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Entwurf

Einsprüche bis 2012-04-20
Vorgesehen als Ersatz für
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DIN EN ISO 19115
Berichtigung 1:2009-09

**Geoinformation –
Metadaten –
Teil 1: Grundsätze (ISO/DIS 19115-1:2011);
Englische Fassung prEN ISO 19115-1:2011**

Geographic information –

Metadata –

Part 1: Fundamentals (ISO/DIS 19115-1:2011);

English version prEN ISO 19115-1:2011

Information géographique –

Métadonnées –

Partie 1: Principes fondamentaux (ISO/DIS 19115-1:2011);

Version anglaise prEN ISO 19115-1:2011

Anwendungswarnvermerk

Dieser Norm-Entwurf mit Erscheinungsdatum 2012-02-13 wird der Öffentlichkeit zur Prüfung und Stellungnahme vorgelegt.

Weil die beabsichtigte Norm von der vorliegenden Fassung abweichen kann, ist die Anwendung dieses Entwurfes besonders zu vereinbaren.

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Normenausschuss Bauwesen (NABau) im DIN

Nationales Vorwort

Dieses Dokument (prEN ISO 19115-1:2011) wurde vom Technischen Komitee ISO/TC 211 „Geographic information/Geomatics“ in Zusammenarbeit mit dem Technischen Komitee CEN/TC 287 „Geoinformation“, dessen Sekretariat von BSI (Vereinigtes Königreich) gehalten wird, erarbeitet.

Der für die deutsche Mitarbeit zuständige Arbeitsausschuss im DIN Deutsches Institut für Normung e. V. ist der als Spiegelausschuss zum CEN/TC 287 und ISO/TC 211 eingesetzte Arbeitsausschuss NA 005-03-03 AA „Kartographie und Geoinformation“ des Normenausschusses Bauwesen (NABau).

Dieses Dokument ist derzeit zur Umfrage vorgelegt.

Das Präsidium des DIN hat mit seinem Beschluss 1/2004 festgelegt, dass von dem in den Regeln der europäischen Normungsarbeit von CEN/CENELEC verankerten Grundsatz, wonach Europäische Normen in den drei offiziellen Sprachen Deutsch, Englisch und Französisch veröffentlicht werden, in begründeten Ausnahmefällen abgewichen und auf die deutsche Sprachfassung verzichtet werden kann.

Die Genehmigung dafür hat die DIN-Geschäftsleitung entsprechend den festgelegten Kriterien für die vorliegende Norm auf Antrag des Normenausschusses Bauwesen (NABau), Fachbereich 03 „Vermessungswesen; Geoinformation“ erteilt.

DIN EN ISO 19115 *Metadaten* besteht aus:

- *Teil 1: Grundsätze*
- *Teil 2: Erweiterungen für Bild- und Rasterdaten*

Dieses Dokument ging aus der Überarbeitung der ISO 19115:2003 und ISO 19115:2006/Cor 1:2005 hervor. Diese Norm ist jedoch völlig unabhängig von der Vorgängerversion und hat einen neuen Namen. Die UML-Pakete, Klassen und Elemente haben andere eindeutige Identifikatoren als in der Vorgängerversion. Die Vorgängerversion bleibt daher im Archiv der ISO/TC Harmonized Model Management Group (HMMG) verfügbar. Vorhandene Metadaten können somit auch die Vorgängerversion referenzieren. Eine gegebenenfalls geforderte Kompatibilität zwischen den Vorgängerversionen und der neuen Version ist über Transformationsdienste sicherzustellen.

Änderungen

Gegenüber DIN EN ISO 19115:2005-05 und DIN EN ISO 19115 Berichtigung 1:2009-09 wurden folgende Änderungen vorgenommen:

- a) Die Kernmetadaten (core metadata) wurden entfernt;
- b) Metadaten für Web-Dienste wurden ergänzt, abgeleitet aus ISO 19119:2005 und ISO/COR 19119:2008;
- c) Elemente über Datenqualität wurden nach ISO 19157 übertragen;
- d) Anhang über Metadaten zur Suche nach Web-Diensten und Geodaten wurde ergänzt;
- e) mehrere Codelisten wurden erweitert;
- f) die Elemente „Short name“ und „Domain code“ wurden gelöscht.

Eine umfassende Beschreibung aller Änderungen findet sich im Anhang H dieser Norm.

Nationaler Anhang NA (informativ)

Begriffe

4 Begriffe

Für die Anwendung dieses Dokuments gelten die folgenden Begriffe.

ANMERKUNG Die in Verbindung mit den UML-Modellen verwendeten Begriffe sind in ISO/TS 19103:2005 enthalten.

4.1

Zitat

(en: citation)

Verweis auf ein Buch, einen Artikel oder eine andere Quelle

[ISO 12620:1999, B.9]

4.2

Datentyp

(en: data type)

Festlegung eines Wertebereichs mit auf den Werten in diesem Bereich zulässigen **Operationen**

[ISO/TS 19103:2005, 4.1.5]

BEISPIELE Integer (ganzzahlig), Real (reell), Boolean (boolesch), String (Zeichenfolge), Date (Datum) und GM_Point

ANMERKUNG Ein Datentyp wird durch eine Größe gekennzeichnet, z. B. ganze Zahl.

4.3

Datensatz

(en: dataset)

identifizierbare Sammlung von Daten

ANMERKUNG Ein Datensatz kann eine kleine Gruppierung von Daten sein, die, auch wenn sie durch einige Einschränkungen, wie z. B. die räumliche Ausdehnung oder den **Objekttyp** begrenzt ist, sich innerhalb eines größeren Datensatzes befindet. Theoretisch kann ein Datensatz so klein wie ein einzelnes Objekt oder ein Objektattribut sein, das in einem größeren Datensatz enthalten ist. Der Papierausdruck einer Landkarte oder einer thematischen Karte kann als ein Datensatz betrachtet werden.

4.4

Serie von Datensätzen

(en: dataset series)

Sammlung von **Datensätzen** mit gemeinsamen Eigenschaften

4.5

Feature

(en: feature)

Abstraktion eines realen Objekts

[ISO 19101:2002, 4.11]

4.6
Gitter
(en: grid)
Netz aus zwei oder mehr Kurvenscharen, wobei die Mitglieder einer Schar jeweils die Mitglieder der anderen Scharen auf algorithmische Weise schneiden

[ISO 19123:2005, 4.1.23]

4.7
Schnittstelle
(en: interface)
Anzahl an **Operationen**, die in ihrer Gesamtheit das Verhalten einer Einheit festlegen

[ISO 19119:2005, 4.2]

4.8
Abstammung
(en: lineage)
Herkunft, Ursprung und Erstellungsprozess einer **Ressource**

4.9
Metadaten
(en: metadata)
Daten zur Beschreibung von **Ressourcen**

4.10
Metadatenelement
(en: metadata element)
selbstständige Einheit von **Metadaten**

ANMERKUNG 1 Metadatenelemente sind innerhalb einer Metadatenklasse spezifisch.

ANMERKUNG 2 Entspricht einem Attribut (attribute) und/oder einer Assoziation (association) in der UML-Terminologie.

ANMERKUNG 3 Klassenattribute und Beziehungen werden zusammen als Metadatenelemente bezeichnet.

4.11
Metadateneinheit
(en: metadata entity)
Satz von **Metadatenelementen**, die dieselben Aspekte von Daten beschreiben

ANMERKUNG 1 Kann eine oder mehrere Metadateneinheiten enthalten.

ANMERKUNG 2 Entspricht einer Klasse (class) in der UML-Terminologie.

4.12
Metadatenbereich
(en: metadata section)
bestimmte Menge von **Metadaten**, die aus einer Sammlung von **Metadateneinheiten** und **Metadaten-elementen** besteht

ANMERKUNG Entspricht einem Paket (package) in der UML-Terminologie.

4.13
Modell
(en: model)
Abstraktion einiger Aspekte der Realität

[ISO 19109:2005, 4.14]

4.14

Operation

(en: operation)

Festlegung einer Transformation oder Abfrage, zu deren Ausführung ein Objekt aufgerufen werden kann

[ISO 19119:2005, 4.3]

ANMERKUNG Eine Operation besitzt einen Namen und eine Liste von Parametern.

4.15

Herkunft

(en: provenance)

Organisation oder Individuum, die/das Aufzeichnungen erstellt, sammelt, pflegt und verwendet

[ISO 5127:2001]

4.16

Ressource

(en: resource)

identifizierbarer Wert oder Maßnahme, der/die eine Anforderung erfüllt

BEISPIELE **Datensatz, Serie von Datensätzen, Dienst**, Dokument, Tätigkeit, Software, Person oder Organisation

4.17

Dienst

(en: service)

Komponente, die ihre Funktionen über **Schnittstellen** bereitstellt

[ISO 19119:2005, 4.1]

4.18

zeitliches Bezugssystem

(en: temporal reference system)

Bezugssystem, das sich an der Zeit misst

— Leerseite —

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Will supersede EN ISO 19115:2005

English Version

Geographic information —
Metadata —
Part 1: Fundamentals
(ISO/DIS 19115-1:2011)

Information géographique —
Métadonnées —
Partie 1: Principes fondamentaux
(ISO/DIS 19115-1:2011)

Geoinformation —
Metadaten
Teil 1: Grundsätze
(ISO/DIS 19115-1:2011)

This draft European Standard is submitted to CEN members for parallel enquiry. It has been drawn up by the Technical Committee CEN/TC 287.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

This draft European Standard was established by CEN in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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Foreword

This document (prEN ISO 19115-1:2011) has been prepared by Technical Committee ISO/TC 211 “Geographic information/Geomatics” in collaboration with Technical Committee CEN/TC 287 “Geographic Information” the secretariat of which is held by BSI.

This document is currently submitted to the parallel Enquiry.

This document will supersede EN ISO 19115:2005.

Endorsement notice

The text of ISO/DIS 19115-1:2011 has been approved by CEN as a prEN ISO 19115-1:2011 without any modification.

Introduction

Recent advancement of computer software and hardware for managing and analysing geospatial data has resulted in a vast increase in the use of digital geographic information and geographic information systems worldwide. The resulting awareness of the importance of geography and how things relate spatially is impacting almost all aspects of society. Increasingly, individuals from a wide range of disciplines outside of geographic information science and information technology are producing, enhancing, and modifying digital geographic information. As the number, complexity, and diversity of geographic information resources grow, a method for providing an understanding of all aspects of these resources grows in importance.

A digital geographic dataset is a representation of some model of the world for use in computer analysis and graphic display of information. The underlying model is an abstraction, requiring approximation, simplification, and omission of some aspects, and is always just one of many possible “views”. To ensure that data are not misused, the assumptions and limitations affecting the creation of data must be fully documented. Typically, data are used by many people other than the producer. Metadata allows a producer to describe resources so that users can understand the assumptions and limitations and evaluate the resources’ applicability for their intended use. Proper documentation will provide those unfamiliar with the data with a better understanding, and enable them to use it properly. Good quality documentation will also provide data producers with a keener knowledge of their holdings and will allow them to better manage data production, storage, updating, and reuse.

A geographic dataset is typically thought of as a structured, tabular data with a location associated with each row in a table or pixel in a grid. For the purposes of the evolving web-based information cloud, the concept of dataset can be usefully extended to include any packaged information product that is intended to be treated as a unit, defined by its scope, authorship, and intended purpose. In this broader view, any document containing geographically located observations or interpretations can be considered a geographic dataset, whether it is structured or unstructured.

The evolving distributed information system enabled by the internet is fostering the development of service-oriented architecture in which web services are becoming important as sources of information or processing capability, and many of these services provide location-based information or functionality. Description of these services for discovery and utilization has become an important function of metadata.

A significant body of geographically located information is contained in resources that may not be in digital form. These resources include maps and documents of various sorts, as well as specimens or other artefacts collected to characterize some aspect of the Earth — physical, biological, or cultural. The metadata schema presented in this International Standard is also applicable to such resources.

The objective of this International Standard is to provide a model for describing geographically located information resources. This International Standard is intended to be used by information system analysts, program planners, and developers of geographic information systems, as well as others in order to define basic principles and requirements for standardized description of geographic information resources. This International Standard defines metadata elements, their properties, and the relationships between elements, and establishes a common set of metadata terminology, definitions, and extension procedures.

Although the primary purpose of this International Standard is to describe digital geographic information it can be used to describe all types of resources including textual documents, activities, software, non-geographic information, product specifications and repositories.

When implemented by a resource provider, this International Standard will:

- 1) Enable information resource providers to characterize their resources effectively and completely.
- 2) Facilitate the organisation and management of metadata for information resources.

- 3) Enable appropriate use of information resources through accurate understanding of their characteristics.
- 4) Facilitate resource discovery, access, retrieval and reuse.
- 5) Enable users to determine whether an information resource will be of use to them.

This International Standard defines general-purpose metadata. More detailed models for some aspects of resource description, including quality, data-structure or imagery, are defined in other ISO geographic information standards. The model enables implementation of domain-specific user extensions based on a common pattern to facilitate implementation of software using those extensions.

This International Standard is a revision of ISO 19115:2003 and ISO 19115:2006/Cor 1:2005. This revision was driven by advances in Information Technology and a shift toward the use of the Internet for access, use, and management of metadata as well as revisions to reference documents and individual provided suggestions based on 8 years of experience in its use.

This International Standard is fully independent from the previous version with a new name and date. Its UML packages, classes, and elements have different GUIDs from the previous version. The UML from ISO 19115:2003/Cor 1:2006 will remain available in the ISO/TC 211 Harmonized Model Management Group repository. Backward compatibility is to be provided using a transformation service. Past metadata instances may continue to reference/use the previous version.

To aid in ensuring backward compatibility and ease the transformation of metadata instances to this revised International Standard:

- No new mandatory elements were used;
- If the definition of a metadata element required changing it was instead deleted and replaced by a new metadata element; metadata element names were not reused for other concepts;
- Definitions of some metadata elements were broadened;
- Metadata elements were reused when their datatype changed but name and definition remained the same;
- Remaining attributes were kept in the same order as in the replaced standard;
- A list of deleted elements, new elements and a mapping between old elements and their replacement is provided in Annex H;
- Refactoring of the UML was kept to a minimum.

Summary of major changes:

- The concept of “Core metadata” was removed;
- Metadata for services was added, derived from ISO 19119:2005 and ISO/COR 19119:2008;
- Data quality was moved to ISO 19157;
- An annex describing metadata for the discovery of service and non-service resources was added;
- Many codelists were extended;
- The use of “Short name” and “Domain code” was dropped for metadata elements and codes respectively.

A full description of changes is provided in Annex H.

1 Scope

This International Standard defines the schema required for describing geographic information and services by means of metadata. It provides information about the identification, the extent, the quality, the spatial and temporal aspects, the content, the spatial reference, the portrayal, distribution, and other properties of digital geographic data and services.

This International Standard is applicable to:

- the cataloguing of all types of resources, clearinghouse activities, and the full description of datasets and services;
- geographic services, geographic datasets, dataset series, and individual geographic features and feature properties.

This International Standard defines:

- mandatory and conditional metadata sections, metadata entities, and metadata elements;
- the minimum set of metadata required to serve the full range of metadata applications (data discovery, determining data fitness for use, data access, data transfer, and use of digital data and services);
- optional metadata elements – to allow for a more extensive standard description of resources, if required;
- a method for extending metadata to fit specialized needs.

Though this International Standard is applicable to digital data and services, its principles can be extended to many other types of resources such as maps, charts, and textual documents as well as non-geographic data. Certain conditional metadata elements may not apply to these other forms of data.

2 Conformance

2.1 Conformance requirements

Any metadata claiming conformance with this International Standard shall pass the requirements described in the abstract test suite presented in Annex A

Metadata shall be provided as specified in Clause 6 and Annex B.

If a discrepancy exists between Clause 6 (the UML models) and Annex B, the UML models shall be considered authoritative.

User-defined metadata shall be defined and provided as specified in Annex C.

Any profile conforming to this International Standard shall conform to the rules in C.6.

2.2 Abstract test suite

For the purposes of conformance testing using the abstract test suite in Annex A, metadata classes and elements shall be considered to be mandatory, conditional or optional as specified in the applicable profile.

3 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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 8859 (parts 1 to 16), *Information technology — 8 bit single byte coded graphic character sets*

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

ISO 8879, *Information processing — Text and office systems — Standard Generalized Markup Language (SGML)*

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

ISO 19101:2002, *Geographic information — Reference model*

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 19115-2:2009, *Geographic information — Metadata – Part 2: Extensions for imagery and gridded data*

ISO 19119:2005 Amd 1: 2008, *Geographic information — Services (this will be updated when new 19119 is produced)*

ISO 19123:2005, *Geographic information — Schema for coverage geometry and functions*

ISO/TS 19139:2007, *Geographic information — Metadata – XML schema implementation*

ISO 19157:—¹⁾, *Geographic information — Data Quality*

1) To be published.

4 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

NOTE The terms and definitions used in conjunction with the UML models are addressed in ISO/TS 19103:2005.

4.1

citation

reference to a book, article or other source

[ISO 12620:1999, B.9]

4.2

data type

specification of a value domain with **operations** allowed on values in this domain

[ISO/TS 19103:2005, 4.1.5]

EXAMPLES Integer, Real, Boolean, String, Date, and GM_Point.

NOTE A data type is identified by a term, e.g. Integer.

4.3

dataset

identifiable collection of data

NOTE A dataset may be a smaller grouping of data which, though limited by some constraint such as spatial extent or feature type, is located physically within a larger dataset. Theoretically, a dataset may be as small as a single **feature** or feature attribute contained within a larger dataset. A hardcopy map or chart may be considered a dataset.

4.4

dataset series

collection of **datasets** sharing common characteristics

4.5

feature

abstraction of real world phenomena

[19101:2002, 4.11]

4.6

grid

network composed of two or more sets of curves in which the members of each set intersect the members of the other sets in an algorithmic way

[ISO 19123:2005, 4.1.23]

4.7

interface

named set of **operations** that characterizes the behaviour of an entity

[ISO 19119:2005, 4.2]

4.8

lineage

provenance, source and creation process for a **resource**

4.9

metadata

data describing **resources**

4.10

metadata element

discrete unit of **metadata**

NOTE 1 Metadata elements are unique within a metadata class.

NOTE 2 Equivalent to an attribute and/or an association in UML terminology.

NOTE 3 Class attributes and relationships are referred to collectively as metadata elements

4.11

metadata entity

set of **metadata** elements describing the same aspect of data

NOTE 1 May contain one or more metadata entities.

NOTE 2 Equivalent to a class in UML terminology.

4.12

metadata section

subset of **metadata** which consists of a collection of related **metadata entities** and **metadata elements**

NOTE Equivalent to a package in UML terminology.

4.13

model

abstraction of some aspects of reality

[ISO 19109:2005, 4,14]

4.14

operation

specification of a transformation or query that an object may be called to execute

[ISO 19119:2005, 4.3]

NOTE An operation has a name and a list of parameters.

4.15

provenance

organization or individual that created, accumulated, maintained and used records [ISO 5127:2001]

4.16

resource

identifiable asset or means that fulfils a requirement

EXAMPLES **Dataset, dataset series, service**, document, activity, software, person or organisation.

4.17

service

distinct part of the functionality that is provided by an entity through **interfaces**

[ISO 19119:2005, 4.1]

4.18

temporal reference system

reference system against which time is measured

[ISO 19108:2002, 4.1.35]

5 Symbols and abbreviated terms

5.1 Abbreviations

OCL	Object Constraint Language
OGC	Open Geospatial Consortium
UML	Unified Modelling Language
XML	Extensible Markup Language

5.2 Package abbreviations

Two letter abbreviations are used to denote the package that contains a class. Those abbreviations precede class names, connected by a “_”. The standard that those classes are located in is indicated in parentheses. A list of those abbreviations follows.

CI	Citation (ISO 19115-1)
DQ	Data quality (ISO 19157)
DS	Dataset (ISO 19115)
EX	Extent (ISO 19115)
FC	Feature Catalogue (ISO 19110)
GF	General Feature (ISO 19109)
GM	Geometry (ISO 19107)
LI	Lineage (ISO 19115)
LE	Lineage extended (ISO19115-2)
MD	Metadata (ISO 19115)
PT	Polylinguistic Text (ISO/TS 19103)
RS	Reference System (ISO 19115)
SC	Spatial Coordinates (ISO 19111)
SV	Services (ISO 19119 and ISO 19115)
TM	Temporal (ISO 19108)

6 Metadata Requirements

6.1 Metadata for Resources

This International Standard identifies the metadata required to describe all types of resources. Metadata is applicable to: collections of resources and their components, (e.g. series); datasets and their components (e.g. feature and feature property types); software; hardware; services; non-geographic datasets; and other types of resources. Metadata shall be provided for geographic datasets and may, optionally, be provided for other types of resources.

6.2 Metadata application information

Figure 1 is a Unified Modelling Language (UML) class diagram defining the classes of information to which metadata applies. It specifies that a resource (DS_Resource) and aggregations of resources must have one or more related Metadata sets (MD_Metadata). Metadata may optionally relate to a Feature, Feature Attribute, Feature Type, Feature Property Type (Metaclass' instantiated by Feature association role, Feature attribute type, and Feature operation). The method for relating metadata to feature and attribute instances is defined in ISO 19109. A dataset (DS_Dataset), DS_Aggregate, and a service (SV_Service) are specializations (subtypes) of a resource (DS_Resource). Resource aggregations may be specified (subclassed) as a general association (DS_OtherAggregate), a dataset series (DS_Series), or a specific activity (DS_Initiative). DS_StereoMate is an example of a specialized class of DS_OtherAggregate. Aggregate resources which are specified (subtyped) as a series (DS_Series) are related by the fact that they have a common heritage, e.g. they may be datasets that have been derived from the same sensor (DS_Sensor), platform (DS_Platform) or adhere to a common production specification (DS_ProductionSeries). MD_Metadata applies to a wide variety of resources and services which are specified in MD_ScopeCode (B.5.24). The data dictionary for this model is located in B.2.1

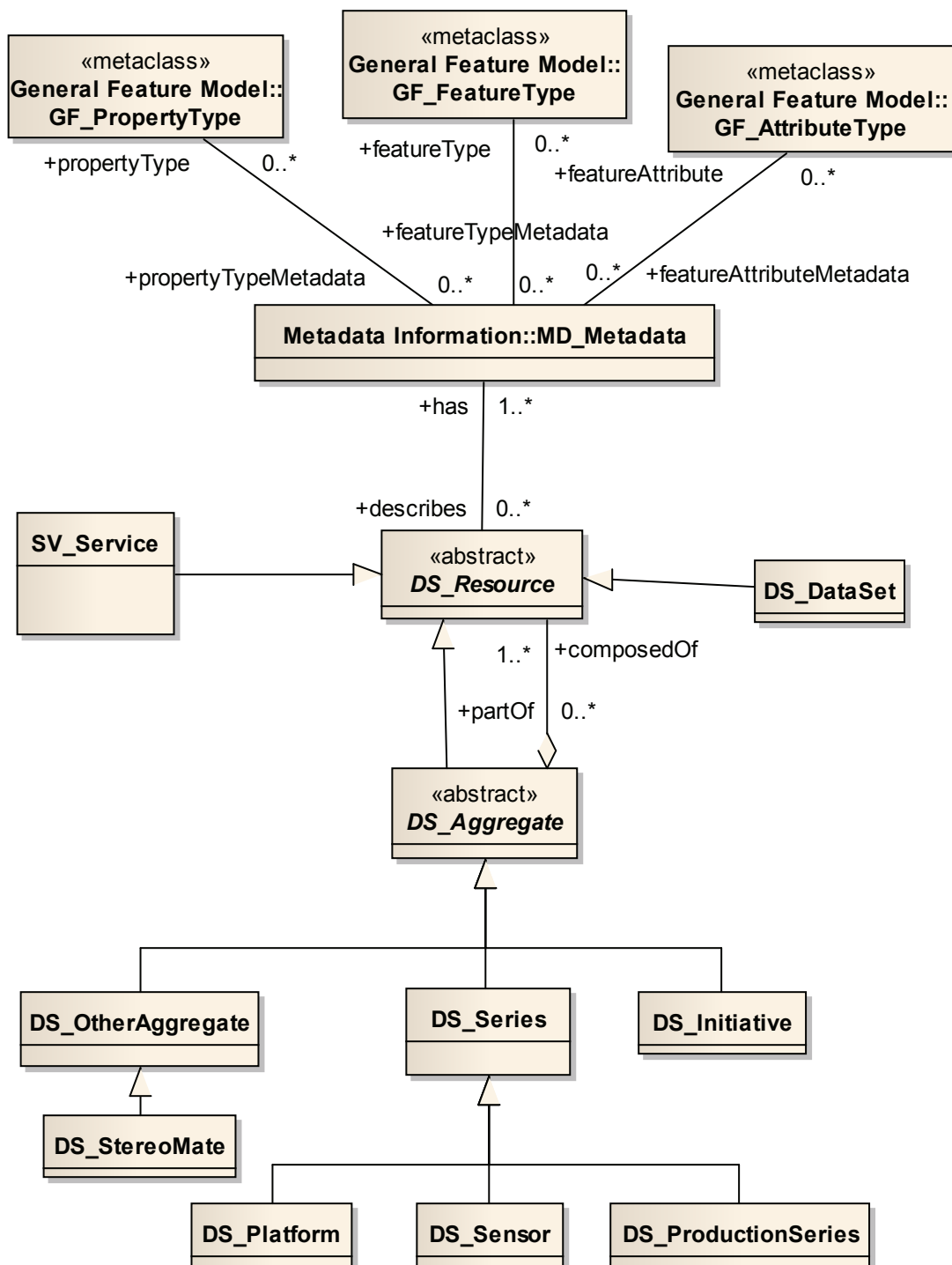


Figure 1 — Metadata application

6.3 Metadata fundamentals packages and dependencies

The suite of ISO 19100 series of standards are defined using one or more UML packages and are maintained in a single integrated UML model. This International Standard utilizes concepts defined in several of these other standard's packages. Figure 2 illustrates the ISO/TC 211 packages required and their relationships to this International Standard. Metadata-Fundamentals are defined and provided by one or more packages; each package provides a separate component of metadata information. There are 13 packages that are used to define and provide metadata: Metadata information, Identification information, Constraint information, Lineage information, Content information, Distribution information, Reference system information, Spatial representation information, Portrayal catalogue information, Metadata application information, Application Schema information, Metadata extension information, and Service metadata information. There are 3 packages: Citation information, Responsible party information, and Extent information which are used by other packages. Individual packages may be used alone to provide separate components of metadata 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. The additional packages shall be added when providing supplementary metadata.

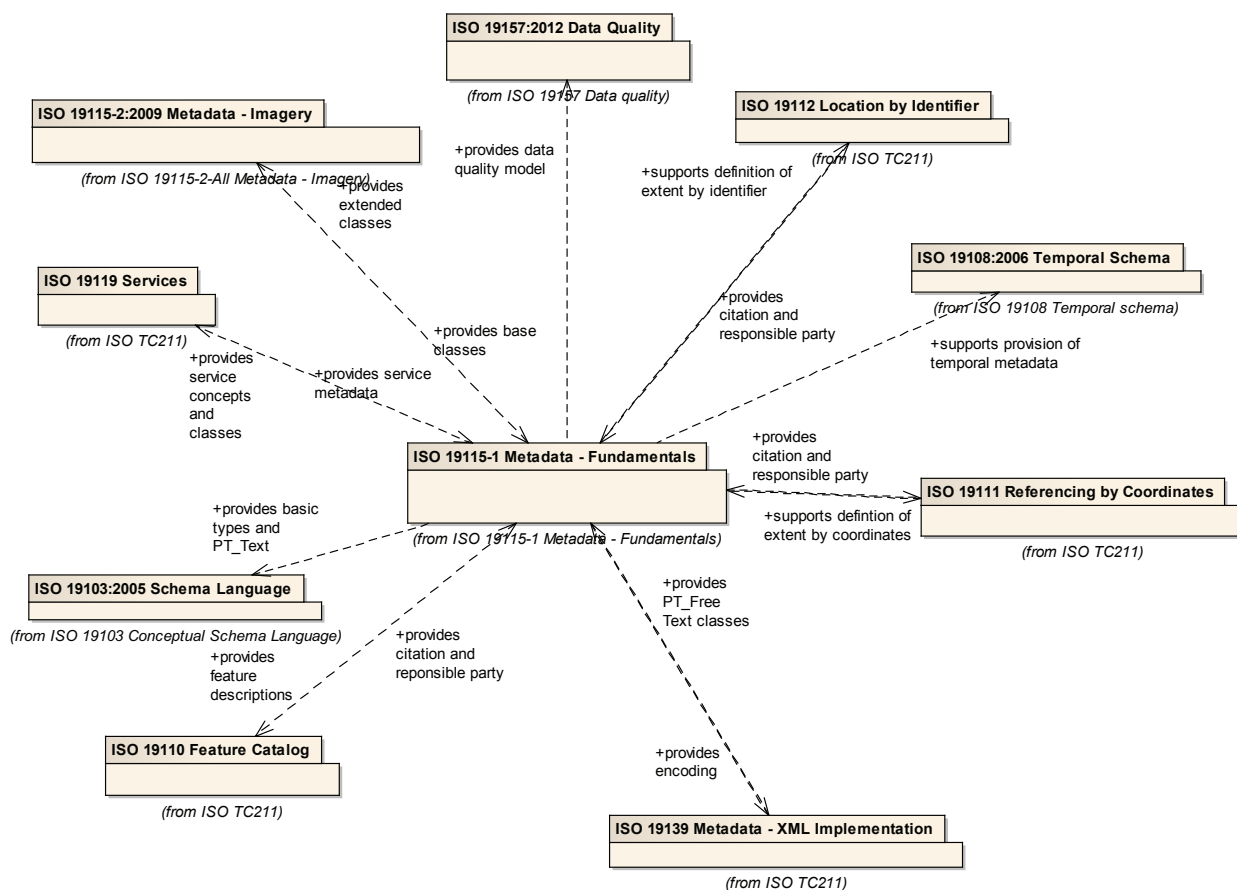


Figure 2 — Metadata fundamentals package and dependencies

6.4 Citation and responsible party, Metadata application information, and Extent information package relationships

Three packages; Citation and responsible party information, Extent information and Metadata application information are used by the other packages when providing metadata (Figure 3.).

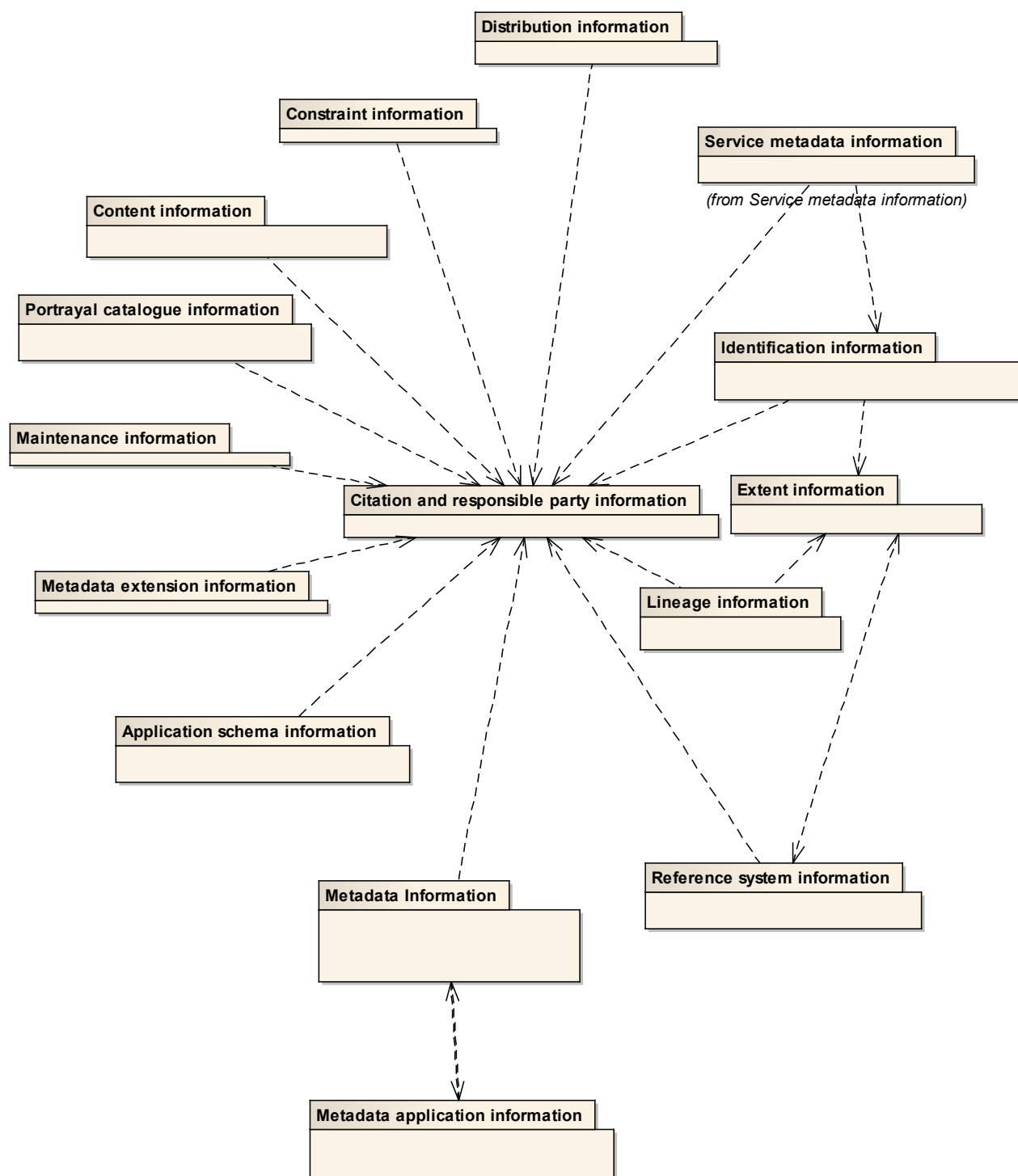


Figure 3 — Citation and responsible party information, Metadata application information, and Extent information package relationships

6.5 Resource metadata class diagrams by package

6.5.1 Introduction

Metadata is composed of one or more metadata packages containing one or more metadata classes containing attributes. The relationships between metadata packages and between metadata classes are specified by composition and aggregation relationship symbols. Class attributes and relationships are referred to collectively as metadata elements. The diagrams in the following subclauses provide “views,” which are portions of the total abstract model for metadata. Each diagram defines a metadata UML package of related classes, elements, data types, and code lists. Related classes, which are defined in another diagram, are shown with attributes suppressed and the package where they are fully specified identified by the package name proceeding a double colon (::). The metadata is fully specified by the UML model diagrams and an associated data dictionary for each package in Annex B. Abstract classes (which are classes which are defined for schematic organisation purposes – i.e. only their subclasses are implemented) are identified with their names in italic.

NOTE In some cases, optional classes may have mandatory elements; those elements become mandatory only if the optional element is used.

6.5.2 Metadata information (MD_Metadata)

6.5.2.1 General

The MD_Metadata package defines the schema for describing the complete metadata about a resource and metadata about the metadata itself. The data dictionary for this diagram is located in B.2.2.

6.5.2.2 Metadata schema

Metadata describes a resource (DS_Resource). 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 MD_Metadata class contains attributes providing information about the metadata as specified in Figure 5.

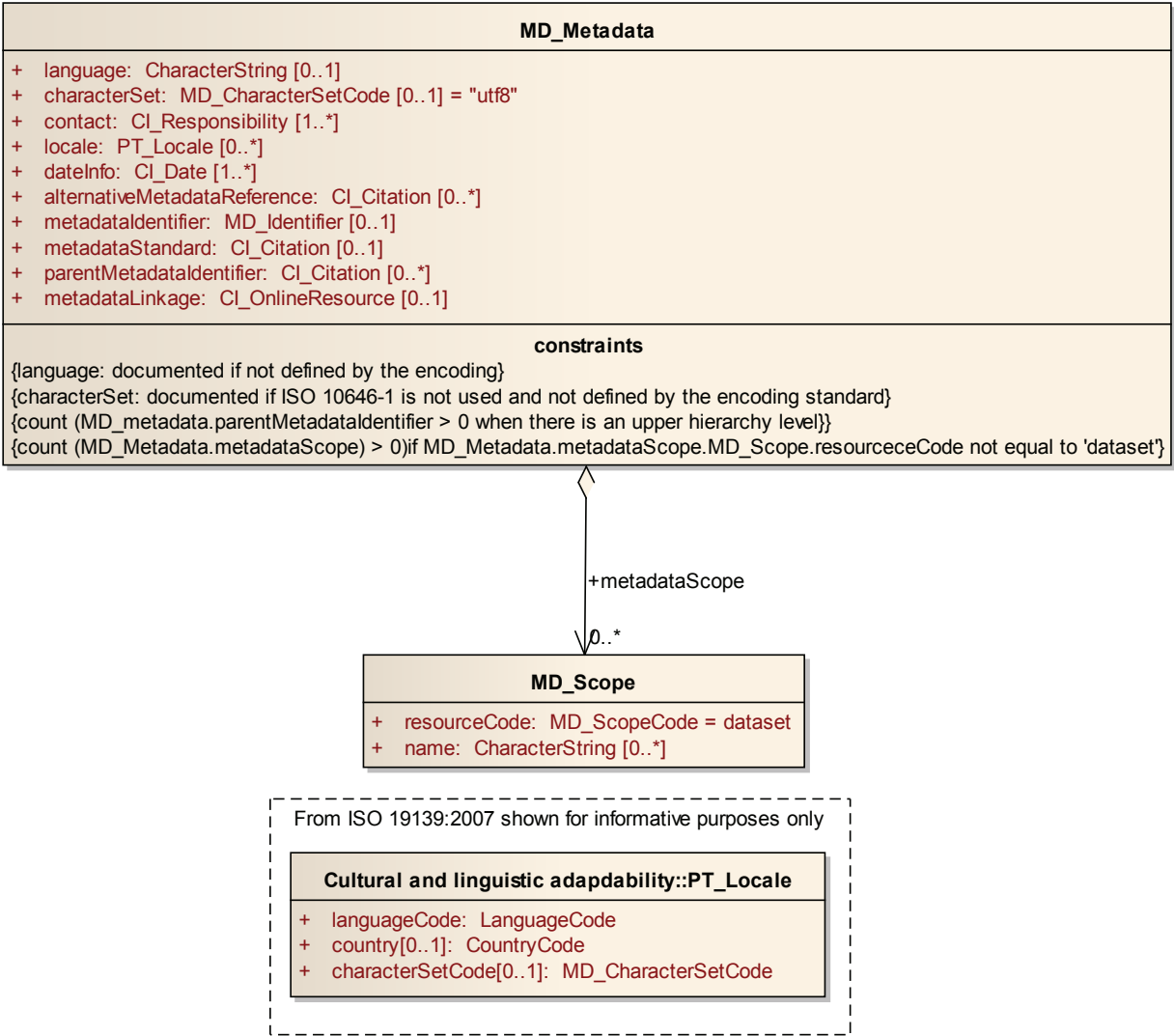


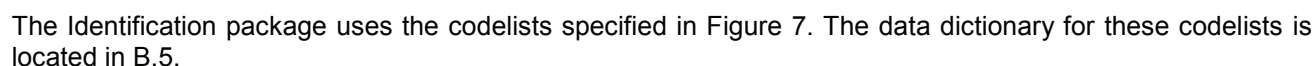
Figure 5 — Metadata on metadata classes

6.5.3 Identification information (MD_Identification)

6.5.3.1 General

Identification information supports the provision of information to uniquely identify a resource. MD_Identification can be specified as MD_DataIdentification or SV_ServiceIdentification and is an aggregate of seven classes of metadata which aid in resource identification. The full package is specified in Figure 6. The data dictionary for this diagram is located in B.2.3.

6.5.3.3 Identification information codelists



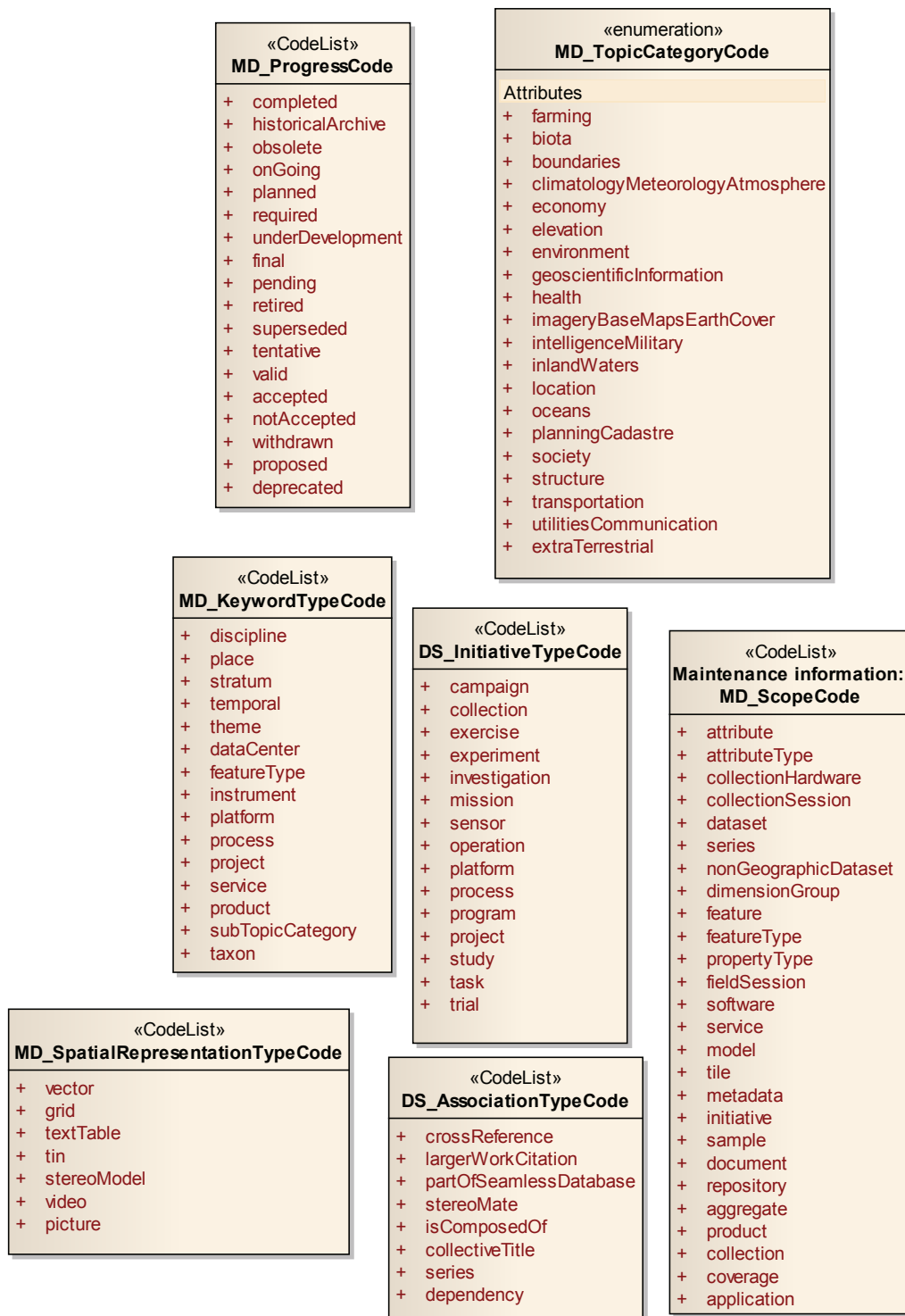


Figure 7 — Identification information codelists

6.5.4 Constraint information (MD_Constraints)

This package supports the provision of metadata concerning the legal and security constraints placed on resources and metadata about resources. It consists of MD_Constraints which can also be specified as

MD_LegalConstraints and/or MD_SecurityConstraints. The full package is specified in Figure 8. The data dictionary for this diagram is located in B.2.4

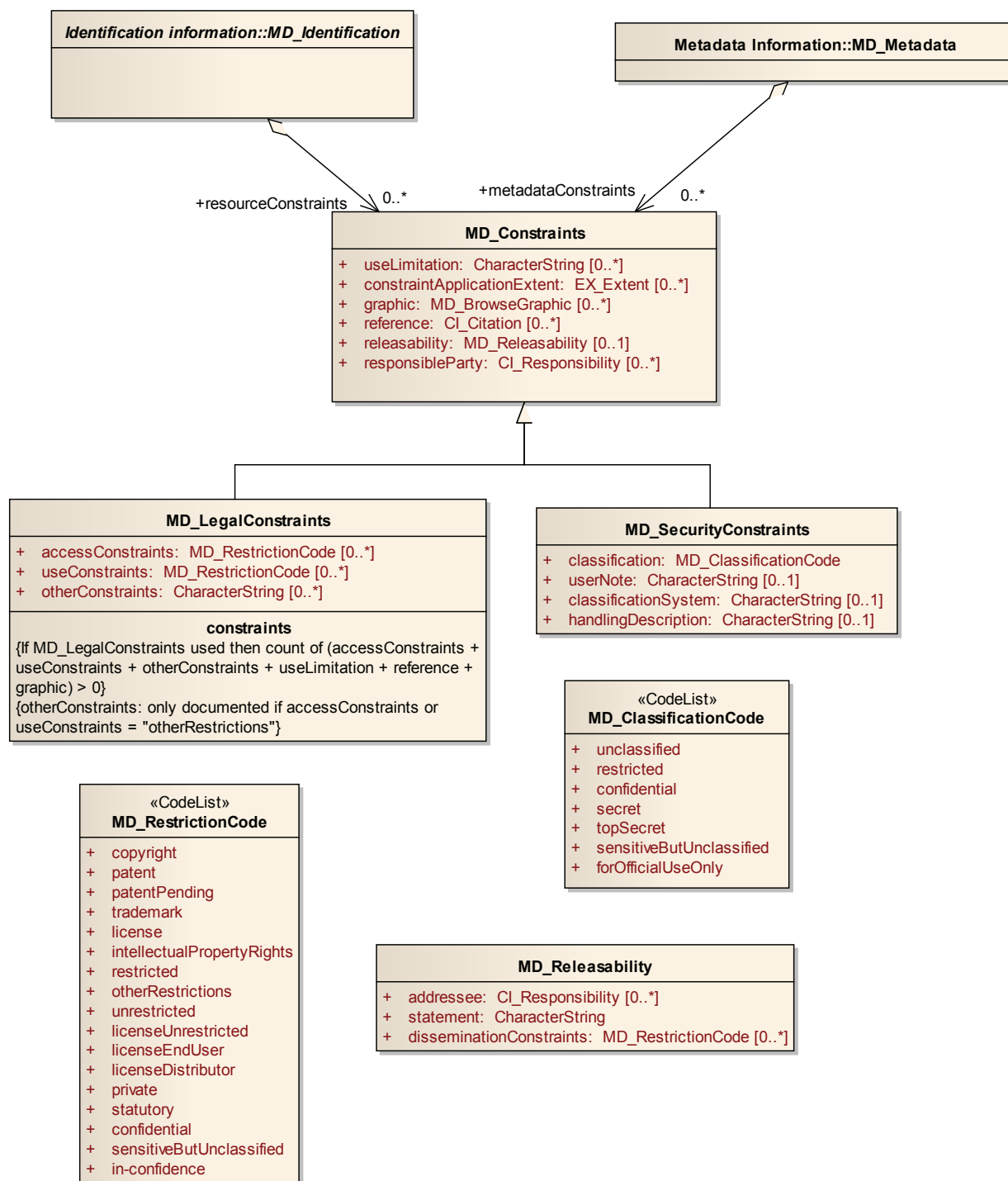


Figure 8 — Constraint information classes

6.5.5 Lineage information (LI_Lineage)

This package supports the provision of metadata concerning the sources and production processes used in producing a resource. LI_Lineage is an aggregate of two classes LI_Source, LI_ProcessStep. The full

package is specified in Figure 9. The classes with the suffix “LE” are defined in ISO 19115-2 and are shown here for reference and to provide a complete view of the lineage model. The data dictionary for this diagram is located in B.2.5.

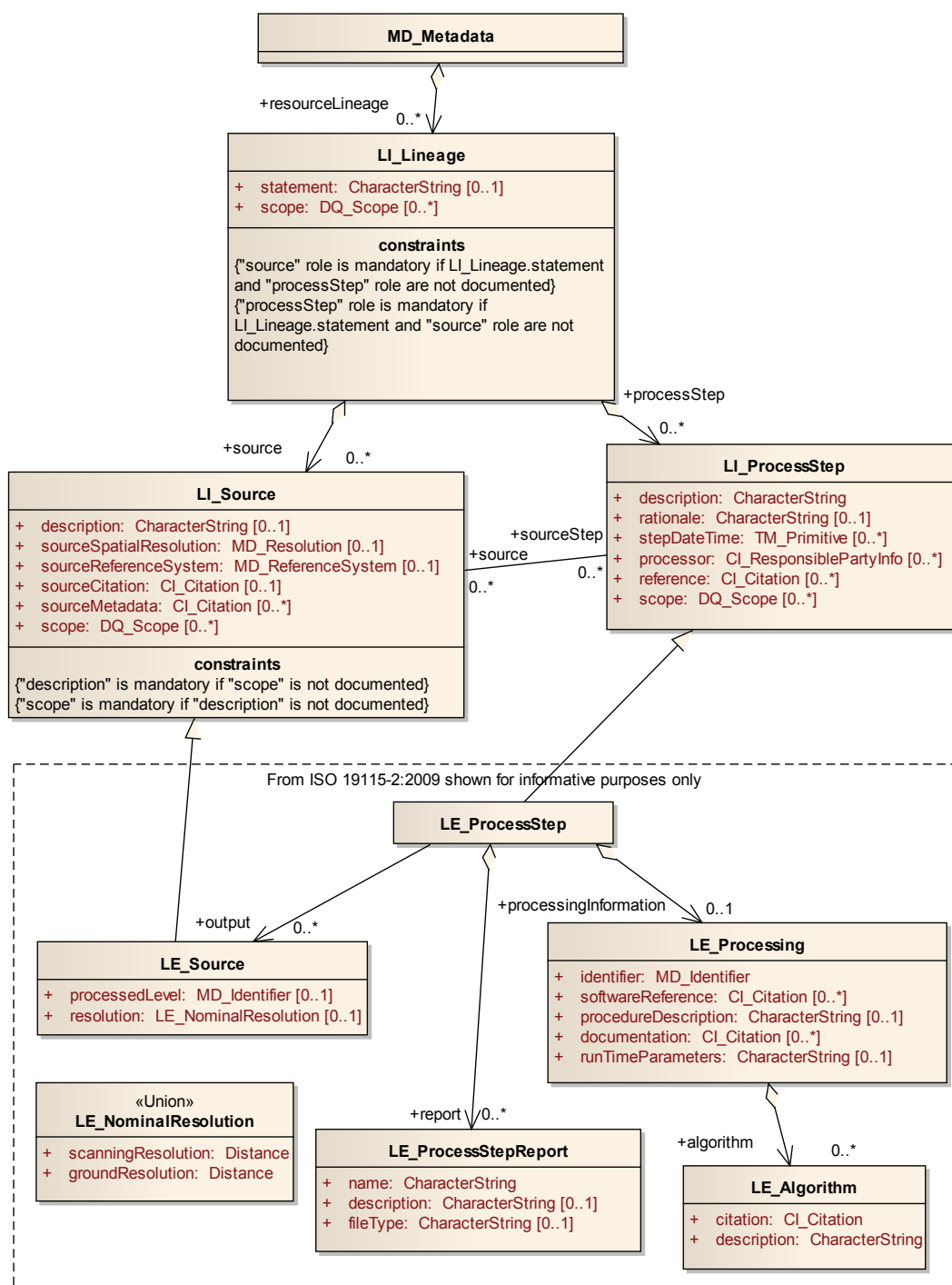
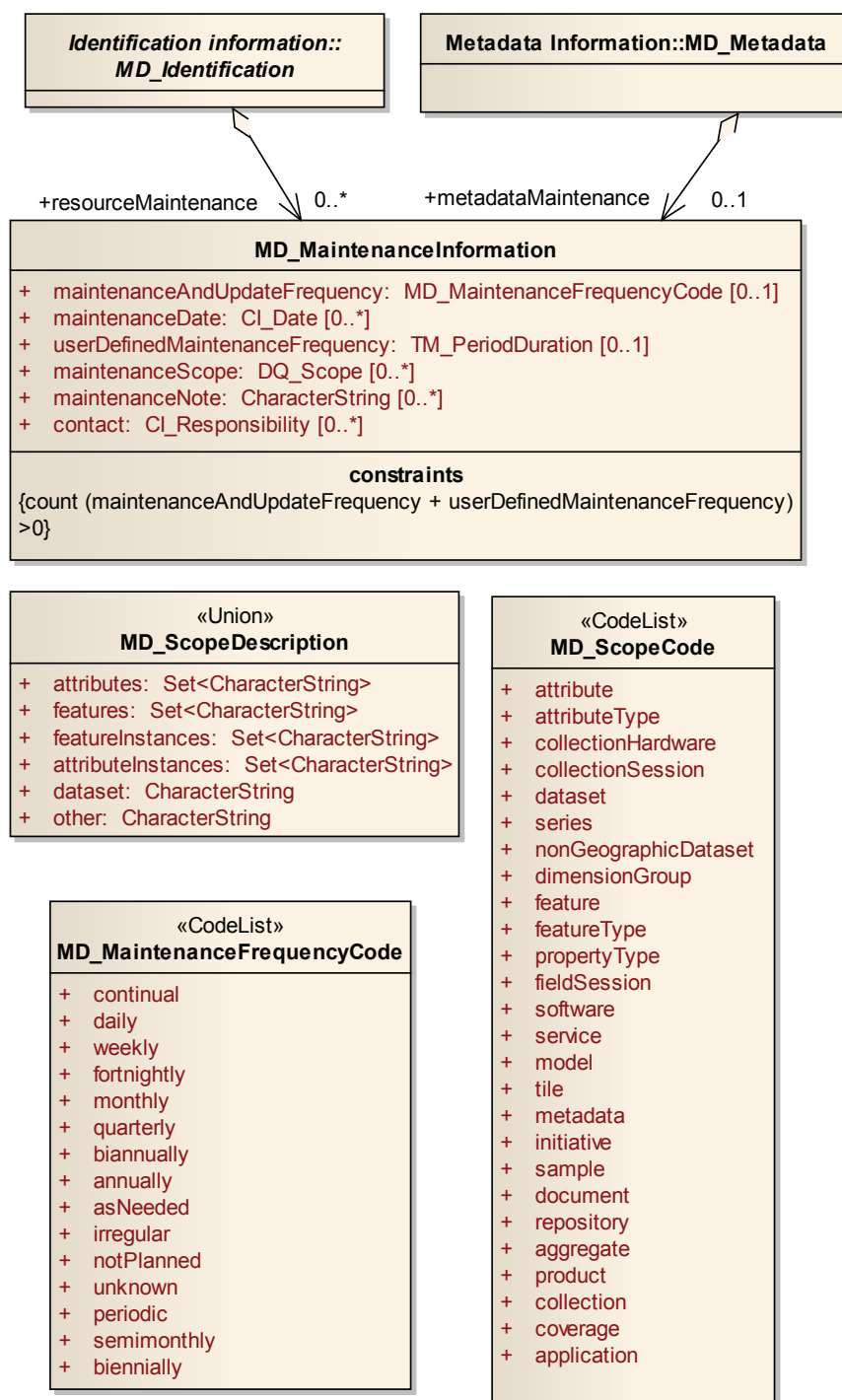


Figure 9 — Lineage information classes

6.5.6 Maintenance information (MD_MaintenanceInformation)

This package supports the provision of metadata related to the scope and frequency of maintenance for a resource and metadata about a resource – MD_MaintenanceInformation. The full package is specified in Figure 10. The data dictionary for this diagram is located in B.2.6.

**Figure 10 — Maintenance information classes**

6.5.7 Spatial representation information (MD_SpatialRepresentation)

This package supports the provision of metadata identifying the spatial primitives used by a resource and the mechanisms used to model real world phenomena in a digital information system. It consists of the MD_SpatialRepresentation which can be specified as either MD_VectorSpatialRepresentation or MD_GridSpatialRepresentation. MD_GridSpatialRepresentation can be further specified as MD_Georectified or MD_Georeferenceable. The full package is specified in Figure 11. The data dictionary for this diagram is located in B.2.7.

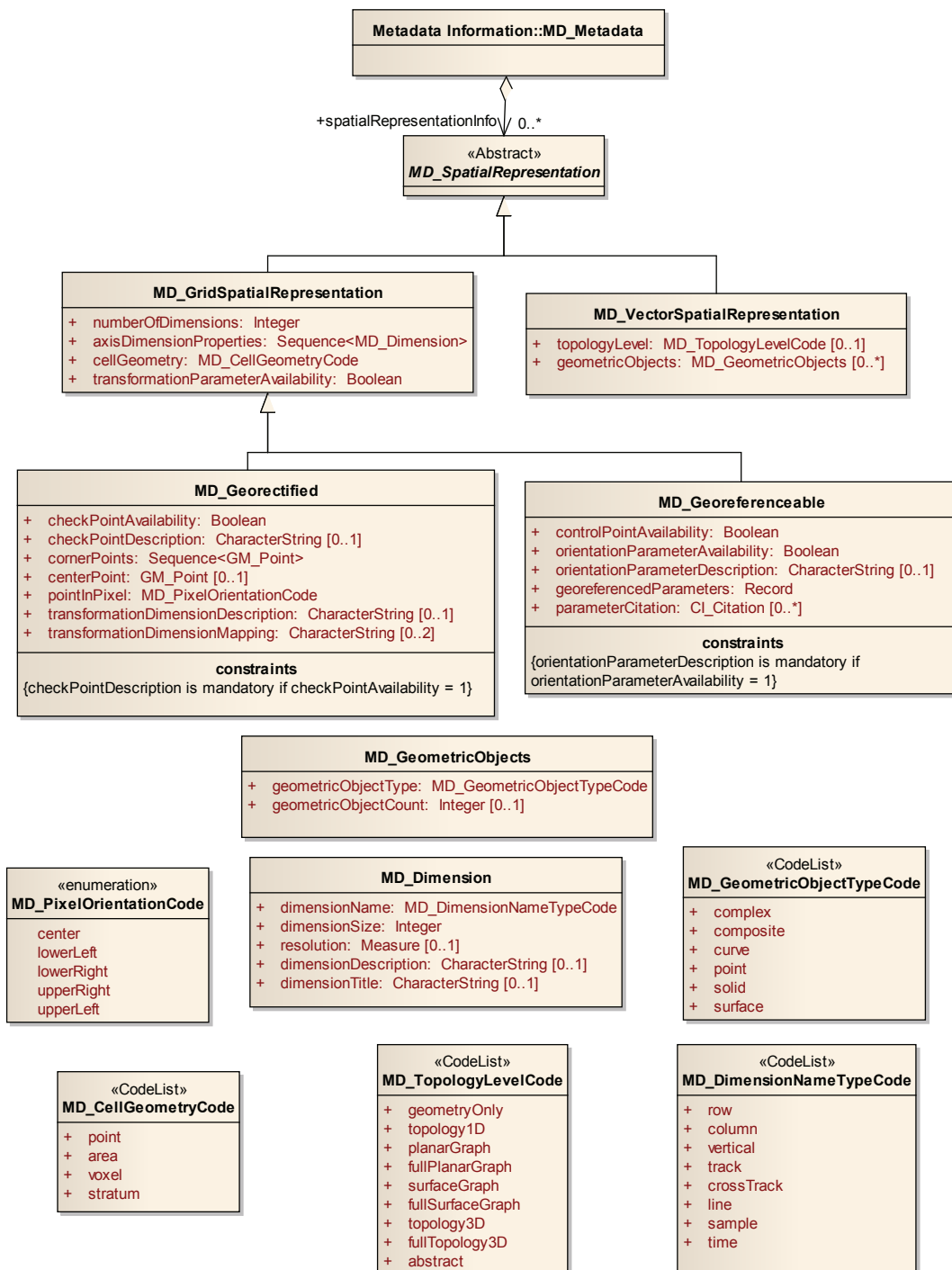


Figure 11 — Spatial representation information classes

6.5.8 Reference system information (MD_ReferenceSystem)

This package supports the metadata identifying the spatial and temporal reference system(s) used by a resource – MD_ReferenceSystem. The full package is specified in Figure 12. The data dictionary for this diagram is located in B.2.8.

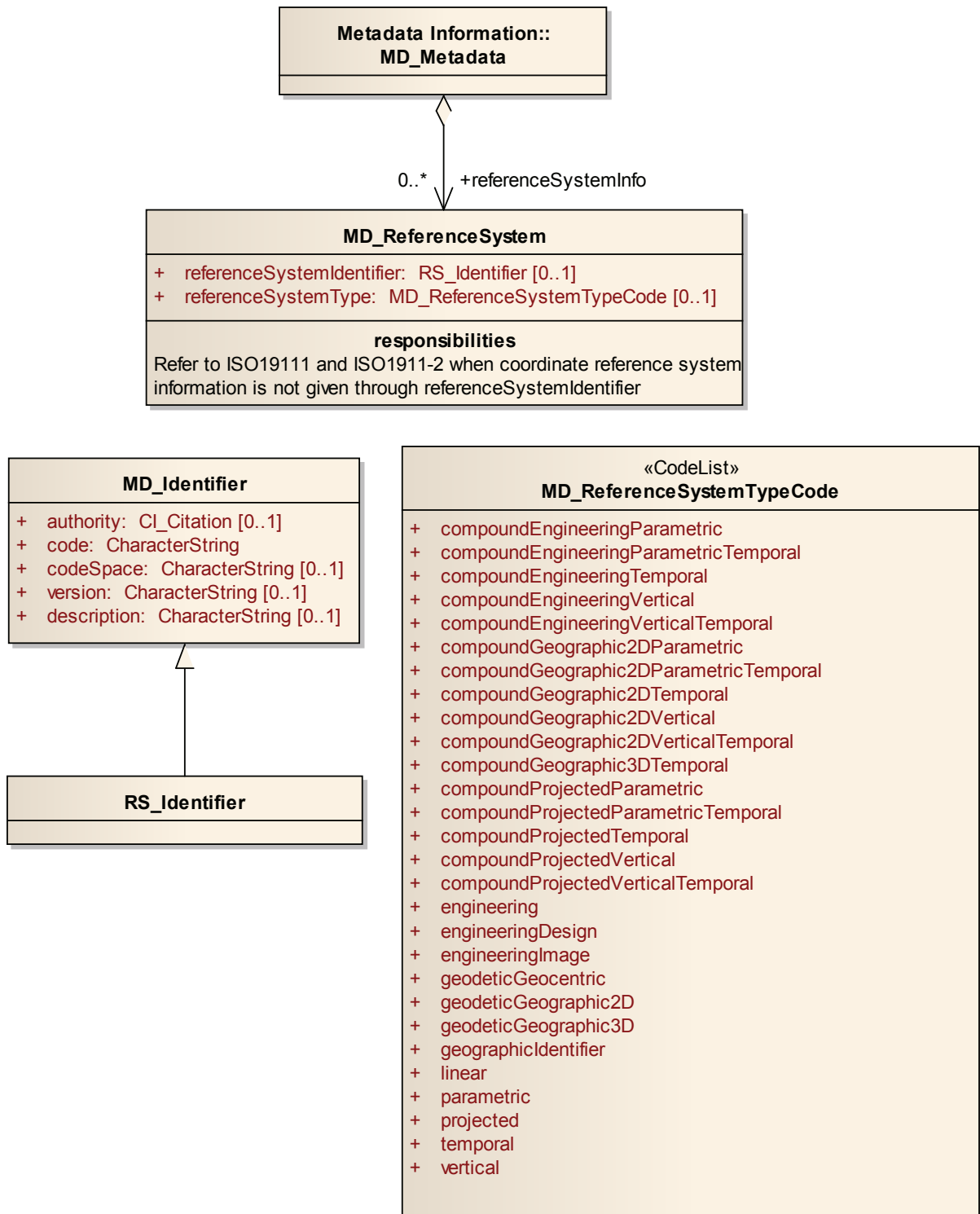


Figure 12 — Reference system information classes

6.5.9 Content information (MD_ContentInformation)

This package supports the provision of metadata identifying the content of a resource by: citing the feature catalogue used to define the content (MD_FeatureCatalogueDescription); incorporating the feature catalogue (MD_FeatureCatalogue – defined in ISO 19110); or describing the content of a coverage resource (MD_CoverageDescription) which also may be specified as MD_ImageDescription. The full package is specified in Figure 13. The data dictionary for this diagram is located in B.2.9.

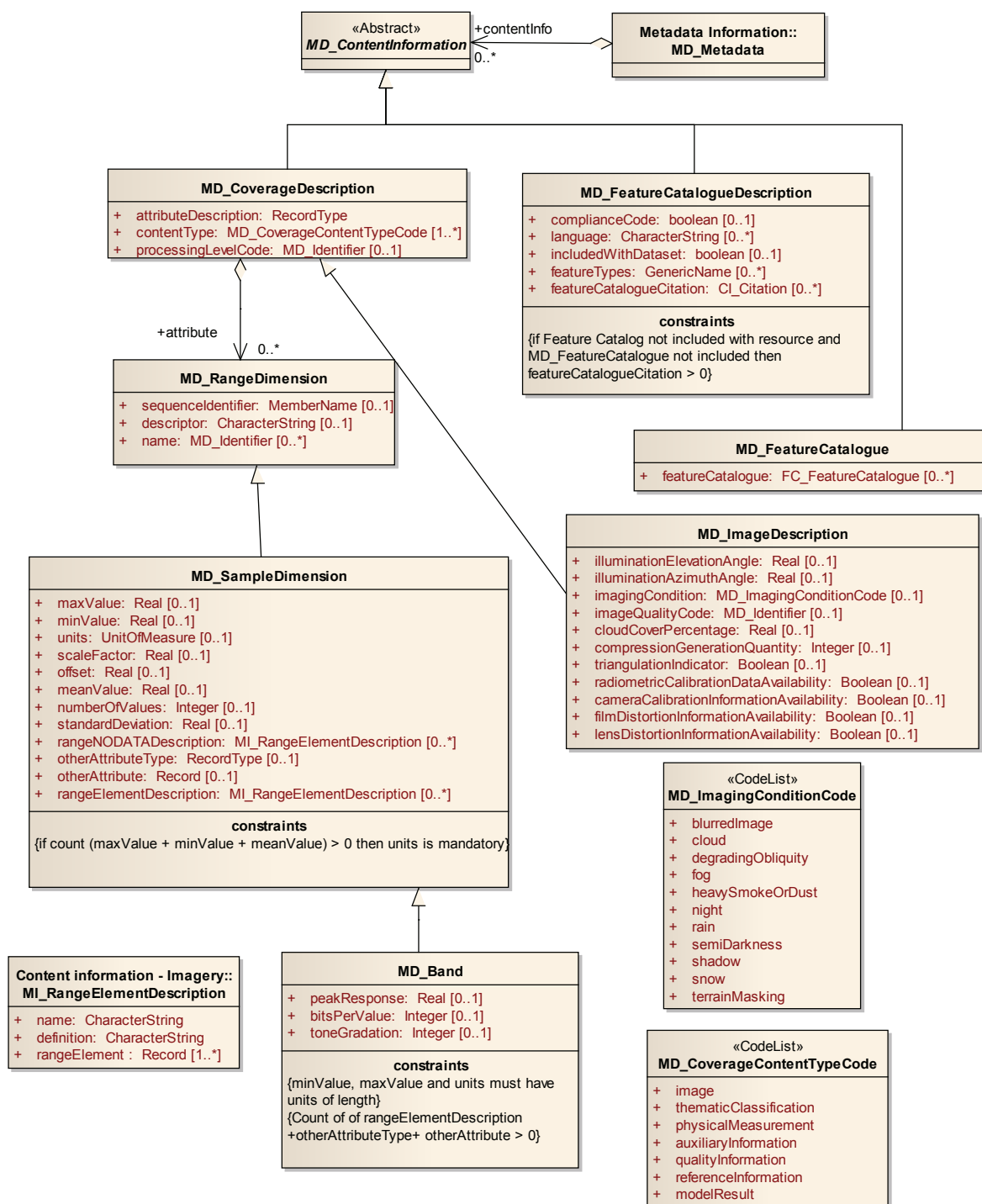


Figure 13 — Content information classes

6.5.10 Portrayal catalogue information (MD_PortrayalCatalogueReference)

This package supports the provision of metadata identifying the portrayal catalogue used. The portrayal catalogue describes how the resource can be rendered for human visualisation. The full package is specified in Figure 14. The data dictionary for this diagram is located in B.2.10.

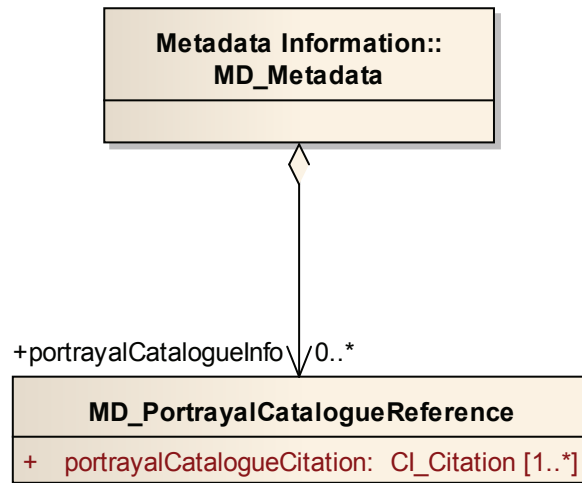


Figure 14 — Portrayal catalogue information classes

6.5.11 Distribution information (MD_Distribution)

This package supports the provision of metadata about the distributor of, and options for obtaining, a resource. MD_Distribution is an aggregate of three additional classes. The full package is specified in Figure 15. The data dictionary for this diagram is located in B.2.11.

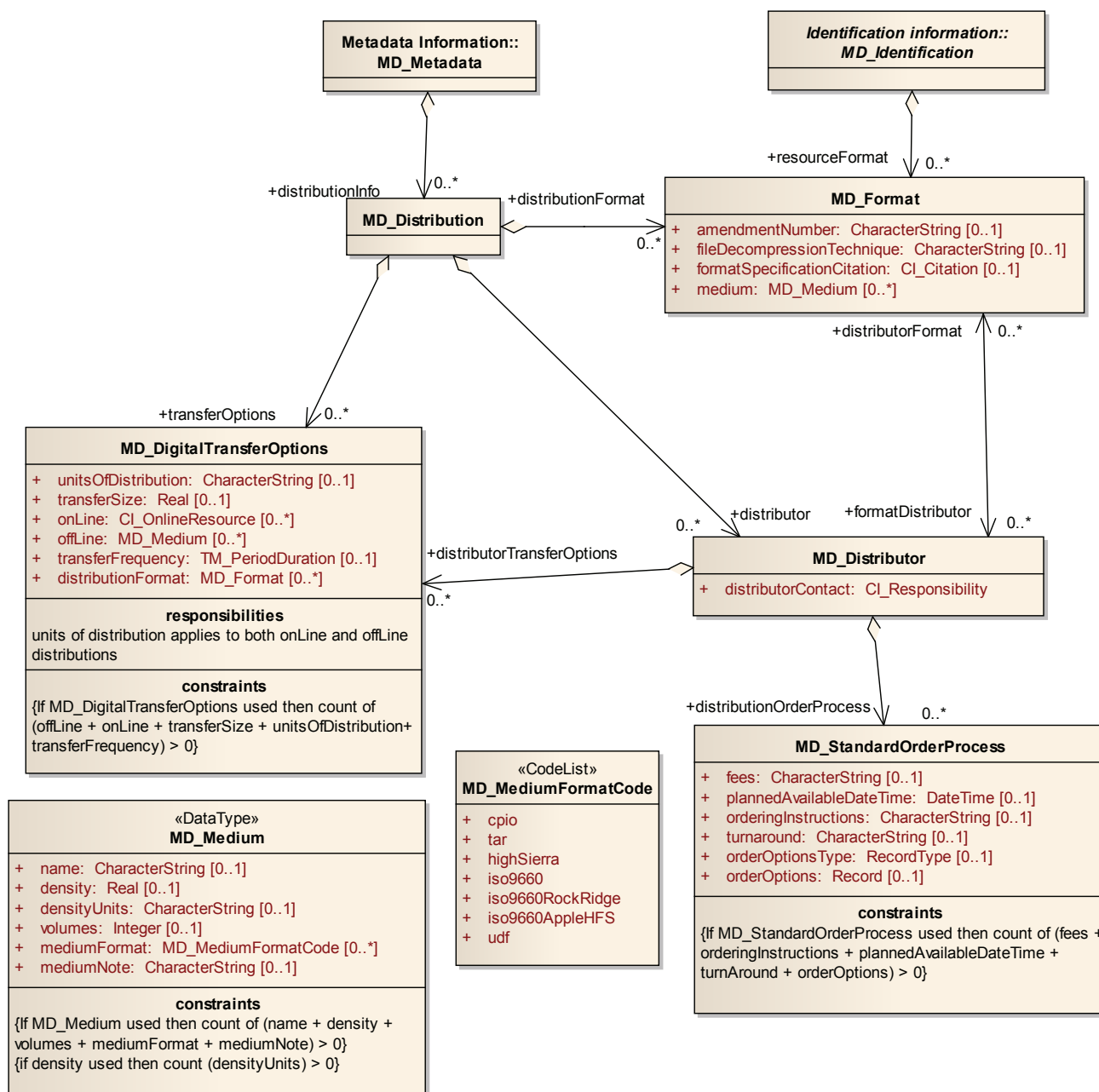


Figure 15 — Distribution information classes

6.5.12 Metadata extension information (MD_MetadataExtensionInformation)

This package supports the provision of information about user specified metadata extensions. MD_MetadataExtensionInformation is an aggregate of one other class. The full package is specified in Figure 16. The data dictionary for this diagram is located in B.2.12.

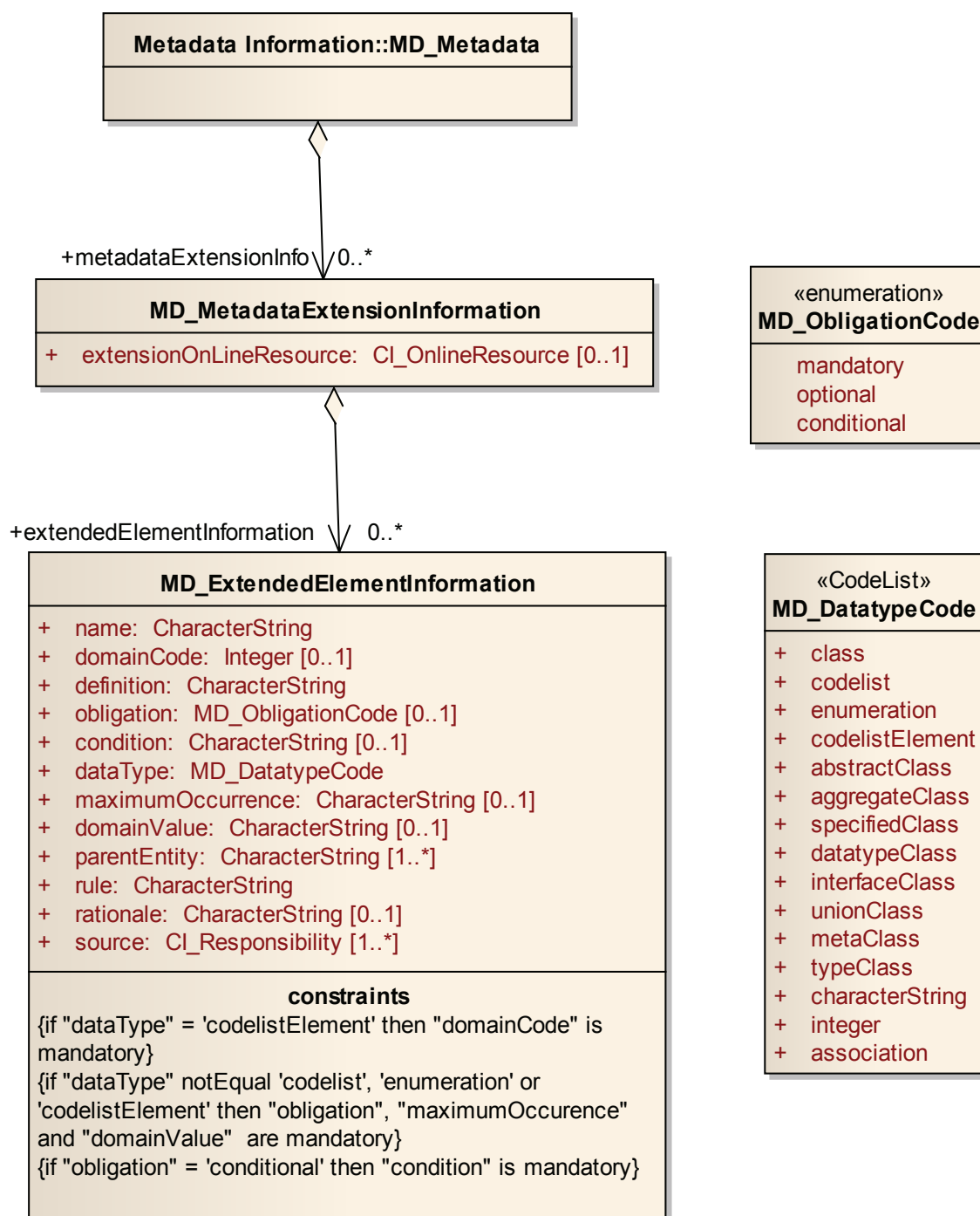


Figure 16 — Metadata extension information classes

6.5.13 Application schema information (MD_ApplicationSchemaInformation)

This package supports the provision of metadata describing the application schema used to define and expose the structure of a resource. The application schema is the model and/or data dictionary that represents the resource. MD_ApplicationSchemaInformation is specified in Figure 17. The data dictionary for this diagram is located in B.2.13.

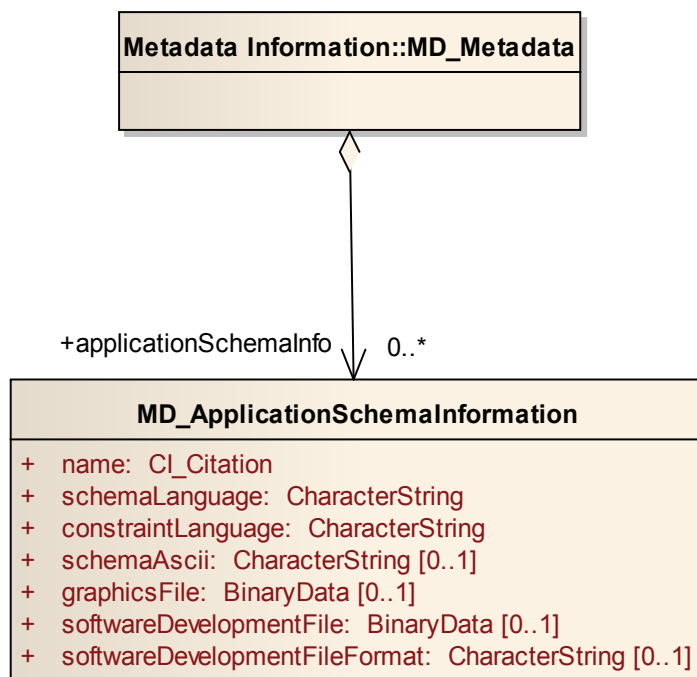


Figure 17 — Application schema information classes

6.5.14 Service metadata information

This package contains metadata about services. The structure of service metadata includes three major classes: a section of basic **service** metadata (SV_ServiceIdentification class) that provides a general description of the functionality provided by the service and two sections that describe the **operations** (SV_OperationMetadata) and **data** (MD_DataIdentification) available from a particular service.

SV_ServiceIdentification has an aggregation relationship with multiple instances of SV_OperationMetadata. While it is known that the service structure may be more complicated than this aggregation, the additional detail of services-aggregating services is not needed in a service metadata record.

A service instance may be either tightly coupled with a dataset instance, loosely coupled (i.e. non associated with specific dataset instances), or it may be “mixed coupled.”

- In the tightly coupled case, the service metadata shall describe both the service and the geographic dataset. The permitted values for the description of operations shall be constrained by the values defined by the datasets associated with the service.
- Loosely coupled services may have an association with data types through the service type definition (SV_ServiceIdentification.serviceType). Dataset metadata need not be provided in the service metadata for the loosely coupled case (ie operatedDataset:CI_Citation or operatesOn:MD_DataIdentification optional).
- A single service instance may be associated to both kinds of data associated, loosely and tightly coupled. This is the case of “mixed coupled” instance. The coupling type is specified from the SV_CouplingType codelist, which includes {tight, loose, mixed}.

The class SV_CoupledResource enables the description of the link between an operation, and the data on which it is based. This class requires that a given operation, resource and scopedName shall refer respectively to an existing operation (instance of SV_OperationMetadata), a resource metadata (instance of

MD_DataIdentification or a CI_Citation), and a scopedName providing the name of the data in the context of the operation. The full service metadata package is specified in Figure 18. The data dictionary for this diagram is located in B.2.14.

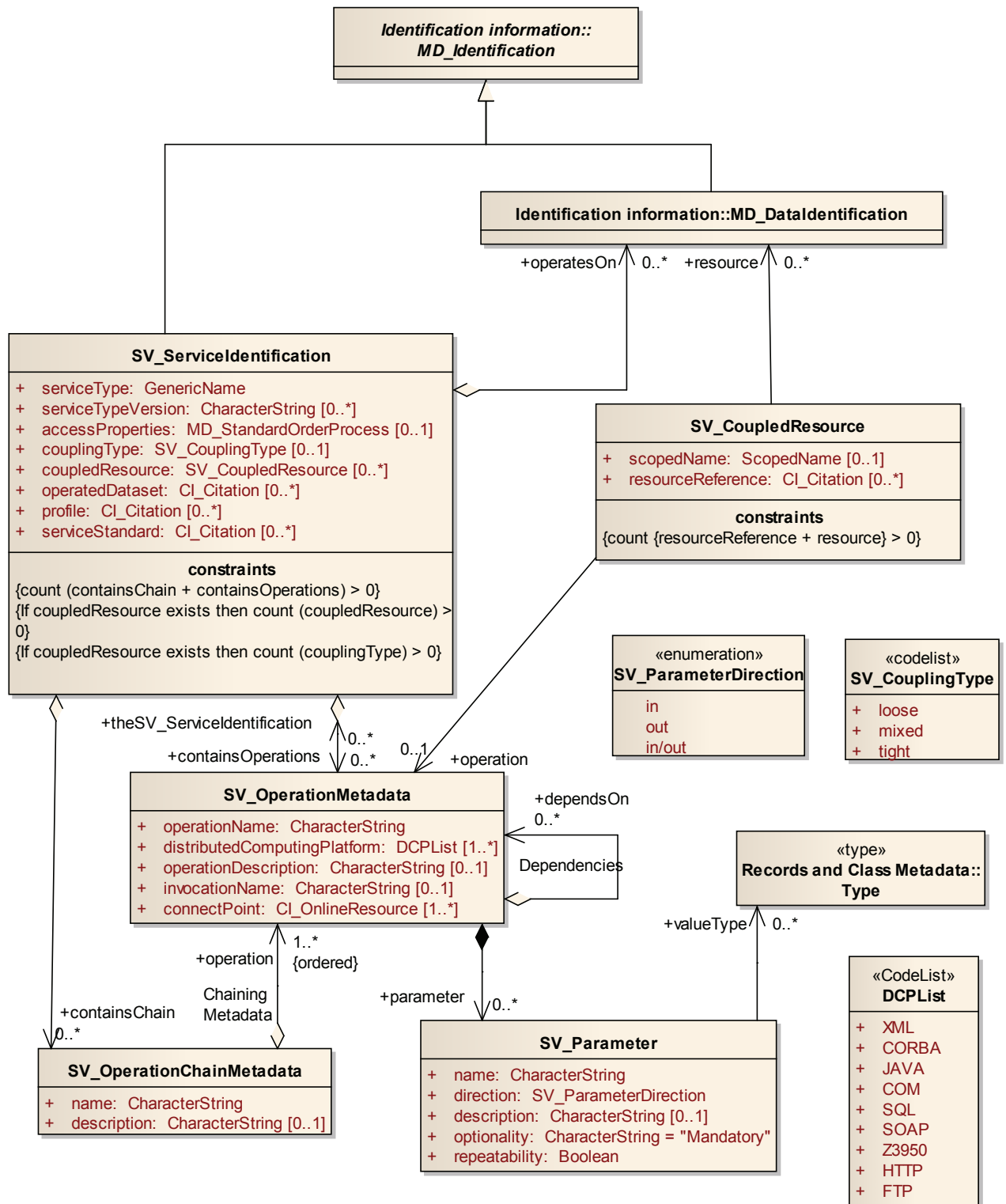


Figure 18 — Service metadata information classes

6.6 Extent and Citation Packages

6.6.1 Extent information (EX_Extent)

The datatype in this package is an aggregate of the metadata elements that describe the spatial and temporal extent of resources, objects, events, or phenomena. The EX_Extent class contains information about the geographic (EX_GeographicExtent), temporal (EX_TemporalExtent) and the vertical (EX_VerticalExtent) extent of something. EX_GeographicExtent can be subclassed as EX_BoundingPolygon, EX_GeographicBoundingBox and EX_GeographicDescription. The combined spatial and temporal extent (EX_SpatialTemporalExtent) is an aggregate of EX_GeographicExtent. EX_SpatialTemporalExtent is a subclass of EX_TemporalExtent. The full package is specified in Figure 19.

The EX_Extent class has three optional roles named “geographicElement”, “temporalElement”, and “verticalElement” and an element called “description”. At least one of the four shall be used. The data dictionary for this diagram is located in B.3.1.

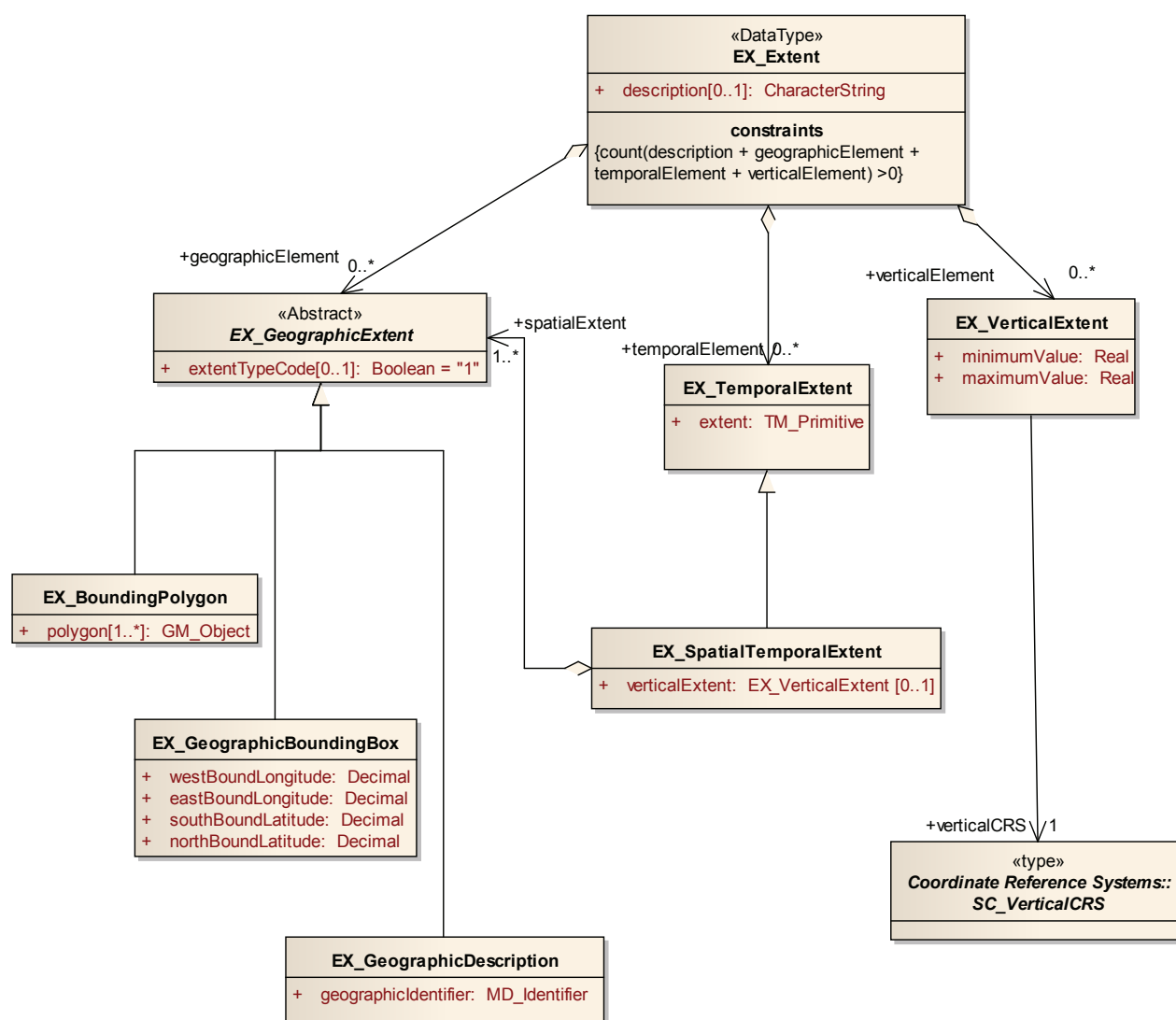


Figure 19 — Extent information classes

6.6.2 Citation and responsible party information (CI_Citation and CI_Responsibility) classes

This package provides a standardized method for citing a resource, as well as information about the party responsible for a resource. Citations use CI_Citation and cite the party responsible using CI_Responsibility. CI_Responsibility may be used without CI_Citation. CI_Responsibility is an aggregate of one or more parties (CI_Party). CI_Party may be specified as CI_Individual and/or CI_Organisation. The full package is specified in Figure 20. The data dictionary for this diagram is located in B.3.2.

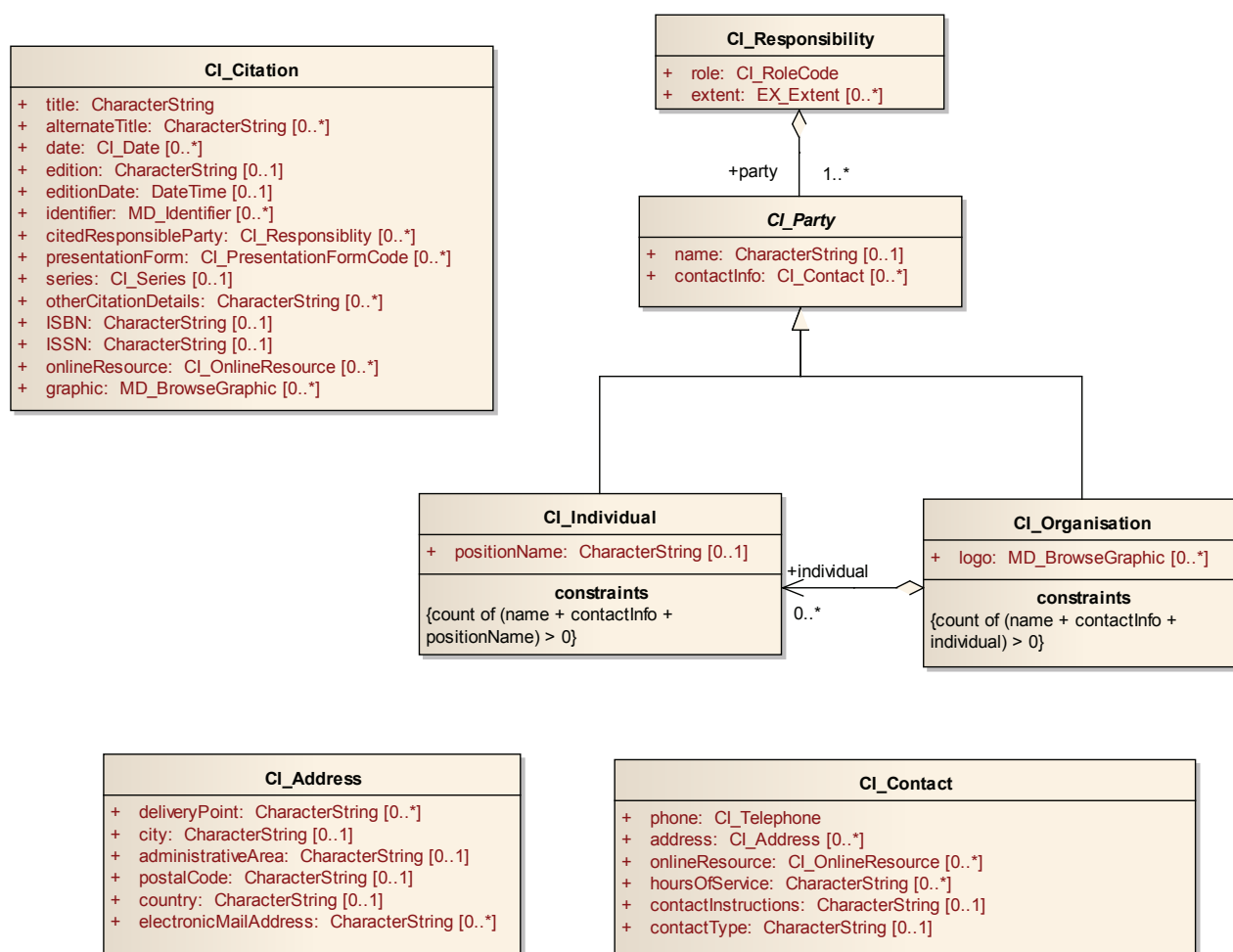


Figure 20 — Citation and responsible party information classes

6.6.3 Citation and responsible party information (CI_Citation and CI_Responsibility) Data Types and codelists

The Data Types and codelists used by Citation and responsible party information are specified in Figure 21. The data dictionary for this diagram is located in B.3.2.

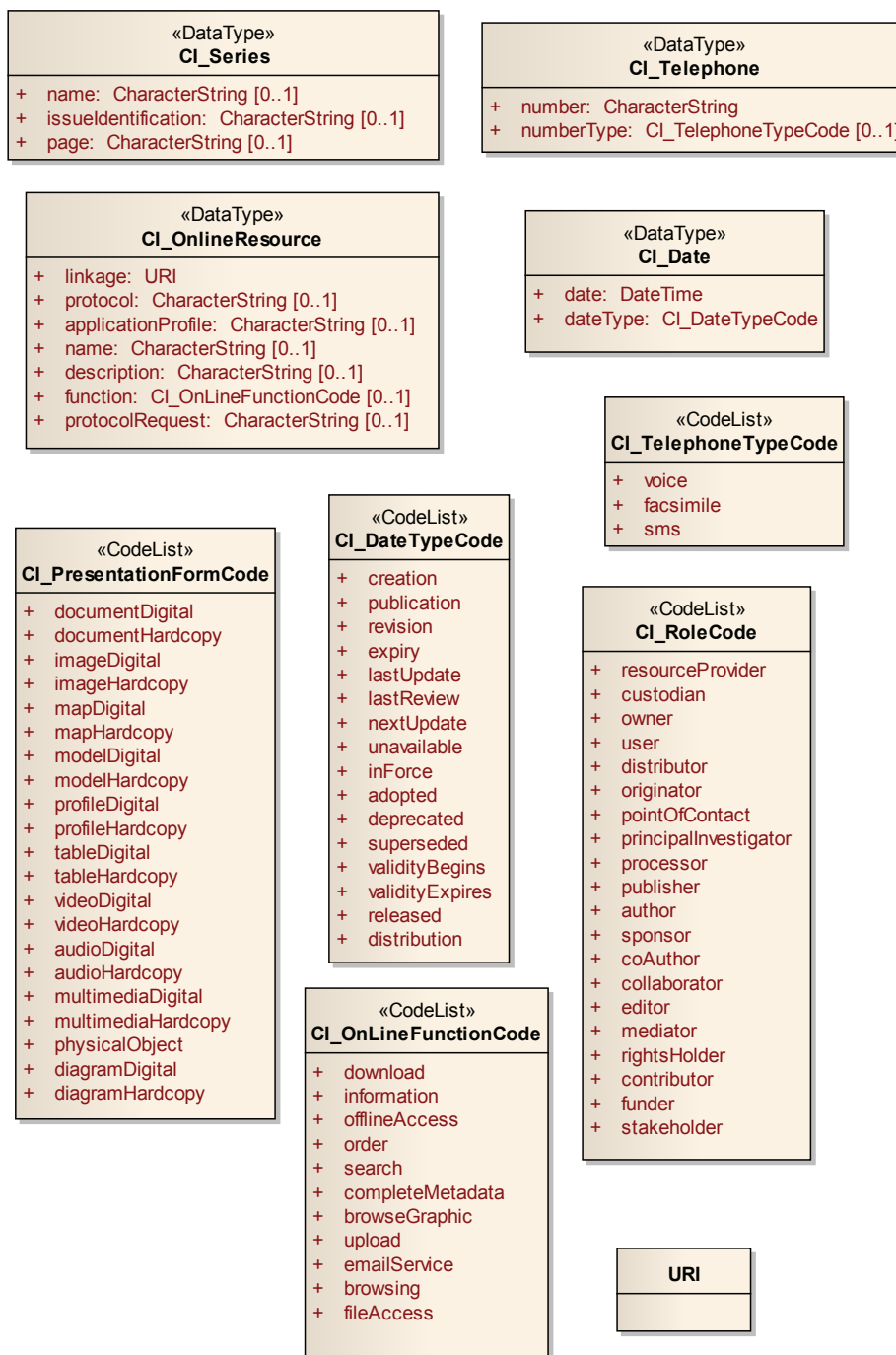


Figure 21 — Citation and responsible party information codelists

6.7 Metadata implementation

Annex D provides an overview of methods and ideas for the implementation and management of metadata for the purposes of search and retrieval, metadata exchange, and presentation.

6.8 Implementation examples

Annex E provides an example of the use of this International Standard for a geographic dataset. An example of extended metadata elements, as may be developed by a specific information community, is provided.

6.9 Multilingual support for free text fields

Annex F provides a structure to implement the free text fields of this International Standard in multiple languages.

6.10 Discovery metadata

Annex G provides a list of metadata elements that facilitate the discovery of geospatial resources.

6.11 Revisions

Annex H provides a list of revisions to the standard.

Annex A (normative)

Abstract test suite

A.1 Abstract test suite

Metadata provided as specified in Clause 6 and Annex B shall meet the requirements specified in this abstract test suite. This abstract test suite applies to any profile derived from this International Standard. User-defined metadata shall be defined and provided as specified in Annex C and shall satisfy the requirements as stated in A.3.

A.2 Metadata test suite

A.2.1 Test case identifier: Completeness test

- a) Test Purpose: to determine conformance by the inclusion of all metadata packages, metadata classes, and metadata elements that are specified with an obligation of “mandatory” or mandatory under the conditions specified.

NOTE Many elements designated as mandatory are contained within optional classes. These elements become mandatory only when their containing class is used.

- b) Test Method: a comparison between this International Standard and a subject metadata set to be tested shall be performed to determine if all metadata defined as mandatory in Clause 6 and Annex B are present. A comparison test shall also be performed to determine if all metadata elements defined as conditional in Clause 6 and Annex B are present if the conditions set out in this International Standard apply.
- c) Reference: Clause 6 and Annex B.
- d) Test Type: Basic.

The test cases in A.2.2 to A.2.5, A.3 and A.4 apply at all levels of obligation – mandatory, conditional, and optional.

A.2.2 Test case identifier: Maximum occurrence test

- a) Test Purpose: to ensure each metadata element occurs no more than the number of times specified in this International Standard.
- b) Test Method: examine a subject metadata set for the number of occurrences of each metadata package, metadata class, and metadata element provided. The number of occurrences for each shall be compared with its “Maximum Occurrences” attribute specified in Clause 6 and Annex B.
- c) Reference: Clause 6 and Annex B.
- d) Test Type: Basic.

A.2.3 Test case identifier: Data type test

- a) Test Purpose: to determine if each metadata element within a subject metadata set uses the specified data type.

- b) Test Method: the value of each provided metadata element is tested to ensure its data type adheres to the data type specified.
- c) Reference: Clause 6 and Annex B.
- d) Test Type: Basic.

A.2.4 Test case identifier: Domain test

- a) Test Purpose: to determine if each provided metadata element within a subject metadata set falls within the specified domain.
- b) Test Method: the values of each metadata element are tested to ensure they fall within the specified domain.
- c) Reference: Clause 6 and Annex B.
- d) Test Type: Basic.

A.2.5 Test case identifier: Schema test

- a) Test Purpose: to determine if a subject metadata set follows the schema specified in this International Standard.
- b) Test Method: test each metadata element and ensure it is contained within the specified metadata class.
- c) Reference: Clause 6 and Annex B.
- d) Test Type: Basic.

A.3 User-defined extension metadata test suite

A.3.1 Test case identifier: Exclusiveness test

- a) Test Purpose: to verify that each user-defined metadata package, metadata class, and metadata element is unique and not already defined in this International Standard.
- b) Test Method: each user-defined metadata class and metadata element is tested to ensure it is unique and not previously used.
- c) Reference: Clause 6 and Annex B.
- d) Test Type: Basic.

A.3.2 Test case identifier: Definition test

- a) Test Purpose: to verify that user-defined metadata classes and metadata elements have been defined as specified in this International Standard.
- b) Test Method: each user-defined metadata class and metadata element is tested to ensure that all attributes have been defined.
- c) Reference: C.3.
- d) Test Type: Basic.

A.3.3 Test case identifier: Standard metadata test

- a) Test Purpose: to verify that user-defined metadata within a subject metadata set fulfils the same requirements as ISO 19115 standard metadata.
- b) Test Method: all user-defined metadata in a subject metadata set is tested in accordance with A.2 of this International Standard.
- c) Reference: 2.3.
- d) Test Type: Basic.

A.4 Metadata profiles – Test case identifier: Metadata profiles

- a) Test Purpose: to verify that a profile follows the rules specified in this International Standard.
- b) Test Method: apply tests defined in A.2 and A.3 of this International Standard.
- c) Reference: 2.2.
- d) Test Type: Basic.

Annex B (normative)

Data dictionary for geographic metadata

B.1 Data dictionary overview

B.1.1 Introduction

This data dictionary describes the characteristics of the metadata defined in 6.2 through 6.6. The dictionary is specified in a hierarchy to establish relationships and an organisation for the information. The dictionary is categorised into sections equivalent to the UML model package diagrams. The clause titles of several of the tables have been expanded to reflect class specification within the respective diagram. Each model diagram from 6.2, 6.3 and 6.4 has a section within the data dictionary. Each UML model class along with its sub-class equates to a clause in this data dictionary. The shaded rows define classes. Each UML model class attribute or association equates to an unshaded data dictionary element. The classes and metadata elements within the data dictionary are defined by six attributes (those attributes are listed below).

B.1.2 Name/role name

A label assigned to a metadata class or to a metadata element. Metadata class names start with an upper case letter. Spaces do not appear in a metadata class name. Instead, multiple words are concatenated, with each new subword starting with a capital letter (example: XnnnYmmm). Metadata class names are unique within the entire data dictionary of this International Standard. Metadata element names are unique within a metadata class, not the entire data dictionary of this International Standard. Metadata element names are made unique, within an application, by the combination of the metadata class and metadata element names (example: MD_Metadata.characterSet). Role names are used to identify metadata abstract model associations and are preceded by "Role name:" to distinguish them from other metadata elements.

B.1.3 Definition

The metadata class/element description.

B.1.4 Obligation/ConditionGeneral

B.1.4.1 General

This is a descriptor indicating whether a metadata class or metadata element shall always be documented in the metadata or sometimes be documented (i.e. contains value(s)). This descriptor may have the following values: M (mandatory), C (conditional), or O (optional).

B.1.4.2 Mandatory (M):

The metadata class or metadata element shall be documented.

B.1.4.3 Conditional (C):

Specifies a condition that can be processed by a machine under which at least one metadata class or a metadata element is mandatory. 'Conditional' is used for one of the three following possibilities:

- Expressing a choice between two or more options. At least one option is mandatory and must be documented.

- Documenting a metadata class or a metadata element if another element has been documented.
- Documenting a metadata element if a specific value for another metadata element has been documented. To facilitate reading by humans, the specific value is used in plain text (ex. table in B.2.2, row 19 “C/not defined by encoding?”). If the answer to the condition is true, then the metadata class or the metadata element shall be mandatory.

B.1.4.4 Optional (O):

The metadata class or the metadata element may or may not be documented. Optional metadata classes and optional metadata elements have been defined to provide a guide to those looking to fully document their data. (Use of this common set of defined elements will help promote interoperability among geographic information users and producers world-wide.) If an optional class is not used, the elements contained within that class (including mandatory elements) will also not be used.

NOTE Optional classes may have mandatory elements; those elements only become mandatory if the optional entity is used.

B.1.5 Maximum occurrence

Specifies the maximum number of instances the metadata class or the metadata element may have. Single occurrences are shown by “1”; repeating occurrences are represented by “N”. Fixed number occurrences other than one are allowed, and will be represented by the corresponding number (i.e. “2”, “3”...etc).

B.1.6 Data type

Specifies a set of distinct values for representing the metadata elements; for example, integer, real, string, DateTime, and Boolean.

B.1.7 Domain

For a class, the domain indicates the line numbers covered by that class.

For a metadata element, the domain specifies the values allowed or the use of free text. “Free text” indicates that no restrictions are placed on the content of the field.

B.2 Metadata package data dictionaries

B.2.1 Metadata application information

- UML model shown in Figure 1.

	Name / Role name	Definition	Obligation / Condition	Maximum occurrence	Data type	Domain
1.	<i>DS_Resource</i>	an identifiable asset or means that fulfils a requirement	Use obligation from referencing object	Use maximum occurrence from referencing object	Class <<Abstract>>	Lines 2-3
2.	<i>Role name:</i> has	resource has related metadata	M	N	Association	MD_Metadata (B.2.2)
3.	<i>Role name:</i> partOf	resource is a component of an aggregate resource	O	N	Association	<i>DS_Aggregate</i> (B.2.1)
4.	<i>DS_DataSet</i>	identifiable collection of data	Use obligation from referencing object	Use maximum occurrence from referencing object	Specified Class (<i>DS_Resource</i>)	Lines 2-3
5.	<i>SV_Service</i>	resource is a service	Use obligation from referencing object	Use maximum occurrence from referencing object	Specified Class (<i>DS_Resource</i>)	Lines 2-3
6.	<i>DS_Aggregate</i>	collection of resources	Use obligation from referencing object	Use maximum occurrence from referencing object	Specified Class (<i>DS_Resource</i>) <<Abstract>>	Lines 2-3
7.	<i>Role name:</i> composedOf	aggregate is composed of multiple resources	M	N	Association	<i>DS_Resource</i> (B.2.1)

	Name / Role name	Definition	Obligation / Condition	Maximum occurrence	Data type	Domain
8.	DS_OtherAggregate	collection of resource associated through inspecified means	Use obligation from referencing object	Use maximum occurrence from referencing object	Specified Class (DS_Aggregate)	Lines 2-3 and 7
9.	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)	Lines 2-3 and 7
10.	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)	Lines 2-3 and 7
11.	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)	Lines 2-3 and 7
12.	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)	Lines 2-3 and 7
13.	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)	Lines 2-3 and 7
14.	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)	Lines 2-3 and 7