maintenance period other than those defined | C / maintenanceAndUpdateFrequency not provided? | 1 | Class / TM\_PeriodDuration (6.1.3) |
| maintenanceScope | type of resource and/or extent to which the maintenance information applies | O | N | Class / MD\_Scope (5.1.1) |
| maintenanceNote | information regarding specific requirements for maintaining the resource | O | N | CharacterString / Free text |
| contact | identification of, and means of communicating with, person(s) and organisation(s) with responsibility for maintaining the resource | O | N | Class / CI\_Responsibility (4.2.2) |

## MD\_MaintenanceFrequencyCode <<CodeList>>

| **Concept name (English)** | **Code** | **Definition** |
| --- | --- | --- |
| MD\_MaintenanceFrequencyCode |  | frequency with which modifications and deletions are made to the data after it is first produced |
| continual | continual | resource is repeatedly and frequently updated |
| daily | daily | resource is updated each day |
| weekly | weekly | resource is updated on a weekly basis |
| fortnightly | fortnightly | resource is updated every two weeks |
| monthly | monthly | resource is updated each month |
| quarterly | quarterly | resource is updated every three months |
| biannually | biannually | resource is updated twice each year |
| annually | annually | resource is updated every year |
| asNeeded | asNeeded | resource is updated as deemed necessary |
| irregular | irregular | resource is updated in intervals that are uneven in duration |
| notPlanned | notPlanned | there are no plans to update the data |
| unknown | unknown | frequency of maintenance for the data is not known |
| periodic | periodic | resource is updated at regular intervals |
| semimonthly | semimonthly | resource updated twice a monthly |
| biennially | biennially | resource is updated every 2 years |

# Spatial representation information (MD\_SpatialRepresentation)

No changes to the Spatial representation information have been made in this profile. The UML class diagram (Figure 11) and data dictionaries have been provided here for reference.



Figure 8 — Spatial representation information classes

## Spatial representation information: Data dictionary

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| *MD\_SpatialRepresentation* | digital mechanism used to represent spatial information | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Aggregated Class / |
| (MD\_Metadata) |
| <<Abstract>> |

## MD\_GridSpatialRepresentation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| MD\_GridSpatial | information about grid spatial objects in the resource | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Specified Class (MD\_Spatial |
| Representation | Representation) |
| numberOfDimensions | number of independent spatial-temporal axes | M | 1 | Integer / Integer |
| axisDimensionProperties | information about spatial-temporal axis properties | M | N | Sequence (6.1.5) / MD\_Dimension |
| <<DataType>> (3.7.1.5) |
| cellGeometry | identification of grid data as point or cell | M | 1 | Class / MD\_CellGeometryCode |
| <<CodeList>> (3.7.2.3) |
| transformationParameter  Availability | indication of whether or not parameters for transformation between image coordinates and geographic or map coordinates exist (are available) | M | 1 | Boolean  0 = no / 1 = yes |
|  |

## MD\_Georectified

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| MD\_Georectified | grid whose cells are regularly spaced in a geographic (i.e., lat / long) or map coordinate system defined in the Spatial Referencing System (SRS) so that any cell in the grid can be geolocated given its grid coordinate and the grid origin, cell spacing, and orientation | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Specified (MD\_GridSpatial  Representation) |
| checkPointAvailability | indication of whether or not geographic position points are available to test the accuracy of the georeferenced grid data | M | 1 | Boolean |
| 0 = no / 1 = yes |
| checkPointDescription | description of geographic position points used to test the accuracy of the georeferenced grid data | C / | 1 | CharacterString / Free text |
| checkPointAvailability = “yes”? |
| cornerPoints | earth location in the coordinate system defined by the Spatial Reference System and the grid coordinate of the cells at opposite ends of grid coverage along two diagonals in the grid spatial dimensions. There are four corner points in a georectified grid; at least two corner points along one diagonal are required. The first corner point corresponds to the origin of the grid. | O | 2..4 | Sequence (6.1.5) / GM\_Point <<Type>> (6.1.4) |
|

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| centrePoint | earth location in the coordinate system defined by the Spatial Reference System and the grid coordinate of the cell halfway between opposite ends of the grid in the spatial dimensions | O | 1 | Class / GM\_Point <<Type>> (6.1.4) |
|
| pointInPixel | point in a pixel corresponding to the Earth location of the pixel | M | 1 | Class / MD\_PixelOrientationCode <<Enumeration>> (3.7.2.5) |
|
| transformationDimension | general description of the transformation | O | 1 | CharacterString / Free text |
| Description |
| transformationDimension | information about which grid axes are the spatial (map) axes | O | 2 | CharacterString / Free text |
| Mapping |

## MD\_Georeferenceable

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| MD\_Georeferenceable | grid with cells irregularly spaced in any given geographic/map projection coordinate system, whose individual cells can be geolocated using geolocation information supplied with the data but cannot be geolocated from the grid properties alone | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Specified Class |
| (MD\_GridSpatial |
| Representation) |
| controlPointAvailability | indication of whether or not control point(s) exists | M | 1 | Boolean |
| 0 = no / 1 = yes |
| orientationParameterAvailability | indication of whether or not orientation parameters are available | M | 1 | Boolean |
| 0 = no / 1 = yes |
| orientationParameterDescription | description of parameters used to describe sensor orientation | O | 1 | CharacterString / Free text |
| georeferencedParameters | terms which support grid data georeferencing | M | 1 | Class / Record (6.1.2) |
| parameterCitation | reference providing description of the parameters | O | N | Class / CI\_Citation (4.2.1) |

## MD\_VectorSpatialRepresentation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| MD\_VectorSpatial  Representation | information about the vector spatial objects in the resource | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Specified Class  (MD\_Spatial  Representation) |
| topologyLevel | code which identifies the degree of complexity of the spatial relationships | O | 1 | Class / MD\_TopologyLevelCode |
| <<CodeList>> (3.7.2.4) |
| geometricObjects | information about the geometric objects used in the resource | O | N | Class / MD\_GeometricObjects |
| <<DataType>> (3.7.1.6) |

## MD\_Dimension

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| MD\_Dimension | axis properties | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Class <<DataType>> |
| dimensionName | name of the axis | M | 1 | Class /  MD\_Dimension  NameType |
| Code <<CodeList>> (3.7.2.2) |
| dimensionSize | number of elements along the axis | M | 1 | Integer / Integer |
| resolution | degree of detail in the grid dataset | O | 1 | Class / Measure (6.1.2) |
| dimensionTitle | enhancement/modifier of the dimension name | O | 1 | CharacterString / Free text |
| e.g dimensionName = “column” dimensionTitle = “Longitude” |
| dimensionDescription | description of the axis | O | 1 | CharacterString / Free text |

## MD\_GeometricObjects

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| MD\_GeometricObjects | number of objects, listed by geometric object type, used in the resource | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Class <<DataType>> |
| geometricObjectType | name of point or vector objects used to locate zero-, one-, two-, or three-dimensional spatial locations in the resource | M | 1 | Class / MD\_GeometricObjectType  Code <<CodeList>> (3.7.2.1) |
| geometricObjectCount | total number of the point or vector object type occurring in the dataset | O | 1 | Integer / > 0 |

## Spatial representation codelists and enumerations

## MD\_GeometricObjectTypeCode <<CodeList>>

| **Concept name (English)** | **Code** | **Definition** |
| --- | --- | --- |
| MD\_GeometricObjectTypeCode |  | name of point or vector objects used to locate zero-, one-, two-, or three-dimensional spatial locations in the dataset |
| complex | complex | set of geometric primitives such that their boundaries can be represented as a union of other primitives |
| composite | composite | connected set of curves, solids or surfaces |
| curve | curve | bounded, 1-dimensional geometric primitive, representing the continuous image of a line |
| point | point | zero-dimensional geometric primitive, representing a position but not having an extent |
| solid | solid | bounded, connected 3-dimensional geometric primitive, representing the continuous image of a region of space |
| surface | surface | bounded, connected 2-dimensional geometric primitive, representing the continuous image of a region of a plane |

## MD\_DimensionNameTypeCode <<CodeList>>

| **Concept name (English)** | **Code** | **Definition** |
| --- | --- | --- |
| MD\_DimensionNameTypeCode |  | name of the dimension |
| row | row | ordinate (y) axis |
| column | column | abscissa (x) axis |
| vertical | vertical | vertical (z) axis |
| track | track | along the direction of motion of the scan point |
| crossTrack | crossTrack | perpendicular to the direction of motion of the scan point |
| line | line | scan line of a sensor |
| sample | sample | element along a scan line |
| time | time | duration |

## MD\_CellGeometryCode <<CodeList>>

| **Concept name (English)** | **Code** | **Definition** |
| --- | --- | --- |
| MD\_CellGeometryCode |  | code indicating the geometry represented by the grid cell value |
| point | point | each cell represents a point |
| area | area | each cell represents an area |
| voxel | voxel | each cell represents a volumetric measurement on a regular grid in three dimensional space |
| stratum | stratum | height range for a single point vertical profile |

## MD\_TopologyLevelCode <<CodeList>>

| **Concept name (English)** | **Code** | **Definition** |
| --- | --- | --- |
| MD\_TopologyLevelCode |  | degree of complexity of the spatial relationships |
| geometryOnly | geometryOnly | geometry objects without any additional structure which describes topology |
| topology1D | topology1D | 1-dimensional topological complex – commonly called “chain-node” topology |
| planarGraph | planarGraph | 1-dimensional topological complex that is planar. (A planar graph is a graph that can be drawn in a plane in such a way that no two edges intersect except at a vertex.) |
| fullPlanarGraph | fullPlanarGraph | 2-dimensional topological complex that is planar. (A 2-dimensional topological complex is commonly called “full topology” in a cartographic 2D environment.) |
| surfaceGraph | surfaceGraph | 1-dimensional topological complex that is isomorphic to a subset of a surface. (A geometric complex is isomorphic to a topological complex if their elements are in a one-to-one, dimensional-and boundary-preserving correspondence to one another.) |
| fullSurfaceGraph | fullSurfaceGraph | 2-dimensional topological complex that is isomorphic to a subset of a surface |
| topology3D | topology3D | 3-dimensional topological complex. (A topological complex is a collection of topological primitives that are closed under the boundary operations.) |
| fullTopology3D | fullTopology3D | complete coverage of a 3D Euclidean coordinate space |
| abstract | abstract | topological complex without any specified geometric realisation |

## MD\_PixelOrientationCode <<enumeration>>

| **Concept name (English)** | **Code** | **Definition** |
| --- | --- | --- |
| MD\_PixelOrientationCode |  | point in a pixel corresponding to the Earth location of the pixel |
| centre | center | point halfway between the lower left and the upper right of the pixel |
| lowerLeft | lowerLeft | the corner in the pixel closest to the origin of the SRS; if two are at the same distance from the origin, the one with the smallest x-value |
| lowerRight | lowerRight | next corner counterclockwise from the lower left |
| upperRight | upperRight | next corner counterclockwise from the lower right |
| upperLeft | upperLeft | next corner counterclockwise from the upper right |

# Reference system information (MD\_ReferenceSystem)

No changes to the Constraint information have been made in this profile. The UML class diagram (Figure 12) and data dictionaries have been provided here for reference.



Figure 9 — Reference system information classes

## Reference system information: Data dictionary

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| MD\_ReferenceSystem | information about the reference system | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Aggregated Class / |
| (MD\_Metadata) |
| referenceSystemIdentifier | identifier and codespace for reference system  e.g. EPSG::4326 | Refer to SC\_CRS in ISO 19111 and ISO 19111-2 when coordinate reference system information is not given through reference system identifier | 1 | Class / MD\_Identifier (5.1.3) |
| referenceSystemType | type of reference system used  e.g. compoundGeographic  2DParametric | O | 1 | CodeList / MD\_ReferenceSystem  TypeCode <<CodeList>> (3.8.2) |

## MD\_ReferenceSystemTypeCode <<CodeList>>

| **Concept name (English)** | **Code** | **Definition** |
| --- | --- | --- |
| MD\_ReferenceSystemTypeCode |  | defines type of reference system used |
| compoundEngineeringParametric | compoundEngineeringParametric | compound statio-parametric coordinate reference system containing an engineering coordinate reference system and a parametric reference system  e.g. [local] x, y, pressure |
| compoundEngineeringParametricTemporal | compoundEngineeringParametricTemporal | compound statio-parametric-temporal coordinate reference system containing an engineering, a parametric, and a temporal coordinate reference system  e.g. [local] x, y, pressure, time |
| compoundEngineeringTemporal | compoundEngineeringTemporal | compound spatio-temporal coordinate reference system containing an engineering and a temporal coordinate reference system  e.g. [local] x, y, time |
| compoundEngineeringVertical | compoundEngineeringVertical | compound spatial reference system containing a horizontal engineering coordinate reference system and a vertical coordinate reference system  e.g. [local] x, y, height |
| compoundEngineeringVerticalTemporal | compoundEngineeringVerticalTemporal | compound spatio-temporal coordinate reference system containing an engineering, a vertical, and a temporal coordinate reference system  e.g. [local] x, y, height, time |
| compoundGeographic2DParametric | compoundGeodeticParametric | compound statio-parametric coordinate reference system containing a 2 dimensional geographic horizontal coordinate reference system and a parametric reference system  e.g. latitude, longitude, pressure |
| compoundGeographic2DParametricTemporal | compoundGeodeticParametricTemporal | compound statio-parametric-temporal coordinate reference system containing a 2 dimensional geographic horizontal, a parametric and a temporal coordinate reference system  e.g. latitude, longitude, pressure, time |
| compoundGeographic2DTemporal | compoundGeographic2DTemporal | compound spatio-temporal coordinate reference system containing a 2 dimensional geographic horizontal coordinate reference system and a temporal reference system  e.g. latitude, longitude, time |
| compoundGeographic2DVertical | compoundGeographic2DVertical | compound coordinate reference system in which one constituent coordinate reference system is a horizontal geodetic coordinate reference system and one is a vertical coordinate reference system  e.g. latitude, longitude, [gravity-related] height or depth |
| compoundGeographic2DVerticalTemporal | compoundGeographicVerticalTemporal | compound spatio-temporal coordinate reference system containing a 2 dimensional geographic horizontal, a vertical, and a temporal coordinate reference system  e.g. latitude, longitude, height, time |
| compoundGeographic3DTemporal | compoundGeographic3DTemporal | compound spatio-temporal coordinate reference system containing a 3 dimensional geographic and a temporal coordinate reference system  e.g. latitude, longitude, ellipsoidal height, time |
| compoundProjected2DParametric | compoundProjected2DParametric | compound statio-parametric coordinate reference system containing a projected horizontal coordinate reference system and a parametric reference system  e.g. easting, northing, density |
| compoundProjected2DParametricTemporal | compoundProjected2DParametricTemporal | compound statio-parametric-temporal coordinate reference system containing a projected horizontal, a parametric, and a temporal coordinate reference system  e.g. easting, northing, density, time |
| compoundProjectedTemporal | compoundProjectedTemporal | compound spatio-temporal coordinate reference system containing a projected horizontal and a temporal coordinate reference system  e.g. easting, northing, time |
| compoundProjectedVertical | compoundProjectedVertical | compound spatial reference system containing a horizontal projected coordinate reference system and a vertical coordinate reference system  e.g. easting, northing, [gravity-related] height or depth |
| compoundProjectedVerticalTemporal | compoundProjectedVerticalTemporal | compound spatio-temporal coordinate reference system containing a projected horizontal, a vertical, and a temporal coordinate reference system  e.g. easting, northing, height, time |
| engineering | engineering | coordinate reference system based on an engineering datum (datum describing the relationship of a coordinate system to a local reference)  e.g. [local] x,y |
| engineeringDesign | engineering Design | engineering coordinate reference system in which the base representation of a moving object is specified  e.g. [local] x,y |
| engineeringImage | engineeringImage | coordinate reference system based on an image datum (engineering datum which defines the relationship of a coordinate system to an image)  e.g. row, column |
| geodeticGeocentric | geodeticGeocentric | geodetic CRS having a Cartesian 3D coordinate system  e.g. [geocentric] X,Y,Z |
| geodeticGeographic2D | geodeticGeographic2D | geodetic CRS having an ellipsoidal 2D coordinate system  e.g. latitude, longitude |
| geodeticGeographic3D | geodeticGeographic3D | geodetic CRS having an ellipsoidal 3D coordinate system  e.g. latitude, longitude, ellipsoidal height |
| geographicIdentifier | geographicIdentifier | spatial reference in the form of a label or code that identifies a location  e.g. post code |
| linear | linear | set of Linear Referencing Methods and the policies, records and procedures for implementing them  reference system that identifies a location by reference to a segment of a linear geographic feature and distance along that segment from a given point  e.g. x km along road |
| parametric | parametric | coordinate reference system based on a parametric datum (datum describing the relationship of a parametric coordinate system to an object)  e.g. pressure |
| projected | projected | coordinate reference system derived from a two-dimensional geodetic coordinate reference system by applying a map projection  e.g. easting, northing |
| temporal | temporal | reference system against which time is measured  e.g. time |
| vertical | vertical | one-dimensional coordinate reference system based on a vertical datum (datum describing the relation of gravity-related heights or depths to the Earth)  e.g. [gravity-related] height or depth |

# Content information (MD\_ContentInformation)

As explained in subclause 1.1 of this document, inclusion of a URI allows cross-linkage of resources, is readable by machines, and it supports the proper development of the semantic web. The addition of ***ontologyURI*** element in the MD\_FeatureTypeInfo class will prove helpful in performaing semantic searches on feature types. It is also useful to gain the larger context in which the concept is defined as well as its relationships to other terms.

No other changes to the Content information have been made in this profile. The UML class diagram (Figure 13) and data dictionaries have been provided here for reference.



Figure 10 — Content information classes

## Content information: Data dictionary

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| *MD\_ContentInformation* | description of the content of a resource | Use obligation/ condition from referencing object | Use maximum occurrence from referencing object | Aggregated Class (MD\_Metadata) <<Abstract>> |

## MD\_FeatureCatalogueDescription

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| MD\_FeatureCatalogue | information identifying the feature catalogue or the conceptual schema | Use obligation/ condition from referencing object | Use maximum occurrence from referencing object | Specified Class (MD\_ContentInformation) |
| Description |
| complianceCode | indication of whether or not the cited feature catalogue complies with ISO 19110 | O | 1 | Boolean / |
| 0 = no / 1 = yes |
| locale | language(s) and character set(s) used within the catalogue | O | N | Class / PT\_Locale (**Error! Reference source not found.**) |
| includedWithDataset | indication of whether or not the feature catalogue is included with the resource | O | 1 | Boolean / |
| 0=no / 1=yes |
| featureTypes | subset of feature types from cited feature catalogue occurring in resource and count of feature instances | O | N | Class / MD\_FeatureTypeInfo (3.9.1.9) |
| featureCatalogueCitation | complete bibliographic reference to one or more external feature catalogues | C / Feature Catalogue not included with resource and MD\_FeatureCatalogue not provided? | N | Class / CI\_Citation (4.2.1) |

## MD\_FeatureCatalogue

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| MD\_FeatureCatalogue | a catalogue of feature types | Use obligation/ condition from referencing object | Use maximum occurrence from referencing object | Specified Class (MD\_ContentInformation) |
| featureCatalogue | the catalogue of feature types, attribution, operations, and relationships used by the resource | M | N | Class / FC\_FeatureCatalogue (ISO 19110) |

## MD\_CoverageDescription

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| MD\_CoverageDescription | details about the content of a resource | Use obligation/ condition from referencing object | Use maximum occurrence from referencing object | Specified Class  (MD\_Content  Information) |
| attributeDescription | description of the attribute described by the measurement value | M | 1 | Class / RecordType (6.1.2) |
| processingLevelCode | identifier for the level of processing that has been applied to the resource | O | 1 | Class / MD\_Identifier (5.1.3) |
| *Role name:* | information on groups(s) of related attributes of the resource with the same type | O | N | Class / MD\_AttributeGroup (3.9.1.5) |
| attributeGroup |  |

## MD\_ImageDescription

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| MD\_ImageDescription | | information about an image’s suitability for use | Use obligation/ condition from referencing object | Use maximum occurrence from referencing object | Specified Class  (MD\_Coverage  Description) |
| illuminationElevationAngle | | illumination elevation measured in degrees clockwise from the target plane at intersection of the optical line of sight with the Earth’s surface. For images from a scanning device, refer to the centre pixel of the image | O | 1 | Real / -90 – 90 |
| illuminationAzimuthAngle | | illumination azimuth measured in degrees clockwise from true north at the time the image is taken. For images from a scanning device, refer to the centre pixel of the image | O | 1 | Real / 0,00 – 360 |
| imagingCondition | | conditions affected the image | O | 1 | Class / MD\_ImagingConditionCode <<CodeList>> (3.9.2.2) |
| imageQualityCode | | code in producer’s code space that specifies the image quality | O | 1 | Class / MD\_Identifier <<DataType>> (5.1.3) |
| cloudCoverPercentage | | area of the resource obscured by clouds, expressed as a percentage of the spatial extent | O | 1 | Real / 0,0 – 100,0 |
| compressionGeneration | | count of the number of lossy compression cycles performed on the image | O | 1 | Integer / Integer |
| Quantity | |  |
| triangulationIndicator | | indication of whether or not triangulation has been performed upon the image | O | 1 | Boolean / |
| 0 = no / 1 = yes |
| radiometricCalibrationData | | indication of whether or not the radiometric calibration information for generating the radiometrically calibrated standard data product is available | O | 1 | Boolean / |
| Availability | | 0 = no / 1= yes |
| cameraCalibrationInformationAvailability | | indication of whether or not constants are available which allow for camera calibration corrections | O | 1 | Boolean / |
| 0 = no / 1 = yes |
| filmDistortionInformation | | indication of whether or not Calibration Reseau information is available | O | 1 | Boolean / |
| Availability | | 0 = no / 1 = yes |
| lensDistortionInformation | | indication of whether or not lens aberration correction information is available | O | 1 | Boolean / |
| Availability | | 0 = no / 1 = yes |

## MD\_AttributeGroup

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| MD\_AttributeGroup | Information about contentType for groups of attributes for a specific MD\_RangeDimension | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Aggregated Class / |
| (MD\_Coverage  Description) |
| contentType | type of information represented by the value(s) | M | N | Class / MD\_CoverageContentType |
| Code <<CodeList>> (3.9.2.1) |
| *Role name:* | information on an attribute of the resource | O | N | Class / MD\_RangeDimension (3.9.1.6) |
| attribute |  |

## MD\_RangeDimension

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| MD\_RangeDimension | information on the range of attribute values | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Aggregated Class / |
| (MD\_Coverage Description) |
|  |
| sequenceIdentifier | unique name or number that identifies attributes included in the coverage | O | 1 | Class / MemberName (6.1.6) |
| description | description of the attribute | O | 1 | CharacterString / Free text |
| name | identifiers for each attribute included in the resource. These identifiers can be used to provide names for the attribute from a standard set of names | O | N | Class / MD\_Identifier (5.1.3) |

## MD\_SampleDimension

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| MD\_SampleDimension | the characteristics of each dimension (layer) included in the resource | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Specified Class (MD\_RangeDimension) |
| maxValue | maximum value of data values in each dimension included in the resource. Restricted to UomLength in the MD\_Band class. | O | 1 | Real / real number |
| minValue | minimum value of data values in each dimension included in the resource. Restricted to UomLength in the MD\_Band class. | O | 1 | Real / real number |
| units | units of data in each dimension included in the resource. Note that the type of this is UnitsOfMeasure and that it is restricted to UomLength in the MD\_Band class. | C / minValue, maxValue or meanValue provided? | 1 | Class / UnitsOfMeasure (6.1.2) |
| restricted to UomLength in the MD\_Band class |
| scaleFactor | scale factor which has been applied to the cell value | O | 1 | Real / real number |
| offset | the physical value corresponding to a cell value of zero | O | 1 | Real / real number |
| meanValue | mean value of data values in each dimension included in the resource | O | 1 | Real / real number |
| numberOfValues | this gives the number of values used in a thematicClassification resource | O | 1 | Integer / Number |
| EX:. the number of classes in a Land Cover Type coverage or the number of cells with data in other types of coverages |  |
| standardDeviation | standard deviation of data values in each dimension included in the resource | O | 1 | Real / real number |
| otherPropertyType | type of other attribute description (i.e. netcdf/variable in ncml.xsd) | O | 1 | Class / RecordType (6.1.2) |
| otherProperty | instance of otherAttributeType that defines attributes not explicitly included in MD\_CoverageType | O | 1 | Class / Record (6.1.2) |
| bitsPerValue | maximum number of significant bits in the uncompressed representation for the value in each band of each pixel | O | 1 | Integer / Number |

## MD\_Band

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| MD\_Band | range of wavelengths in the electromagnetic spectrum | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Specified Class / |
| (MD\_SampleDimension) |
| boundMax | longest wavelength that the sensor is capable of | O | 1 | Real / real number |
| collecting within a |  |
| designated band |  |
| boundMin | shortest wavelength that the sensor is capable of | O | 1 | Real / real number |
| collecting within a |  |
| designated band |  |
| boundUnit | units in which sensor wavelengths are expressed | O | 1 | Class / UomLength (6.1.2) |
|  |  |
| peakResponse | wavelength at which the response is the highest | O | 1 | Real / real number |
| toneGradation | number of discrete numerical values in the data | O | 1 | Integer / number |

## MD\_FeatureTypeInfo

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| MD\_FeatureTypeInfo | Information about the occurring feature type | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Aggregated Class / (MD\_FeatureCatalogue  Description) |
| featureTypeName | name of the feature type | M | 1 | Class / GenericName (6.1.6) |
| featureInstanceCount | number of occurence of feature instances for this feature type | O | 1 | Integer / >0 |
| ontologyURI | a unique URI that refers to the concept denoting the feature type | O | 1 | URI (6.1.8) |

## Content information codelists

## MD\_CoverageContentTypeCode <<CodeList>>

| **Concept name (English)** | **Code** | **Definition** |
| --- | --- | --- |
| MD\_CoverageContentTypeCode |  | specific type of information represented in the cell |
| image | image | meaningful numerical representation of a physical parameter that is not the actual value of the physical parameter |
| thematicClassification | thematicClassification | code value with no quantitative meaning, used to represent a physical quantity |
| physicalMeasurement | physicalMeasurement | value in physical units of the quantity being measured |
| auxillaryInformation | auxillaryInformation | data, usually a physical measurement, used to support the calculation of the primary physicalMeasurement coverages in the dataset (e.g. grid of aerosol optical thickness used in the calculation of a sea surface temperature product). |
| qualityInformation | qualityInformation | data used to characterize the quality of the physicalMeasurement coverages in the dataset. Typically included in a gmi:QE\_CoverageResult. |
| referenceInformation | referenceInformation | reference information used to support the calculation or use of the physicalMeasurement coverages in the dataset (e.g. grids of latitude/longitude used to geolocate the physical measurements). |
| modelResult | modelResult | resources with values that are calculated using a model rather than being observed or calculated from observations. |
| coordinate | coordinate | data used to provide coordinate axis values |

## MD\_ImagingConditionCode <<CodeList>>

| **Concept name (English)** | **Code** | **Definition** |
| --- | --- | --- |
| MD\_ImagingConditionCode |  | code which indicates conditions which may affect the image |
| blurredImage | blurredImage | portion of the image is blurred |
| cloud | cloud | portion of the image is partially obscured by cloud cover |
| degradingObliquity | degradingObliquity | acute angle between the plane of the ecliptic (the plane of the Earth’s orbit) and the plane of the celestial equator |
| fog | fog | portion of the image is partially obscured by fog |
| heavySmokeOrDust | heavySmokeOrDust | portion of the image is partially obscured by heavy smoke or dust |
| night | night | image was taken at night |
| rain | rain | image was taken during rainfall |
| semiDarkness | semiDarkness | image was taken during semi-dark conditions—twilight conditions |
| shadow | shadow | portion of the image is obscured by shadow |
| snow | snow | portion of the image is obscured by snow |
| terrainMasking | terrainMasking | the absence of collection data of a given point or area caused by the relative location of topographic features which obstruct the collection path between the collector(s) and the subject(s) of interest |

# Portrayal catalogue information (MD\_PortrayalCatalogueReference)

No changes to the Portrayal catalogue information have been made in this profile. The UML class diagram (Figure 14) and data dictionaries have been provided here for reference.



Figure 11 — Portrayal catalogue information classes

## Portrayal catalogue information: Data dictionary

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| MD\_PortrayalCatalogue | information identifying the portrayal catalogue used | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Aggregated Class / (MD\_Metadata) |
| Reference |
| portrayalCatalogueCitation | bibliographic reference to the portrayal catalogue cited | M | N | Class / CI\_Citation (4.2.1) |

# Distribution information (MD\_Distribution)

No changes to the Constraint information have been made in this profile. The UML class diagram (Figure 15) and data dictionaries have been provided here for reference.



Figure 12 — Distribution information classes

## Distribution information: Data dictionary

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| MD\_Distribution | information about the distributor of and options for obtaining the resource | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Aggregated Class / (MD\_Metadata) |
|
| description | brief description of a set of distribution options | O | 1 | CharacterString / Free text |
| *Role name:* | provides a description of the format of the data to be distributed | O | N | Class / MD\_Format (3.11.1.3) |
| distributionFormat |
| *Role name:* | provides information about the distributor | O | N | Class / MD\_Distributor (3.11.1.2) |
| distributor |
| *Role name:*  transferOptions | provides information about technical means and media by which a resource is obtained from the distributor | O | N | Class / MD\_DigitalTransferOptions (3.11.1.1) |

## MD\_DigitalTransferOptions

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name / Role Name** | | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| MD\_DigitalTransferOptions | technical means and media by which a resource is obtained from the distributor | | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Aggregated Class / (MD\_Distribution and MD\_Distributor) |
| (If this class is used at least one attribute must be provided) |
| unitsOfDistribution | tiles, layers, geographic areas, etc., in which data are available | | O | 1 | CharacterString / Free text |
| NOTE: “unitsOfDistribution” applies to both onLine and offLine distributions | |
| transferSize | estimated size of a unit in the specified transfer format, expressed in megabytes. The transfer size is > 0.0 | | O | 1 | Real / > 0.0 |
| onLine | information about online sources from which the resource can be obtained | | O | N | Class / CI\_OnlineResource (4.2.4.3) |
| offLine | information about offline media on which the resource can be obtained | | O | N | Class / MD\_Medium (3.11.1.4) <<DataType>> |
| transferFrequency | rate of occurrence of distribution | | O | 1 | Class / TM\_PeriodDuration (6.1.3) |
| distributionFormat | format of distribution | | O | N | Class / MD\_Format (3.11.1.3) |

## MD\_Distributor

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | | **Data type / Domain** |
| MD\_Distributor | information about the distributor | Use obligation/condition from referencing object | | Use maximum occurrence from referencing object | Aggregated Class (MD\_Distribution and MD\_Format) |
| distributorContact | party from whom the resource may be obtained. This list need not be exhaustive | M | | 1 | Class / CI\_Responsibility (4.2.2) |
|
| *Role name:* | provides information about how the resource may be obtained, and related instructions and fee information | O | | N | Class / MD\_StandardOrderProcess (3.11.1.5) |
| distributionOrderProcess |
| *Role name:* | provides information about the format used by the distributor | O | | N | Class / MD\_Format (3.11.1.3) |
| distributorFormat |
| *Role name:* | provides information about the technical means and media used by the distributor | O | | N | Class / MD\_DigitalTransferOptions (3.11.1.1) |
| distributorTransferOptions |

## MD\_Format

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| MD\_Format | description of the computer language construct that specifies the representation of data objects in a record, file, message, storage device or transmission channel | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Aggregated Class / (MD\_Distribution, MD\_Identification, and MD\_Distributor) |
|
| formatSpecificationCitation | citation/URL of the specification for the format | M | 1 | Class / CI\_Citation (4.2.1) |
| amendmentNumber | amendment number of the format version | O | 1 | CharacterString / Free text |
| fileDecompressionTechnique | recommendations of algorithms or processes that can be applied to read or expand resources to which compression techniques have been applied | O | 1 | CharacterString / Free text |
| medium | medium used by the format | O | N | Class / MD\_Medium (3.11.1.4) |
| *Role name:* | provides information about the distributor of the format | O | N | Class / MD\_Distributor (3.11.1.2) |
| formatDistributor |

## MD\_Medium

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** | |
| MD\_Medium | information about the media on which the resource can be stored (resourceFormat) or distributed | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | | Class <<DataType>> |
| (If this class is used at least one attribute must be provided) |
| name | name of the medium on which the resource can be stored (resourceFormat) or distributed | O | 1 | | ChacacterString / Free text |
| density | density at which the data are recorded | O | 1 | | Real / > 0,0 |
| densityUnits | units of measure for the recording density | O | 1 | | CharacterString Integer / |
| volumes | number of items in the media identified | O | 1 | | Free text Ø  0 |
| mediumFormat | method used to write to the medium | O | N | | Class / MD\_MediumFormatCode |
| <<CodeList>> (3.11.2) |
| mediumNote | description of other limitations or requirements for using the medium | O | 1 | | CharacterString / Free text |
| identifier | unique identifier for an instance of the MD\_Medium | O | 1 | | Class / MD\_Identifier (5.1.3) |

## MD\_StandardOrderProcess

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| MD\_StandardOrderProcess | common ways in which the resource may be obtained or received, and related instructions and fee information | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Aggregated Class (MD\_Distributor) |
| (If this class is used at least one attribute must be provided) |
| fees | fees and terms for retrieving the resource. Include monetary units (as specified in ISO 4217) | O | 1 | CharacterString / Free text |
| plannedAvailableDateTime | date and time when the resource will be available | O | 1 | Class / DateTime (6.1.1) |
| orderingInstructions | general instructions, terms and services provided by the distributor | O | 1 | CharacterString / Free text |
| turnaround | typical turnaround time for the filling of an order | O | 1 | CharacterString / Free text |
| orderOptionsType | description of the order options record | O | 1 | Class / RecordType (6.1.2) |

## MD\_MediumFormatCode <<CodeList>>

| **Concept name (English)** | **Code** | **Definition** |
| --- | --- | --- |
| MD\_MediumFormatCode |  | method used to write to the medium |
| cpio | cpio | Copy In / Out (UNIX file format and command) |
| tar | tar | Tape Archive |
| highSierra | highSierra | high sierra file system |
| iso9660 | iso9660 | information processing – volume and file structure of CD-ROM |
| iso9660RockRidge | iso9660RockRidge | rock ridge interchange protocol (UNIX) |
| iso9660AppleHFS | iso9660AppleHFS | hierarchical file system (Macintosh) |
| udf | udf | universal disk format |

# Metadata extension information (MD\_MetadataExtensionInformation)

No changes to the Constraint information have been made in this profile. The UML class diagram (Figure 16) and data dictionaries have been provided here for reference.



Figure 13 — Metadata extension information classes

## Metadata extension information: Data dictionary

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| MD\_MetadataExtensionInformation | information describing metadata extensions | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Aggregated Class (MD\_Metadata) |
| extensionOnLineResource | information about on-line sources containing the community profile name, the extended metadata elements and information for all new metadata elements information about on-line sources containing the community profile name, the extended metadata elements and information for all new metadata elements | O | N | Class / CI\_OnlineResource (4.2.4.3) |
| *Role name:* | provides information about a new metadata element, not found in ISO 19115, which is required to describe the resource | O | N | Class / MD\_ExtendedElement Information (3.12.1.1) |
| extendedElementInformation |

## MD\_ExtendedElementInformation

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Name / Role Name** | | **Definition** | **Obligation / Condition** | | **Maximum occurrence** | | **Data type / Domain** |
| MD\_ExtendedElementInformation | new metadata element, not found in ISO 19115, which is required to describe geographic data | | | Use obligation/condition from referencing object | | Use maximum occurrence from referencing object | Aggregated Class (MD\_Metadata ExtensionInformation) |
|
| name | name of the extended metadata element | | | C / dataType not “codelist”, “enumeration” or “codelistElement”? | | 1 | CharacterString / Free text |
| definition | definition of the extended element | | | M | | 1 | CharacterString / Free text |
| obligation | obligation of the extended element | | | C / dataType not “codelist”, “enumeration” or “codelistElement”? | | 1 | Class / MD\_ObligationCode <<Enumeration>> (3.12.1.3) |
|
| condition | condition under which the extended element is mandatory | | | C / obligation = “Conditional”? | | 1 | CharacterString / Free text |
| dataType | code which identifies the kind of value provided in the extended element | | | M | | 1 | Class / MD\_DatatypeCode <<CodeList>> (3.12.1.2) |
|
| maximumOccurrence | maximum occurrence of the extended element | | | C / dataType not “codelist”, “enumeration” or “codelistElement”? | | 1 | CharacterString / N or any integer |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| domainValue | valid values that can be assigned to the extended element | C / dataType not “codelist “, “enumeration” or “codelistElement”? | 1 | CharacterString / Free text |
| parentEntity | name of the metadata entity(s) under which this extended metadata element may appear. The name(s) may be standard metadata element(s) or other extended metadata element(s) | M | N | CharacterString / Free text |
| rule | specifies how the extended element relates to other existing elements and entities | M | 1 | CharacterString / Free text |
| rationale | reason for creating the extended element | O | 1 | CharacterString / Free text |
| source | name of the person or organisation creating the extended element | M | N | Class / CI\_Responsibility (4.2.2) |
| conceptName | the name of the item | C / datatype equal codelist “, “enumeration” or “codelistElement”? | 1 | CharacterString / Free text |
| code | a language neutral identifier | C / datatype equal codelist “, “enumeration” or “codelistElement”? | 1 | CharacterString / Unspecified domain |

## MD\_DataTypeCode <<CodeList>>

| **Concept name (English)** | **Code** | **Definition** |
| --- | --- | --- |
| MD\_DatatypeCode |  | datatype of element or entity |
| class | class | descriptor of a set of objects that share the same attributes, operations, methods, relationships, and behaviour |
| codelist | codelist | flexible enumeration useful for expressing a long list of values, can be extended |
| enumeration | enumeration | data type whose instances form a list of named literal values, not extendable |
| codelistElement | codelistElement | permissible value for a codelist or enumeration |
| abstractClass | abstractClass | class that cannot be directly instantiated |
| aggregateClass | aggregateClass | class that is composed of classes it is connected to by an aggregate relationship |
| specifiedClass | specifiedClass | subclass that may be substituted for its superclass |
| datatypeClass | datatypeClass | class with few or no operations whose primary purpose is to hold the abstract state of another class for transmittal, storage, encoding or persistent storage |
| interfaceClass | interfaceClass | named set of operations that characterize the behaviour of an element |
| unionClass | unionClass | class describing a selection of one of the specified types |
| metaClass | metaClass | class whose instances are classes |
| typeClass | typeClass | class used for specification of a domain of instances (objects), together with the operations applicable to the objects. A type may have attributes and associations |
| characterString | characterString | textual information |
| integer | integer | numerical field |
| association | association | semantic relationship between two classes that involves connections among their instances |

## MD\_ObligationCode <<enumeration>>

| **Concept name (English)** | **Code** | **Definition** |
| --- | --- | --- |
| MD\_ObligationCode |  | obligation of the element or entity |
| mandatory | mandatory | element is always required |
| optional | optional | element is not required |
| conditional | conditional | element is required when a specific condition is met |

# Application schema information (MD\_ApplicationSchemaInformation)

No changes to the Constraint information have been made in this profile. The UML class diagram (Figure 17) and data dictionaries have been provided here for reference.



Figure 14 — Application schema information class

## Application schema information: Data dictionary

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| MD\_ApplicationSchemaInformation | the application schema used to define and expose the structure of a resource, i.e. the model and/or data dictionary that represents the resource. | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Aggregated Class (MD\_Metadata) |
| name | name of the application schema used | M | 1 | Class / CI\_Citation (4.2.1) |
| schemaLanguage | identification of the schema language used | M | 1 | CharacterString / Free text |
| constraintLanguage | formal language used in Application Schema | M | 1 | CharacterString / Free text |
| schemaAscii | full application schema given as an ASCII file | O | 1 | CharacterString / Free text |
| graphicsFile | full application schema given as a graphics file | O | 1 | Class / CI\_OnlineResource (4.2.4.3) |
| softwareDevelopmentFile | full application schema given as a software development file | O | 1 | Class / CI\_OnlineResource (4.2.4.3) |
| softwareDevelopmentFileFormat | software dependent format used for the application schema software dependent file | O | 1 | CharacterString / Free text |

# Service metadata information

This profile includes an element of SV\_ServiceIdentification, ***serviceDocumentation***, which allows reference back to a dataset, map, or layer. This new element is of type CI\_OnlineResource and it is mandatory when using this profile.

Additionally in this profile, SV\_ServiceIdentification ***operatesOn*** MD\_Identification rather than MD\_DataIdentification, thereby allowing relationships between this class and the new MD\_MapIdentification and MD\_LayerIdentification classes.

There are no other changes made to the Service metadata information.

Figure 15 — Service metadata information classesService metadata: Data dictionary

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| SV\_ServiceIdentification | identification of capabilities which a service provider makes available to a service user through a set of interfaces that define a behaviour - See ISO 19119 for further information | Use obligation from referencing object | Use maximum occurrence from referencing object | Specified Class (MD\_Identification) |
| serviceType | a service type name, e.g. ‘discovery’, ‘view’, ‘download’, ‘transformation’, or ‘invoke’ | M | 1 | Class / GenericName (6.1.6) |
| serviceDocumentation | information about online sources from which the service can be obtained | M | 1 | Class / CI\_OnlineResource |
| serviceTypeVersion | the version of the service, supports searching based on the version of serviceType. For example, we might only be interested in OGC Catalogue V1.1 services. If version is maintained as a separate attribute, users can easily search for all services of a type regardless of the version | O | N | CharacterString / no specified domain |
| accessProperties | information about the availability of the service, including,         fees         planned available date and time         ordering instructions         turnaround | O | 1 | Class / MD\_StandardOrderProcess (3.11.1.5) |
| couplingType | type of coupling between service and associated data (if exists) | C / coupled resource exists? | 1 | Class / SV\_CouplingType <<CodeList>> (3.14.2.1) |
| coupledResource | further description of the data coupling in the case of tightly coupled services | C / coupled resource exists? | N | Class / SV\_CoupledResource (3.14.1.4) |
| operatedDataset | provides a reference to the resource on which the service operates | O | N | Class / CI\_Citation (4.2.1) |
| Note: for one resource either operatedDataset or operatesOn may be used (not both for the same resource) |
| profile | profile to which the service adheres | O | N | Class / CI\_Citation (4.2.1) |
| serviceStandard | standard to which the service adheres | O | N | Class / CI\_Citation (4.2.1) |
| *Role name:* | provides information about the operations that comprise the service | O | N | Association / SV\_OperationMetadata (3.14.1.1) |
| containsOperations |
| *Role name:* | provides information on the resources that the service operates on | O | N | Association / MD\_Identification (3.3.2) |
| operatesOn | Note: either operatedDataset or operatesOn may be used (not both for the same resource) |
| *Role name:*  containsChain | provide information about the chain applied by the service | O | N | Association / SV\_OperationChainMetadata(3.14.1.2) |

## SV\_OperationMetadata

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| SV\_OperationMetadata | describes the signature of one and only one method provided by the service | Use obligation from referencing object | Use maximum occurrence from referencing object | Aggregated Class (MD\_ServiceIdentification) |
| operationName | a unique identifier for this interface | M | 1 | CharacterString / no specified domain |
| distributedComputingPlatform | distributed computing platforms on which the operation has been implemented | M | N | Class / DCPlist <<CodeList>> (3.14.2.2) |
| operationDescription | free text description of the intent of the operation and the results of the operation | O | 1 | CharacterString / FreeText |
| invocationName | the name used to invoke this interface within the context of the DCP. The name is identical for all DCPs. | O | 1 | CharacterString / FreeText |
| connectPoint | handle for accessing the service interface | M | N | Class / CI\_OnlineResource (4.2.4.3) |
| *role name:*  parameters | the parameters that are required for this interface in sequence | O | N | Association / SV\_Parameter (3.14.1.3) |
| *role name:*  dependsOn | list of operations that must be completed immediately before current operation is invoked, structured as a list for capturing alternate predecessor paths and sets for capturing parallel predecessor paths | O | N | Association / SV\_OperationMetadata (3.14.1.1) |

## SV\_OperationChainMetadata

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| SV\_OperationChainMetadata | Operation Chain Information | Use obligation from referencing object | Use maximum occurrence from referencing object | Aggregated Class (SV\_ServiceIdentification) |
| name | the name, as used by the service for this chain | M | 1 | CharacterString / FreeText |
| description | a narrative explanation of the services in the chain and resulting output | O | 1 | CharacterString / FreeText |
| *role name:*  operation | (ordered) information about the operations applied by the chain | M | N | Class / SV\_OperationMetadata (3.14.1.1) |

## SV\_Parameter

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| SV\_Parameter | parameter information | Use obligation from referencing object | Use maximum occurrence from referencing object | Aggregated Class (SV\_ServiceIdentification) |
| name | the name, as used by the service for this parameter | M | 1 | Class / MemberName (6.1.6) |
| direction | indication if the parameter is an input to the service, an output or both | M | 1 | Class / SV\_ParameterDirection <<Enumeration>> (3.14.2.3) |
| description | a narrative explanation of the role of the parameter | O | 1 | CharacterString / FreeText |
| optionality | indication if the parameter is required | M | 1 | Boolean / |
| 0=no / 1= yes |
| repeatability | indication if more than one value of the parameter may be provided | M | 1 | Boolean / |
| 0=no / 1= yes |

## SV\_CoupledResource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| SV\_CoupledResource | links a given operationName (mandatory attribute of SV\_OperationMetadata) with a resource identified by an “identifier” | Use obligation from referencing object | Use maximum occurrence from referencing object | Aggregated Class (SV\_ServiceIdentification) |
| scopedName | scoped identifier of the resource in the context of the given service instance | O | 1 | Class / ScopedName (6.1.6) |
| NOTE: name of the resources (i.e. dataset) as it is used by a service instance (e.g. layer name or featureTypeName). |
| resourceReference | reference to the resource on which the service operates | O | N | Class / CI\_Citation (4.2.1) |
| Note: for one resource either resource or resourceReference shall be used (not both for the same resource) |
| *Role name*: | the tightly coupled resource. This attribute should be implemented by reference | O | N | Class / MD\_DataIdentification (3.3.2.1) |
| resource | Note: for one resource either resource or resourceReference shall be used (not both for the same resource) |
| *Role name:*  operation | the service operation. This attribute should be implemented by reference | O | 1 | Class / SV\_OperationMetadata (3.14.1.1) |

## Service metadata information codelists and enumerations

## SV\_CouplingType <<CodeList>>

| **Concept name (English)** | **Code** | **Definition** |
| --- | --- | --- |
| SV\_CouplingType |  | class of information to which the referencing entity applies |
| loose | loose | service instance is loosely coupled with a data instance, i.e. no MD\_DataIdentification class has to be described |
| mixed | mixed | service instance is mixed coupled with a data instance, i.e. MD\_DataIdentification describes the associated data instance and additionally the service instance might work with other external data instances |
| tight | tight | service instance is tightly coupled with a data instance, i.e. MD\_DataIdentification class MUST be described |

## DCPList <<CodeList>>

| **Concept name (English)** | **Code** | **Definition** |
| --- | --- | --- |
| DCPList |  | class of information to which the referencing entity applies |
| XML | XML | Extensible Markup Language |
| CORBA | CORBA | Common Object Request Broker Architecture |
| JAVA | JAVA | Object-oriented programming language |
| COM | COM | Component Object Model |
| SQL | SQL | Structured Query Language |
| SOAP | SOAP | Simple Object Access Protocol |
| Z3950 | Z3950 | ISO 23950 |
| HTTP | HTTP | HyperText Transfer Protocol |
| FTP | FTP | File Transfer Protocol |
| WebServices | WebServices | Web service |

## SV\_ParameterDirection <<enumeration>>

| **Concept name (English)** | **Code** | **Definition** |
| --- | --- | --- |
| SV\_ ParameterDirection |  | class of information to which the referencing entity applies |
| in | in | the parameter is an input parameter to the service instance |
| out | out | the parameter is an output parameter to the service instance |
| in/out | in/out | the parameter is both an input and output parameter to the service instance |

# Extent, Citation, and Language-characterset localisation information

## Extent information (EX\_Extent)

No changes to the Constraint information have been made in this profile. The UML class diagram (Figure 19) and data dictionaries have been provided here for reference.



Figure 16 — Extent information classes

## Extent information: Data dictionaries

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| EX\_Extent | extent of the resource | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | <<DataType>> Class |
|
| description | extent of the referring object | C / geographicElement and temporalElement and verticalElement not documented? | 1 | CharacterString / Free text |
| *Role name:* | provides spatial component of the extent of the referring object | C / description and temporalElement and verticalElement not documented? | N | Association /  EX\_GeographicExtent <<Abstract>> (4.1.1.1) |
| geographicElement |
| *Role name:* | provides temporal component of the extent of the referring object | C / description and geographicElement and verticalElement not documented? | N | Association / EX\_TemporalExtent (4.1.1.5) |
| temporalElement |
| *Role name:* | provides vertical component of the extent of the referring object | C / description and geographicElement and temporalElement not documented? | N | Association / EX\_VerticalExtent (4.1.1.7) |
| verticalElement |

## EX\_GeographicExtent

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| *EX\_GeographicExtent* | spatial area of the resource | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Aggregated Class  (EX\_Extent and EX\_SpatialTemporal Extent)  <<Abstract>> |
| extentTypeCode | indication of whether the geographic element encompasses an area covered by the data or an area where data are not present | O | 1 | Boolean / |
| Default = 1 | 0 = exclusion / 1 = inclusion |

## EX\_BoundingPolygon

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| EX\_BoundingPolygon | enclosing geometric object which locates the resource, expressed as a set of (x,y) coordinate (s) | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Specified Class  (EX\_GeographicExtent) |
| NOTE: If a polygon is used it should be closed (last point replicates first point) |
| NOTE: This type can be used to represent geometries other than polygons (e.g. points, lines) |
| polygon | sets of points defining the bounding polygon or any other GM\_Object geometry (point, line or polygon) | M | N | Class / GM\_Object (4.1.2.1) |

## EX\_GeographicBoundingBox

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| EX\_GeographicBoundingBox | geographic position of the resource | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Specified Class  (EX\_GeographicExtent) |
| NOTE: This is only an approximate reference so specifying the coordinate reference system is unnecessary and need only be provided with a precision of up to two decimal places |
| westBoundLongitude | western-most coordinate of the limit of the resource extent, expressed in longitude in decimal degrees (positive east) | M | 1 | Decimal /  -180,0 <= West Bounding Longitude Value <= 180,0 |
| eastBoundLongitude | eastern-most coordinate of the limit of the resource extent, expressed in longitude in decimal degrees (positive east) | M | 1 | Decimal /  -180,0 <= East Bounding Longitude Value <= 180,0 |
| southBoundLatitude | southern-most coordinate of the limit of the resource extent, expressed in latitude in decimal degrees (positive north) | M | 1 | Decimal /  -90,0 <= South Bounding Latitude Value <= 90,0; South Bounding Latitude Value <= North bounding Latitude Value |
| northBoundLatitude | northern-most coordinate of the limit of the resource extent expressed in latitude in decimal degrees (positive north) | M | 1 | Decimal /  -90,0 <= North Bounding Latitude Value <= 90,0; North Bounding Latitude Value >= South Bounding Latitude Value |

## EX\_GeographicDescription

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| EX\_GeographicDescription | description of the geographic area using identifiers | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Specified Class  (EX\_GeographicExtent) |
| geographicIdentifier | identifier used to represent a geographic area  e.g. a geographic identifier as described in ISO 19112 | M | 1 | Class / MD\_Identifier (5.1.3) |

## EX\_TemporalExtent

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| EX\_TemporalExtent | time period covered by the content of the resource | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Aggregated Class  (EX\_Extent) |
| extent | period for the content of the resource | M | 1 | Class / TM\_Primitive (4.1.2.2) |

## EX\_SpatialTemporalExtent

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| EX\_SpatialTemporalExtent | extent with respect to date/time and spatial boundaries | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Specified Class |
| (EX\_TemporalExtent) |
| verticalExtent | vertical extent component | O | 1 | Class / EX\_VerticalExtent (4.1.1.7) |
| *role name:* | spatial extent component of composite spatial and temporal extent | M | N | Association / |
| spatialExtent | EX\_GeographicExtent <<Abstract>> (4.1.1.1) |

## EX\_VerticalExtent

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| EX\_VerticalExtent | vertical domain of resource | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Aggregated Class |
| (EX\_Extent) |
| minimumValue | lowest vertical value contained in the resource | M | 1 | Real / Real |
| maximumValue | highest vertical value contained in the resource | M | 1 | Real / Real |
| *role name:* | provides information about the vertical coordinate reference system to which the maximum and minimum elevation values are measured. The CRS identification includes unit of measure. | C / verticalCRSId not documented? | 1 | Class / SC\_VerticalCRS <<Abstract>> (4.1.2.3) |
| verticalCRS |
| verticalCRSId |  | C / verticalCRS not documented? | 1 | Class / MD\_ReferenceSystem (3.8.1) |

## Extent information: related classes

## GM\_Object

GM\_Object: root class of the geometric object taxonomy and supports interfaces common to all geographically referenced geometric objects. This class is fully documented in ISO 19107.

## TM\_Primitive

TM\_Primitive: an abstract class representing a non-decomposed element of geometry or topology. This class is fully documented in ISO 19108.

## SC\_VerticalCRS

SC\_CRS: set of parameters describing the relation of gravity-related heights to the Earth. This class is fully documented in ISO 19111 and ISO 19111-2.

# Citation information

For reasons explained in subclause 1.1, the profile extends the CI\_Citation class to include the element ***uri*** (of type URI). Additionally, CI\_Party shall have an ***identifier*** (of type URI). For both of these elements, effort should be done to make the URI resolveable.

Similarly, this profile has raised from optional CI\_Contact/address/CI\_Address/electronicMailAddress so as to assure there is an email address associated with the cited resource.

To allow better description of web services, the elements ***format***, ***representationTechnique***, and ***mimeType*** have been added to the CI\_OnlineResource data type. The element ***format*** shall be of type MD\_Format. The element ***representationTechnique*** specifies how the distribution that is contained in the online resource is expressed. For example, the XML schema distribution of ADMS is in a ZIP file (<http://purl.org/NET/mediatypes/application/zip>) while the representation technique is XML Schema (<http://purl.org/adms/representationtechnique/XMLSchema>). Similarly, the specification of ISO 19115 is in an HTML file (or PDF) while the representation technique is human language. Finally, the code ***apiDocument*** has been added to the CI\_OnllineFunctionCode code list.

These extensions to CI\_OnlineResource and CI\_OnlineFunctionCode will provide a better means by which machines can read the metadata and understand the protocol of a service.

Since it is not practical to use the explicit description of services via ***protocolRequest***, this profile does not recommend its use. Additionally, guidance has been given for the use of two elements of CI\_OnlineResource: it is recommended that the title of the resource be used for ***name***; and, ***applicationProfile*** is recommended to be used to discern between different sets of metadata elements such as NMIS, INSPIRE profile. An application profile will consist of a set of metadata elements, policies, and guidelines defined for a particular application.

No other changes have been made to the citation package. The UML for the citation information, including the changes described above, is given in Figure 20, and that of the code lists and data types is given in Figure 21. The data dictionaries have also been provided here.



Figure 17 — Citation and responsible party information classes

## Citation information: data dictionaries

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| CI\_Citation | standardized resource reference | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Class |
| title | name by which the cited resource is known | M | 1 | CharacterString / Free text |
| uri | the URI of the cited resource (effort should be done to make it resolvable) | O | 1 | URI (6.1.8) |
| alternateTitle | short name or other language name by which the cited information is known. Example: “DCW” as an alternative title for “Digital Chart of the World” | O | N | CharacterString / Free text |
| date | reference date for the cited resource | O | N | Class / CI\_Date (4.2.4.1) |
| edition | version of the cited resource | O | 1 | CharacterString / Free text |
| editionDate | date of the edition | O | 1 | Class / DateTime (6.1.1) |
| identifier | value uniquely identifying an object within a namespace | O | N | Class / MD\_Identifier (5.1.3) |
| citedResponsibleParty | roles, name, contact, and position information for an individual or organisation that is responsible for the resource | O | N | Class / CI\_Responsibility (4.2.2) |
|
| presentationForm | mode in which the resource is represented | O | N | Class / CI\_PresentationFormCode <<CodeList>> (4.2.4.7) |
| series | information about the series, or aggregate resource, of which the resource is a part | O | 1 | Class / CI\_Series (4.2.4.2) |
| otherCitationDetails | other information required to complete the citation that is not recorded elsewhere | O | N | CharacterString / Free text |
| ISBN | international Standard Book Number | O | 1 | CharacterString / no specified domain |
| ISSN | international Standard Serial Number | O | 1 | CharacterString / no specified domain |
| onlineResource | online reference to the cited resource | O | N | Class / CI\_OnlineResource (4.2.4.3) |
| graphic | citation graphic or logo for the cited resource | O | N | Class / MD\_BrowseGraphic (5.1.4) |

## CI\_Responsibility

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| CI\_Responsibility | information about the party and their role | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Class |
|
| role | function performed by the responsible party | M | 1 | Class / CI\_RoleCode <<CodeList>> (4.2.4.8) |
| extent | spatial or temporal extent of the role | O | N | Class / EX\_Extent (4.1.1) |
| *role name:* | information about the party | M | N | Association / CI\_Party <<Abstract>> (4.2.3) |
| party |

## CI\_Party

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| *CI\_Party* | information about the individual and/or organisation of the party | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Class <<Abstract>> |
|
| name | name of the party (individual or organization) | C / logo and positionName not documented? | 1 | CharacterString / Free text |
| identifier | the URI of the resource (effort should be done to make it resolvable) | M | 1 | URI (6.1.8) |
| contactInfo | contact information for the party | O | N | Class / CI\_Contact (4.2.3.3) |

## CI\_Individual

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| CI\_Individual | information about the party if the party is an individual | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Specified Class (CI\_Party) |
|
| positionName | position of the individual in an organisation | C / name and logo not documented? | 1 | CharacterString / Free text |

## CI\_Organisation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| CI\_Organisation | information about the party if the party is an organisation | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Specified Class (CI\_Party) |
|
| logo | Graphic identifying the organisation | C / name or positionName not documented? | N | Class / MD\_BrowseGraphic (5.1.4) |
| *Role name*  individual | an individual in the named organisation | O | N | Association / CI\_Individual (0) |

## CI\_Contact

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| CI\_Contact | information required to enable contact with the responsible person and/or organisation | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Class |
| phone | telephone numbers at which the organisation or individual may be contacted | O | N | Class / CI\_Telephone (4.2.4.4) |
|
| address | physical and email address at which the organisation or individual may be contacted | M | N | Class / CI\_Address(4.2.3.4) |
|
| onlineResource | on-line information that can be used to contact the individual or organisation | O | N | Class / CI\_OnlineResource (4.2.4.3) |
| hoursOfService | time period (including time zone) when individuals can contact the organisation or individual | O | N | CharacterString / Free text |
| contactInstructions | supplemental instructions on how or when to contact the individual or organisation | O | 1 | CharacterString / Free text |
| contactType | type of the contact | O | 1 | CharacterString / Free text |

## CI\_Address

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| CI\_Address | location of the responsible individual or organisation | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Class |
| deliveryPoint | address line for the location (as described in ISO 11180, Annex A) | O | N | CharacterString / Free text |
| city | city of the location | O | 1 | CharacterString / Free text |
| administrativeArea | state, province of the location | O | 1 | CharacterString / Free text |
| postalCode | ZIP or other postal code | O | 1 | CharacterString / no specified domain |
| country | country of the address | O | 1 | CharacterString / no specified domain |
| electronicMailAddress | address of the electronic mailbox of the responsible organisation or individual | M | N | CharacterString / no specified domain |

## Citation information: data types and codelists

The classes and codelists used by Citation and responsible party information are specified in Figure 21. The data dictionary for this diagram is located in **Error! Reference source not found.**.



Figure 18 — Citation and responsible party information codelists

## CI\_Date <<DataType>>

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| CI\_Date | reference date and event used to describe it | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Class <<DataType>> |
|
| date | reference date for the cited resource | M | 1 | Class / DateTime (6.1.1) |
| dateType | event used for reference date | M | 1 | CodeList / CI\_DateTypeCode <<CodeList>> (4.2.4.6) |
|

## CI\_Series <<DataType>>

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| CI\_Series | information about the series, or aggregate resource, to which a resource belongs | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Class |
| name | name of the series, or aggregate resource, of which the resource is a part | O | 1 | CharacterString / Free text |
| issueIdentification | information identifying the issue of the series | O | 1 | CharacterString / Free text |
| page | details on which pages of the publication the article was published | O | 1 | CharacterString / Free text |

## CI\_OnlineResource <<DataType>>

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| CI\_OnlineResource | information about on-line sources from which the resource, specification, or community profile name and extended metadata elements can be obtained | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Class <<DataType>> |
|
| linkage | location (address) for online access using a Uniform Resource Locator / Uniform Resource Identifier address or similar addressing scheme such as  <http://www.statkart.no/isotc211>  *(recommended: use URL)* | M | 1 | CharacterString / Text restricted to URL (see IETF RFC 3986) |
| mimeType | media type for the online resource | M | 1 | CharacterString / Representing a MIME-type |
| format | a human description of the format of the online resource for example, XSLT, XML Schema, etc. | M | 1 | Class / MD\_Format (3.11.1.3) |
| representationTechnique | the URI of the SKOS:Concept which provides the specification of how the distribution that is contained in the online resource is expressed | O | 1 | URI (6.1.8) |
| name | name of the online resource *(recommended: use title)* | O | 1 | CharacterString / Free text |
| description | detailed text description of what the online resource is/does | O | 1 | CharacterString / Free text |
| function | code for function performed by the online resource | O | 1 | Codelist / CI\_OnLineFunctionCode <<CodeList>> (4.2.4.9) |
| applicationProfile | name of an application profile that can be used with the online resource  *(Recommended: to be used to differentiate between different encodings.)* | O | 1 | CharacterString / Free text |
| protocol | connection protocol to be used i.e.. ftp, http get KVP, http POST, etc… | O | 1 | CharacterString / no specified domain |
| ~~protocolRequest~~ | ~~request used to access the resource depending on the protocol (to be used mainly for POST requests)e.g.~~  ~~POST/XML:~~  ~~<GetFeature service="WFS" version="2.0.0" outputFormat="application/gml+xml; version=3.2" xmlns=http://www.opengis.net/wfs/2.0 xmlns:xsi=http://www.w3.org/2001/XMLSchema-instance xsi:schemaLocation="http://www.opengis.net/wfs/2.0http://schemas.opengis.net/wfs/2.0.0/wfs.xsd">~~  ~~<Query typeNames="Roads"/>~~  ~~</GetFeature>~~ | ~~O~~ | ~~1~~ | ~~CharacterString / Unspecified domain~~ |

## CI\_Telephone <<DataType>>

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| CI\_Telephone | telephone numbers for contacting the responsible individual or organisation | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Class <<DataType>> |
|
| number | telephone number by which individuals can contact responsible organisation or individual | M | 1 | CharacterString / no specified domain |
| numberType | type of telephone number | O | 1 | Class / CI\_TelephoneTypeCode <<CodeList>> (4.2.4.5) |

## CI\_TelephoneTypeCode <<CodeList>>

| **Concept name (English)** | **Code** | **Definition** |
| --- | --- | --- |
| CI\_TelephoneTypeCode |  | type of telephone |
| voice | voice | telephone provides voice service |
| facsimile | fax | telephone provides facsimile service |
| sms | sms | telephone provides sms service |

## CI\_DateTypeCode <<CodeList>>

| **Concept name (English)** | **Code** | **Definition** |
| --- | --- | --- |
| CI\_DateTypeCode |  | identification of when a given event occurred |
| creation | creation | date identifies when the resource was brought into existence |
| publication | publication | date identifies when the resource was issued |
| revision | revision | date identifies when the resource was examined or re-examined and improved or amended |
| expiry | expiry | date identifies when resource expires |
| lastUpdate | lastUpdate | date identifies when resource was last updated |
| lastRevision | lastRevision | date identifies when resource was last reviewed |
| nextUpdate | nextUpdate | date identifies when resource will be next updated |
| unavailable | unavailable | date identifies when resource became not available or obtainable |
| inForce | inForce | date identifies when resource became in force |
| adopted | adopted | date identifies when resource was adopted |
| deprecated | deprecated | date identifies when resource was deprecated |
| superseded | superseded | date identifies when resource was superseded or replaced by another resource |
| validityBegins | validityBegins | time at which the data are considered to become valid.  NOTE: There could be quite a delay between creation and validity begins |
| validityExpires | validityExpires | time at which the data are no longer considered to be valid |
| released | released | the date that the resource shall be released for public access |
| distribution | distribution | date identifies when an instance of the resource was distributed |

## CI\_PresentationFormCode <<CodeList>>

| **Concept name (English)** | **Code** | **Definition** |
| --- | --- | --- |
| CI\_PresentationFormCode |  | mode in which the data are represented |
| documentDigital | documentDigital | digital representation of a primarily textual item (can contain illustrations also) |
| documentHardcopy | documentHardcopy | representation of a primarily textual item (can contain illustrations also) on paper, photographic material, or other media |
| imageDigital | imageDigital | likeness of natural or man-made features, objects, and activities acquired through the sensing of visual or any other segment of the electromagnetic spectrum by sensors, such as thermal infrared, and high resolution radar and stored in digital format |
| imageHardcopy | imageHardcopy | likeness of natural or man-made features, objects, and activities acquired through the sensing of visual or any other segment of the electromagnetic spectrum by sensors, such as thermal infrared, and high resolution radar and reproduced on paper, photographic material, or other media for use directly by the human user |
| mapDigital | mapDigital | map represented in raster or vector form |
| mapHardcopy | mapHardcopy | map printed on paper, photographic material, or other media for use directly by the human user |
| modelDigital | modelDigital | multi-dimensional digital representation of a feature, process, etc. |
| modelHardcopy | modelHardcopy | 3-dimensional, physical model |
| profileDigital | profileDigital | vertical cross-section in digital form |
| profileHardcopy | profileHardcopy | vertical cross-section printed on paper, etc. |
| tableDigital | tableDigital | digital representation of facts or figures systematically displayed, especially in columns |
| tableHardcopy | tableHardcopy | representation of facts or figures systematically displayed, especially in columns, printed on paper, photographic material, or other media |
| videoDigital | videoDigital | digital video recording |
| videoHardcopy | videoHardcopy | video recording on film |
| audioDigital | audioDigital | digital audio recording |
| audioHardcopy | audioHardcopy | audio recording delivered by analog media, such as a magnetic tape |
| multimediaDigital | multimediaDigital | information representation using simultaneously various digital modes for text, sound, image |
| multimediaHardcopy | multimediaHardcopy | information representation using simultaneously various analog modes for text, sound, image |
| physicalObject | physicalSample | a physical object, e.g. Rock or mineral sample, microscope slide |
| diagramDigital | diagramDigital | information represented graphically by charts such as pie chart, bar chart, and other type of diagrams and recorded in digital format |
| diagramHardcopy | diagramHardcopy | information represented graphically by charts such as pie chart, bar chart, and other type of diagrams and printed on paper, phototographic material, or other media |

## CI\_RoleCode <<CodeList>>

| **Concept name (English)** | **Code** | **Definition** |
| --- | --- | --- |
| CI\_RoleCode |  | function performed by the responsible party |
| resourceProvider | resourceProvider | party that supplies the resource |
| custodian | custodian | party that accepts accountability and responsibility for the resource and ensures appropriate care and maintenance of the resource |
| owner | owner | party that owns the resource |
| user | user | party who uses the resource |
| distributor | distributor | party who distributes the resource |
| originator | originator | party who created the resource |
| pointOfContact | pointOfContact | party who can be contacted for acquiring knowledge about or acquisition of the resource |
| principalInvestigator | principalInvestigator | key party responsible for gathering information and conducting research |
| processor | processor | party who has processed the data in a manner such that the resource has been modified |
| publisher | publisher | party who published the resource |
| author | author | party who authored the resource |
| sponsor | sponsor | party who speaks for the resource |
| coAuthor | coAuthor | party who jointly authors the resource |
| collaborator | collaborator | party who assists with the generation of the resource other than the principal investigator |
| editor | editor | party who reviewed or modified the resource to improve the content |
| mediator | mediator | a class of entity that mediates access to the resource and for whom the resource is intended or useful |
| rightsHolder | rightsHolder | party owning or managing rights over the resource |
| contributor | contributor | party contributing to the resource |
| funder | funder | party providing monetary support for the resource |
| stakeholder | stakeholder | party who has an interest in the resource or the use of the resource |

## CI\_OnLineFunctionCode <<CodeList>>

| **Concept name (English)** | **Code** | **Definition** |
| --- | --- | --- |
| CI\_OnLineFunctionCode |  | function performed by the resource |
| download | download | online instructions for transferring data from one storage device or system to another |
| information | information | online information about the resource |
| offlineAccess | offlineAccess | online instructions for requesting the resource from the provider |
| order | order | online order process for obtaining the resource |
| search | search | online search interface for seeking out information about the resource |
| completeMetadata | completeMetadata | complete metadata provided |
| browseGraphic | browseGraphic | browse graphic provided |
| upload | upload | online resource upload capability provided |
| emailService | emailService | online email service provided |
| browsing | browsing | online browsing provided |
| fileAccess | fileAccess | online file access provided |
| apiDocument | apiDocument | standard API description language such as WSDL, Swagger, HAL, RAML |

# Language-characterset localisation information

## Multilingual support for free text fields: Free text metadata elements

No changes have been made to the Language-characterset localisation information in this profile. The UML class diagram (Figure 22) and associated data dictionaries (subclause 4.3.2) have been provided for reference.



Figure 22 — PT\_Locale schema

## Free text metadata elements: Data dictionaries

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| PT\_FreeText | multi-language free text data type. A metadata element who’s data type is CharacterString and domain is free text can be alternatively expressed using the PT\_FreeText subtype of CharacterString. A free text instance acts as a normal character string except that it handles complementary translations of the character string value in different locales. | Use obligation from referencing object | Use maximum occurrence from referencing object | Specified class (CharacterString) |
| *Role name*:  textGroup | provides the list of localised character strings expressing each free text value (sequence of characters) in a given locale. | M | N | Association / LocalisedCharacterString (4.3.2.1) |

## LocalisedCharacterString

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| LocalisedCharacterString | expression of a free text in a given locale | Use obligation from referencing object | Use maximum occurrence from referencing object | Specified class (CharacterString) |
| *Role name*: | defines the locale in which the value (sequence of characters) of the localised character string is expressed | M | 1 | Class / PT\_Locale (4.3.2.2) |
| locale |

## PT\_Locale

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| PT\_Locale | description of a locale | Use obligation from referencing object | Use maximum occurrence from referencing object | Class |
| language | designation of the locale language | M | 1 | Class / LanguageCode <<Codelist>> (4.3.2.2.1-ISO 639-2 3-alphabetic digits code) |
| country | designation of the specific country of the locale language | O | 1 | Class / CountryCode <<Codelist>> (4.3.2.2.2 - ISO 3166-1, other parts may be used) |
| characterEncoding | designation of the character set to be used to encode the textual value of the locale | M | 1 | Class / MD\_CharacterSetCode <<Codelist>> (4.3.2.2.3 - use IANA register <http://www.iana.org/assignments/character-sets>) |
|

* + - * 1. LanguageCode <<CodeList>>

Use ISO 639-2. ISO 639-2 is the alpha-3 code in *Codes for the representation of names of languages-- Part 2*.

* + - * 1. CountryCode <<CodeList>>

Use ISO 3166-1 *Codes for the representation of names of countries and their subdivisions* Part 1: Country codes or equivalent. http://www.iso.org/iso/home/standards/country\_codes/country\_names\_and\_code\_elements.htm.

* + - * 1. MD\_CharacterSetCode <<CodeList>>

Use IANA Character Set register: <http://www.iana.org/assignments/character-sets> These are the official names for character sets that may be used in the Internet and may be referred to in Internet documentation. These names are expressed in ANSI\_X3.4-1968 which is commonly called US-ASCII or simply ASCII.

## Management of localised strings

This profile of ISO 19115 makes no changes to the management of localised strings; the use of a locale container to aggregate localised strings of a metadata set is permitted. The UML class diagram for the Translation container (Figure 23) and the corresponding data dictionary (subclause 4.3.3.1) have been provided for rerference.



**Figure 23 — Translation container**

## PT\_LocaleContainer

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| PT\_LocaleContainer | container of localised character strings. It provides a means to isolate the localised strings related to a given locale. | O | N | Class |
| description | designation of the locale language | M | 1 | CharacterString / Free text |
| locale | locale in which the localised strings of the container are expressed | M | 1 | Class / PT\_Locale (4.3.2.2) |
| date | date of creation or revision of the locale container | M | N | Class / CI\_Date (4.2.4.1) |
| responsibleParty | responsible parties of the locale container | M | N | Class / CI\_Responsibility (4.2.2) |
| *Role name*:  localisedString | provides the list of localised character string expressing the linguistic translation of a set of textual information in a given locale | M | N | Association / LocalisedCharacterString (4.3.2.1) |

# Other commonly-used classes: MD\_Identifier, URI, MD\_Scope, MD\_BrowseGraphic

Other commonly-used classes (MD\_Identifier, URI, MD\_Scope, MD\_BrowseGraphic and related classes) are specified here (Figure 24) with data dictionaries given in subclauses 5.1 through 5.1.4.

There is no change in this profile and this information is being provided for reference.



Figure 24 — Commonly-used classes

## Commonly-used classes: data dictionaries

## MD\_Scope <<DataType>>

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| <<DataType>>MD\_Scope | the target resource and physical extent for which information is reported | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Class |
| level | target resource covered | M | 1 | Class / MD\_ScopeCode <<CodeList>> (3.2.3.2) |
| extent | Information about the horizontal, vertical and temporal extent of the resource specified by the scope | O | N | Class / EX\_Extent (4.1.1) |
| levelDescription | detailed description/listing of the items specified by the level | O | N | Codelist / MD\_ScopeDescription <<Union>> (5.1.2) |

## MD\_ScopeDescription

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| MD\_ScopeDescription | description of the class of information covered by the information | Use obligation from referencing object | Use maximum occurrence from referencing object | Class <<Union>> |
| attributes | instances of attribute types to which the information applies | C / features, featureInstances, attributeInstances, dataset and other not documented? | 1 | Set - CharacterString (6.1.5) / no specified domain |
|
|
| features | instances of feature types to which the information applies | C / attributes, featureInstances, attributeInstances, dataset and other not documented? | 1 | Set - CharacterString (6.1.5) / no specified domain |
|
|
| featureInstances | feature instances to which the information applies | C / attributes, features, attributeInstances, dataset and other not documented? | 1 | Set - CharacterString (6.1.5) / no specified domain |
|
|
| attributeInstances | attribute instances to which the information applies | C / attributes, features, featureInstances, dataset and other not documented? | 1 | Set - CharacterString (6.1.5) / no specified domain |
|
|
| dataset | dataset to which the information applies | C / attributes, features, featureInstances, attributeInstances, and other not documented? | 1 | CharacterString / no specified domain |
| other | class of information that does not fall into the other categories to which the information applies | C / attributes, features, featureInstances, attributeInstances, and dataset not documented? | 1 | CharacterString / Free text |

## MD\_Identifier <<DataType>>

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| <<DataType>> MD\_Identifier | value uniquely identifying an object within a namespace | Use obligation/condition from referencing object | Use maximum occurrence from referencing object | Class |
| authority | the person or party responsible for maintenance of that namespace | O | 1 | Class / CI\_Citation (4.2.1) |
| code | alphanumeric value identifying an instance in the namespace  e.g. EPSG::4326  NOTE: avoid characters that are not legal in URLs | M | 1 | CharacterString / no specified domain |
| codeSpace | identifier or namespace in which the code is valid | O | 1 | CharacterString / no specified domain |
| version | version identifier for the namespace | O | 1 | CharacterString / no specified domain |
| description | natural language description of the meaning of the code value  e.g. for codeSpace = EPSG, code = 4326, description = WGS-84 | O | 1 | CharacterString / Free text |

## MD\_BrowseGraphic

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name / Role Name** | **Definition** | **Obligation / Condition** | **Maximum occurrence** | **Data type / Domain** |
| MD\_BrowseGraphic | graphic that provides an illustration of a resource (should include a legend for the graphic, if applicable)e.g. a dataset, an organisation logo, security constraint or citation graphic | Use obligation from referencing object | Use maximum occurrence from referencing object | Aggregated Class (MD\_Identification) / Lines 450-454 |
| fileName | name of the file that contains a graphic that provides an illustration of the resource | M | 1 | CharacterString / no specified domain |
| fileDescription | text description of the illustration | O | 1 | CharacterString / Free text |
| fileType | format in which the illustration is encoded (e.g.: EPS, GIF, JPEG, PBM, PS, TIFF, PDF) | O | 1 | CharacterString / no specified domain |
| imageConstraints | restriction on access and/or use of browse graphic | O | N | Class / MD\_Constraints (3.4.2) |
| linkage | link to browse graphic | O | N | Class / CI\_OnlineResource (4.2.4.3) |

# Externally-referenced classes

* 1. Introduction

There are several classes referenced by ISO 19115-1 that are documented by other, external, standards. Those externally referenced entities are explained here for reference.

* + 1. Date and DateTime information

Date: gives values for year, month and day. Character encoding of a date is a string which shall follow the format for date specified by ISO 8601. This class is documented in full in ISO/TS 19103.

NOTE 1 The precision of the date can be defined by showing a combination of century plus year plus month plus day. E.g. YY (century), YYYY (year), YYYY-MM (year-month), YYYY-MM-DD or YYYYMMDD (year, month and day)

DateTime: combination of a date and a time type (given by an hour, minute and second). Character encoding of a DateTime shall follow ISO 8601. This class is documented in full in ISO/TS 19103

NOTE 2 Although the DateTime definition allows for more precise temporal statements, the less precise values can also be used. For example, YY (century), YYYY (year), YYYY-MM( year, month), YYYY-MM-DD or YYYYMMDD (year, month, day), YYYY-MM-DDThh (year, month, day, hour), YYYY-MM-DDThh:mm (year, month, day, hour, minute), YYYY-MM-DDThh:mm:ss.d or YYYYMMDDThhmmss.d (year, month, day, hour, minute, second and decimals of seconds). The time zone should also be added. E.g. YYYY-M-DDThh:mm:ss.d+hh:mm

NOTE 3 DateTime inherits both from Date and Time, which means that:

• a DateTime property can be instantiated either as a Date or as a DateTime;

• a Time property can be instantiated either as a Time or as a DateTime

* + 1. Distance, angle, measure, number, record, recordType, scale and UomLength information

Distance: This class is documented in full in ISO/TS 19103.

Angle: Amount of rotation needed to bring one line or plane into coincidence with another, generally measured in radians or degrees. This class is documented in full in ISO/TS 19103.

Measure: result from performing the act or process of ascertaining the extent, dimensions, or quantity of some entity. This class is documented in full in ISO/TS 19103.

Number: abstract class that can be sub-typed to a specific number type (real, integer, decimal, double, float). This class is documented in full in ISO/TS 19103.

Record: This class is documented in full in ISO/TS 19103.

RecordType: This class is documented in full in ISO/TS 19103.

Scale: This class is documented in full in ISO/TS 19103.

UnitOfMeasure: This class is documented in full in ISO/TS 19103.

UomLength: any of the measuring systems to measure the length, distance between two entities. This class is documented in full in ISO/TS 19103.

* + 1. PeriodDuration and temporal primitive information

TM\_PeriodDuration: duration of a period as specified by ISO 8601. This class is fully documented in ISO 19108.

TM\_Duration: duration of time as specified by ISO 8601. This class is fully documented in ISO 19108.

* + 1. Point and Object information

GM\_Point: 0-dimensional geometric primitive, representing a position, but not having extent. This class is fully documented in ISO 19107.

* + 1. Set and Sequence information

Set: finite collection of objects, where each object appears in the collection only once. A set shall not contain any duplicated instances. The order of the elements of the set is not specified. This class is documented in full in ISO/TS 19103.

Sequence: A sequence refers to a collection of sequential ordering between its elements. Sequences can be repeated, and may be used as a list or an array. This class is documented in full in ISO/TS 19103.

* + 1. Type name information

AttributeName: This class is documented in full in ISO/TS 19103.

GenericName: This class is documented in full in ISO/TS 19103.

MemberName: This class is documented in full in ISO/TS 19103.

ScopedName: This class is documented in full in ISO/TS 19103.

* + 1. Vertical coordinate reference system information

SC\_CRS: set of parameters describing the relation of gravity-related heights to the Earth. This class is fully documented in ISO 19111 and ISO 19111-2

* + 1. Internet protocol standards

URI – Uniform Resource Identifier: Generic syntax This class documented in full in IETF RFC 3986.