An OMG® Languages, Countries, and Codes Publication

Languages, Countries, and Codes (LCC)

Version 1.1

OMG Document Number: formal/20-02-02 [smsc/xx-xx-xx]
Release Date: February 2020
Standard document URL: http://www.omg.org/spec/LCC/1.1/
Normative Machine Consumable File(s):

document number: ptc/19-03-03:

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https://www.omg.org/spec/LCC/20190201/Countries/Regions/ISO3166-2-SubdivisionCodes-SY.rdf
https://www.omg.org/spec/LCC/20190201/Countries/Regions/ISO3166-2-SubdivisionCodes-SZ.rdf
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https://www.omg.org/spec/LCC/20190201/Countries/Regions/ISO3166-2-SubdivisionCodes-TD.rdf
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https://www.omg.org/spec/LCC/20190201/Countries/Regions/ISO3166-2-SubdivisionCodes-VG.rdf
https://www.omg.org/spec/LCC/20190201/Countries/Regions/ISO3166-2-SubdivisionCodes-VI.rdf

https://www.omg.org/spec/LCC/20190201/Countries/Regions/ISO3166-2-SubdivisionCodes-VN.rdf
https://www.omg.org/spec/LCC/20190201/Countries/Regions/ISO3166-2-SubdivisionCodes-VU.rdf
https://www.omg.org/spec/LCC/20190201/Countries/Regions/ISO3166-2-SubdivisionCodes-WF.rdf
https://www.omg.org/spec/LCC/20190201/Countries/Regions/ISO3166-2-SubdivisionCodes-WS.rdf
https://www.omg.org/spec/LCC/20190201/Countries/Regions/ISO3166-2-SubdivisionCodes-YE.rdf
https://www.omg.org/spec/LCC/20190201/Countries/Regions/ISO3166-2-SubdivisionCodes-ZA.rdf
https://www.omg.org/spec/LCC/20190201/Countries/Regions/ISO3166-2-SubdivisionCodes-ZM.rdf
https://www.omg.org/spec/LCC/20190201/Countries/Regions/ISO3166-2-SubdivisionCodes-ZW.rdf

document number: ptc/19-03-04:
https://www.omg.org/spec/LCC/20190201/Languages/LanguageRepresentation.xml
https://www.omg.org/spec/LCC/20190201/Languages/ISO639-1-LanguageCodes.xml
https://www.omg.org/spec/LCC/20190201/Languages/ISO639-2-LangaugeCodes.xml
https://www.omg.org/spec/LCC/20190201/Countries/CountryRepresentation.xml
https://www.omg.org/spec/LCC/20190201/Countries/ISO3166-1-CountryCodes.xml
https://www.omg.org/spec/LCC/20190201/Countries/ISO3166-2-SubdivisionCodes.xml
https://www.omg.org/spec/LCC/20190201/Countries/UN-M49-RegionCodes.xml

document number: ptc/19-02-42:
https://www.omg.org/spec/LCC/20190201/Languages/LanguageRepresentation.xmi
https://www.omg.org/spec/LCC/20190201/Languages/ISO639-1-LanguageCodes.xmi
https://www.omg.org/spec/LCC/20190201/Languages/ISO639-2-LanguageCodes.xmi
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https://www.omg.org/spec/LCC/20190201/Countries/UN-M49-RegionCodes.xmi

document number: ptc/19-02-45:
https://www.omg.org/spec/LCC/20190201/ISO-3166-Countries.xsl
https://www.omg.org/spec/LCC/20190201/ISO-3166-Subdivisions.xsl
https://www.omg.org/spec/LCC/20190201/LCC-create-SameAs-countries.xsl
https://www.omg.org/spec/LCC/20190201/LCC-create-SameAs-subdivisions.xsl
https://www.omg.org/spec/LCC/20190201/M49.sparql
https://www.omg.org/spec/LCC/20190201/M49-Format.xsl

See Annex B for the list of normative ISO 3166-2 region-specific machine-readable files.

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Preface

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1 Scope

1.1 Introduction

The Languages, Countries, and Codes (LCC) Specification provides metamodels, in the form of ontologies, and model files that consist of individuals defined by those metamodels, representing commonly used codes for the representation of languages and regions, including countries and their subdivisions. While most organizations recognize the ISO 639 standard as the primary source for definition of languages world-wide, and many organizations use the country codes contained in ISO 3166, most governments maintain their own extensions and modifications to the ISO 3166 codes for political and other purposes. Many also reference the United Nations Standard country or area codes for statistical use (M49) together with ISO 3166 as the basis for managing and interpreting regional statistical information. In response to this need and given that the ISO and U.N. codes have not been published by those organizations as RDF vocabularies to date, the OMG LCC standard is designed to fill the gap. It supports the ISO standard language and country codes, the UN M49 region codes, and enables development of other sets of codes using a standard vocabulary and ontology for languages, regions, and countries that users might require. These ontologies are essential for many government, commercial, and academic applications and ontology development activities, ranging from business vocabularies, taxonomies, and nomenclatures, to semantically rich applications, and at OMG, they are required to support the Financial Industry Business Ontology (FIBO) family of standards, among others.

1.2 Overview

The Languages, Countries and Codes (LCC) specification includes two modules:

(1) Languages, which includes three ontologies:

- Language Representation, which provides the concepts and relationships that correspond to all six parts of ISO 639 and are derived from ISO 639-4,
- ISO 639-1 Language Codes, which covers the two character codes representing the 180+ languages that are most commonly used in terminology, lexicography, and linguistics, and
- ISO 639-2, which provides the three character codes for all of the languages specified in ISO 639-1 as well as additional languages and language groups that are relatively commonly used.

(2) Countries, which includes the following:

- Country Representation, which provides the concepts and relationships defining geographic regions, geopolitical entities, countries, subdivisions, high-level relationships between them, and related coding systems.
- ISO 3166-1 Country Codes, which covers the two and three character country codes representing the almost 250 countries, territories, and other entities that are recognized by the United Nations.
- ISO 3166-2 Subdivision Codes, including a small ontology representing high-level region types and individual ontologies for every country that has submitted region codes to the U.N., that provide composite (country + subdivision) codes and subdivision definitions for all of the entities covered by ISO 3166-1.
- In addition to the ISO 3166 countries and regions, the higher level U.N. M49 statistical region codes are included to support multinational, regional requirements (e.g., continents and some sub-continental but multinational regions).

Coverage of the other parts of ISO 639, including ISO 639-3, which provides comprehensive coverage of every known individual language spoken around the world, including many historical and extinct languages, ISO 639-5, which includes language families and groups, and ISO 639-6, which addresses language variants, may be added as requirements for these codes arise.

Based on feedback from the user community, the ODM XMI and UML XMI representations cover the primary ontologies only, rather than the ontologies and all reference data files, such as individuals for country subdivisions, some of which are quite large and cumbersome to use in a UML modeling environment.

1.3 Metadata

Annotations on concepts, properties, and individuals in this specification follow the general policies recommended by the OMG Architecture Board, including the use of (1) the Dublin Core Metadata Terms [Dublin Core], (2) the Simple Knowledge Organization System (SKOS) [SKOS], and (3) the OMG's Specification Metadata [OMG AB Specification Metadata]. In general, every element in the ontologies must have a definition, and in many cases in the Language Representation and Country Representation ontologies, the source section of the relevant standard is referenced.

2 Conformance

The Languages, Countries, and Codes (LCC) specification provides a number of possible conformance points for implementers. These are as follows:

(1) Specification-level conformance with the RDF/OWL ontologies, which means that the subject application formally imports all of the LCC ontologies (*i.e.*, through `owl:imports` statements in another ontology or via loading the full set of ontologies for reference in a knowledge base that supports RDF/OWL) with no resulting logical inconsistencies.

(2) Ontology-level conformance – which means that the subject application formally imports one or more of the LCC ontologies with no resulting logical inconsistencies.

(3) Linked Data-level conformance – which means that the subject application references, one or more of the LCC ontologies or individuals.

For any conformance point, any references to individuals must use, or provide a mapping to, the standard LCC URI, and any properties accessed or stored within the scope of LCC must use or provide a mapping to the standard LCC URI. Implementers may extend any of the LCC ontologies as necessary, to add language or country codes required between releases, or to add application-specific codes needed to address various requirements. Typically such extensions will entail ontology-level conformance. We encourage implementers to submit any requirements for extension to the relevant LCC task force, as appropriate.

Note that ontology-level conformance implies that there is a list of LCC ontologies that have been imported into the conforming application, tool, or ontology. Implementers are required to provide that list with their conformance statements, including the appropriate `owl:versionIRI` for each of the LCC ontologies they support.

3 References

3.1 Normative References

Note that for the ISO specifications listed herein, in cases where there are registration authorities (RA) for the codes, the latest version as of the `owl:versionIRI` in the ontology metadata has been used for development of this specification. The latest version published by the relevant RA is more recent than what has been published by ISO in all cases. The task force intends that subsequent revisions of this specification should be maintained in such a way as to be current with respect to the codes published by the appropriate RA to the degree possible.

Reference	*Description*
[Dublin Core]	DCMI Metadata Terms, Issued 2013-06-14 by the Dublin Core Metadata Initiative. Available at http://www.dublincore.org/documents/dcmi-terms/.
[ISO 639-1]	ISO 639-1:2002 Codes for the representation of names of languages – Part 1: Alpha-2 code
[ISO 639-2]	ISO 639-2:1998 Codes for the representation of names of languages – Part 2: Alpha-3 code
[ISO 639-3]	ISO 639-3:2007 Codes for the representation of names of languages – Part 3: Alpha-3 code for comprehensive coverage of languages
[ISO 639-4]	ISO 639-4:2010 Codes for the representation of names of languages – Part 4: General principles of coding of the representation of names of languages and related entities, and application guidelines
[ISO 639-5]	ISO 639-5:2008 Codes for the representation of names of languages – Part 5: Alpha-3 code for language families and groups
[ISO 639-6]	ISO 639-6:2009 Codes for the representation of names of languages – Part 6: Alpha-4 code for comprehensive coverage of language variants
[ISO 704]	ISO 704:2000 Terminology Work – Principles and Methods
[ISO 1087]	ISO 1087-1:2000 Terminology – Vocabulary – Part 1: Theory and application
[ISO 3166-1]	ISO 3166-1:2013 Codes for the representation of names of countries and their subdivisions – Part 1: Country codes
[ISO 3166-2]	ISO 3166-2:2013 Codes for the representation of names of countries and their subdivisions – Part 2: Country subdivision code
[ISO 3166-3]	ISO 3166-3:2013 Codes for the representation of names of countries and their subdivisions – Part 3: Code for formerly used names of countries
[MOF Core]	Meta Object Facility (MOF™) Core. Available at http://www.omg.org/spec/MOF/
[MOF XMI]	MOF 2/XMI (XML Metadata Interchange) Mapping Specification. Available at http://www.omg.org/spec/XMI/
[ODM]	Ontology Definition Metamodel (ODM. Available at https://www.omg.org/spec/ODM/
[OMG AB Specification Metadata]	OMG Architecture Board recommendations for specification of ontology metadata, Available at https://www.omg.org/techprocess/ab/SpecificationMetadata.rdf
[OWL 2]	OWL 2 Web Ontology Language Quick Reference Guide (Second Edition), W3C

	Recommendation 11 December 2012. Available at http://www.w3.org/TR/2012/REC-owl2-quick-reference-20121211/.
[RDF Concepts]	RDF 1.1 Concepts and Abstract Syntax. Richard Cyganiak, David Wood and Markus Lanthaler, Editors. W3C Recommendation, 25 February 2014. Available at http://www.w3.org/TR/rdf11-concepts/
[RDF Schema]	RDF Schema 1.1. Dan Brickley and R.V. Guha, Editors. W3C Recommendation, 25 February 2014. Available at http:// www.w3.org/TR/rdf-schema/.
[SKOS]	SKOS Simple Knowledge Organization System Reference, W3C Recommendation 18 August 2009. Available at http://www.w3.org/TR/2009/REC-skos-reference-20090818/.
[UML2]	Unified Modeling Language™ (UML®). Available at https://www.omg.org/spec/UML/
[Unicode]	*The Unicode Standard, Version 3*, The Unicode Consortium, Addison-Wesley, 2000. ISBN 0-201-61633-5, as updated from time to time by the publication of new versions. (See http:// www.unicode.org/unicode/standard/versions/ for the latest version and additional information on versions of the standard and of the Unicode Character Database).
[UTF-8]	RFC 3629: UTF-8, a transformation format of ISO 10646. F. Yergeau. IETF, November 2003, http://www.ietf.org/rfc/rfc3629.txt
[W3C Datatypes in RDF and OWL]	XML Schema Datatypes in RDF and OWL, W3C Working Group Note 14 March 2006, Available at http://www.w3.org/TR/2006/NOTE-swbp-xsch-datatypes-20060314/.
[XML Schema Datatypes]	XML Schema Part 2: Datatypes. W3C Recommendation 28 October 2004. Available at http://www.w3.org/TR/xmlschema-2/.

3.2 Non-Normative References

The following informative documents are referenced in this specification:

Reference	*Description*
[BCP 47]	BCP 47, Tags for Identifying Languages, see http://tools.ietf.org/html/bcp47
[DL Handbook]	THE DESCRIPTION LOGIC HANDBOOK: Theory, implementation, and applications. Baader, McGuinness, Nardi, and Patel-Schneider, editors. Cambridge University Press, Cambridge, United Kingdom, 2003.

4 Terms and Definitions

For the purposes of this specification, the following terms and definitions apply. See sections 8 and 9 in this specification for more detailed definitions of several of the terms listed below.

Term	**Definition**
country	A geopolitical entity representing a country or dependent territory.
country subdivision	A geopolitical entity, typically a division of a country, dependency, or other area of special geopolitical interest related to a country or other geopolitical entity.
geographic region identifier	A string of letters assigned to a country or other geopolitical region for the purpose of uniquely representing it.
language	A systematic use of sounds, characters, symbols or signs to communicate

	meaning.
language identifier	A string of characters that uniquely identifies a linguistic entity.
ontology	An ontology specifies a rich description of the: • Terminology, concepts, nomenclature, • Relationships among and between concepts and individuals, • Sentences distinguishing concepts, refining definitions and relationships (constraints, restrictions, regular expressions) relevant to a particular domain or area of interest[1].

5 Symbols

5.1 Symbols

There are no symbols introduced by this specification.

5.2 Abbreviations

The following abbreviations are used throughout this specification:

IRI – Internationalized (Uniform) Resource Identifier

LCC – Languages, Countries and Codes

OWL – Web Ontology Language

ODM – Ontology Definition Metamodel

RDF – Resource Definition Framework

UML – Unified Modeling Language

URI – Uniform Resource Identifier

URL – Uniform Resource Locator

XMI – XML Metadata Interchange

XML – eXtensible Markup Language

[1] Kendall, Elisa and McGuinness, Deborah: "Ontology 101: An Introduction to Knowledge Representation & Ontology Development", Tutorial given at Smart Data 2015, August 18th, 2015, San Jose, CA.

6 Additional Information

6.1 Acknowledgments

The following organization submitted this specification:

- Adaptive, Inc.
- Thematix Partners LLC
- Unisys

The following companies and organizations are strong supporters of this specification:

- EDM Council

6.2 Notation

The diagrams included herein are ODM-compliant UML diagrams, in other words, they conform to the UML Profiles for RDF and OWL specified in the OMG's Ontology Definition Metamodel [ODM] Specification. This includes the set of UML stereotypes and graphical notation used in the diagrams provided.

The color scheme employed in these diagrams includes:

- Basic OWL Classes: white for classes defined within the current (local) ontology, amber for classes defined within an imported (referenced) ontology
- OWL Restriction Classes and other Class Expressions (unions, intersection, complements): green
- OWL Object Properties: blue
- OWL Data Properties: dark gray
- OWL Datatypes: pink
- OWL Individuals: light gray

These colors are provided for clarification purposes only, and are non-normative.

Within the context of this, a module is a group of ontologies, organized as a subdomain with respect to the LCC namespace and as a folder from a file management perspective. Several ontologies are contained in each of the two modules in this specification, which include Languages and Countries. For each module there is an "about" file, which provides metadata about the module, specified herein in tabular form. Each of the primary ontologies in a given module is defined as an ODM-compliant UML model as well as in OWL (aside from the "about" file, which is expressed in RDF/XML-serialized OWL only). The normative ontologies, and the language and country individuals are expressed in ODM XMI (i.e., XMI that conforms to the ODM metamodels for RDF and OWL), ODM UML XMI (i.e., that conforms to the UML Profiles for RDF and OWL in the ODM specification), and in RDF/XML-serialized OWL 2.

The notation used to represent description logic expressions (i.e., the expressions in the Parent columns in class tables containing ontology details) is consistent with the notation defined in the Description Logic Handbook [DL Handbook]. Some of the basics are described in Table 6.1, below. Note that this is not intended to be comprehensive, but includes the primary patterns that are used in the LCC specification, for property restrictions in particular.

Table 6.1: Description Logic Expressions Notation

Construct	Description	Notation
Boolean Connectives and Enumeration		
intersection	The intersection of two classes consists of exactly those individuals which are instances of both classes.	C ∩ D
union	The union of two classes contains every individual which is contained in at least one of these classes.	C ∪ D
enumeration	An enumeration defines a class by enumerating all its instances.	oneOf (i_1, i_2, i_3, … i_n)
Property Restrictions		
universal quantification	Universal quantification is used to specify a class of individuals for which all related individuals must be instances of a given class (i.e., allValuesFrom in OWL).	∀R.C, where R is the relation (property) and C is the class that constrains all values for related individuals
existential quantification	Existential quantification is used to specify a class as the set of all individuals that are connected via a particular property to at least one individual which is an instance of a certain class (i.e., someValuesFrom in OWL).	∃R.C, where R is the relation (property) and C is the class that constrains some values of related individuals
individual value	Individual value restrictions are used to specify classes of individuals that are related to one particular individual (i.e., hasValue in OWL).	∀R.I, where R is the relation (property) and I is the individual
exact cardinality	Cardinality (number) restrictions specify classes by restricting the cardinality on the sets of fillers for roles (relationships, or properties in OWL). Exact cardinality restrictions restrict the cardinality of possible fillers to exactly the number specified.	= n R (for unqualified restrictions) = n R.C (for qualified restrictions, i.e., including onClass or on DataRange)
maximum cardinality	Maximum cardinality restrictions restrict the cardinality of possible fillers to at most the number specified (inclusive).	≤ n R (for unqualified restrictions) ≤ n R.C (for qualified restrictions)
minimum cardinality	Minimum cardinality restrictions restrict the cardinality of possible fillers to at least the number specified (inclusive).	≥ n R (for unqualified restrictions) ≥ n R.C (for qualified restrictions)
Class Axioms		
equivalent classes	Two classes are considered equivalent if they contain exactly the same individuals.	≡ C
disjoint classes	Disjointness means that membership in one class specifically excludes membership in another.	¬ C

Within the tabular representation for restrictions in the tables included herein, the identifiers for the restrictions shown in the diagrams are included parenthetically following the logic expressions. These are not part of the logic, but are included for comparison purposes.

Additionally, some restrictions are nested, whereby the content of an embedded (nested) restriction is also included parenthetically. In these cases, all of the identifiers will be included, also parenthetically, following the complete specification of the complex restriction. Note too that in the case of complex restrictions, where there are nested elements in parentheses, the “dot notation” used as a separator between a property and the role filler is replaced with the embedded parenthetical filler definition. A “role” from a description logic perspective is essentially a property in OWL, and the role “filler” is the class or individual that provides the value for that role in a given axiom (i.e., in a restriction or other logic expression).

The majority of the property restrictions specified in LCC are defined as necessary conditions for class membership, rather than sufficient conditions. As a result, the tables assume that necessary conditions are the default and only in cases where a restriction imposes sufficient conditions will that be stated.

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7 Architecture

7.1 "About" the LCC Ontologies

The "about" files for LCC provide content describing the specification and each of the modules, complementing the content in this specification and in some cases duplicating it in the form of RDF/OWL metadata. These files are designed to (1) describe the machine-readable content of the specification for people who download that content directly and import it into tools that can interpret and display those files, (2) for potential use in tagging the specification document on the OMG site, and (3) to provide high-level ontologies including AboutLCC-1.1.rdf and AboutLCC-1.1-Regions.rdf that import all of the constituent ontologies for ease of use (similar to "make files" for software).

AboutLCC-1.1 imports all the normative ontologies excluding those for the Regions (of which there are over 200). About LCC-1.1-Regions imports this file and also all the Region files, so can be used by itself.

Additionally, there are version-independent metadata ontologies that provide the complete structure as a hierarchical set of Modules (as defined in [OMG AB Specification Metadata]), with the Dublin Core hasPart property used to represent the top-down hierarchy. These metadata ontologies are:

- AboutLCC
- Languages/AboutLanguages
- Countries/AboutCountries
- Countries/Regions/AboutRegions

7.2 Namespace Definitions

The namespaces and prefixes corresponding to external elements required for use in LCC are provided. Table 7.1 lists the prefixes and namespaces on which LCC depends that are external to LCC. Table 7.2 provides the namespace declarations required for use of LCC itself. The prefixes provided in Table 7.1 and 7.2 are normative, and their use is required in any conformant extension.

Table 7.1: Prefix and Namespaces for referenced/external vocabularies

Namespace Prefix	Namespace
rdf	http://www.w3.org/1999/02/22-rdf-syntax-ns#
rdfs	http://www.w3.org/2000/01/rdf-schema#
owl	http://www.w3.org/2002/07/owl#
xsd	http://www.w3.org/2001/XMLSchema#
dct	http://purl.org/dc/terms/
skos	http://www.w3.org/2004/02/skos/core#
sm	http://www.omg.org/techprocess/ab/SpecificationMetadata/

The namespace approach taken for LCC is based on OMG guidelines and is constructed as follows:

- A standard prefix `https://www.omg.org/spec/`
- The abbreviation for the specification: in this case `LCC`
- The ontology name (including the module)

Note that the URI/IRI strategy for the ontologies in LCC takes a "slash" rather than "hash" approach, in order to accommodate server-side applications. Namespace prefixes are constructed as follows with the components separated by "-":

- The specification abbreviation: `lcc`
- An abbreviation for the ontology name

The namespaces and prefixes corresponding for the Languages, Countries, and Codes ontologies are summarized in Table 7.2. These are given by module, and within a module in alphabetical order, rather than with any intent to show imports relationships. The table includes the namespace definitions for the "about" files that are part of the machine-readable deliverables for the specification, but that are not required for imports closure. Note that these are not versioned, although version IRIs are included in every OWL ontology and are documented in the metadata for each of them.

Table 7.2: Prefix and Namespaces for Languages, Countries and Codes (LCC)

Namespace Prefix	Namespace
lcc-spc	https://www.omg.org/spec/LCC/AboutLCC/
lcc-spc-1.1	https://www.omg.org/spec/LCC/1.1/AboutLCC-1.1/
lcc-spc-1.1-reg	https://www.omg.org/spec/LCC/1.1/AboutLCC-1.1-Regions/
lcc-lng	https://www.omg.org/spec/LCC/Languages/AboutLanguages/
lcc-lr	https://www.omg.org/spec/LCC/Languages/LanguageRepresentation/
lcc-639-1	https://www.omg.org/spec/LCC/Languages/ISO639-1-LanguageCodes/
lcc-639-2	https://www.omg.org/spec/LCC/Languages/ISO639-2-LanguageCodes/
lcc-cty	https://www.omg.org/spec/LCC/Countries/AboutCountries/
lcc-cr	https://www.omg.org/spec/LCC/Countries/CountryRepresentation/
lcc-3166-1	https://www.omg.org/spec/LCC/Countries/ISO3166-1-CountryCodes/
lcc-3166-2	https://www.omg.org/spec/LCC/Countries/ISO3166-2-SubdivisionCodes/
lcc-m49	https://www.omg.org/spec/LCC/Countries/UN-M49-RegionCodes/

Individual namespace prefixes for the ISO 3166-2 region codes are formulated as "lcc-3166-2-<xx>", where <xx> is a two-character, lower case code corresponding to the ISO 3166-1 alpha 2 code for the country whose regions are represented therein. Individual namespaces for the ISO 3166-2 region codes are formulated as https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-<XX>, where <XX> is a two-character, upper case code corresponding to the ISO 3166-1 alpha 2 code for the country whose regions are represented therein. See Annex B for a complete list of the namespaces and corresponding countries for which region codes are available.

8 Language Ontologies

8.1 Overview

This section defines the terms, definitions, relationships, and additional logic specified in the ontologies that make up the Languages Module.

8.2 Module: Languages

The Languages module includes three primary ontologies, as well as an “about” file, namely:

- Language Representation, which provides the concepts and relationships that correspond to all six parts of ISO 639 and are derived primarily from ISO 639-4;
- ISO 639-1 Language Codes, which covers the two character codes representing the 180+ languages that are most commonly used in terminology, lexicography, and linguistics; and
- ISO 639-2, which provides the three character codes for all of the languages specified in ISO 639-1 as well as additional languages and language groups that are relatively commonly used.

Metadata contained in the “about” file that describes the module is given inTable 8.1.

Table 8.1: Languages Module Metadata

Metadata Term	Value
sm:filename	AboutLanguages.rdf
sm:fileAbbreviation	lcc-lng
OntologyIRI	https://www.omg.org/spec/LCC/Languages/AboutLanguages/
owl:versionIRI	https://www.omg.org/spec/LCC/20190201/Languages/AboutLanguages/
sm:moduleName	Languages
sm:moduleAbbreviation	LCC-LNG
sm:moduleVersion	1.0
sm:moduleAbstract	This module contains ontologies representing languages commonly used in business, including human and machine-interpretable languages. The main body of the module is based on ISO 639 as well as the language element of the Language Tag specified in BCP 47 (RFC 4646, RFC 4647), to provide a systematic description of the vocabulary used for language representation, including natural and artificial languages.

8.3 Ontology: Language Representation

This ontology, based on ISO 639 as well as the language element of the Language Tag specified in BCP 47 ([BCP 47], RFC 4646, RFC 4647), provides a systemic description of the vocabulary used for language representation, including natural and artificial languages.

ISO 639 provides two language codes, one as a two-letter code (ISO 639-1) and another as a three-letter code (ISO 639-2, ISO 639-3, ISO 639-5) for the representation of names of languages. ISO 639-1 was devised primarily for use in terminology, lexicography, and linguistics. ISO 639-2 represents all of the languages contained in ISO 639-1, additional languages and language groups, as they may be coded for special purposes when more specificity in coding is needed. The languages listed in ISO 639-1 are a subset of the languages listed in ISO 639-2; every language code element in the two-letter code has a corresponding language code element in the three-letter code, but not necessarily vice versa. ISO 639-4 provides the basis for describing languages, as defined in this ontology, and

additional codes are provided in 639-5 and other parts of the standard, again with more details about macrolanguages, other lesser known independent languages, and special language groups.

ISO 639-3 extends the set of three-letter codes provided in 639-2 to cover all of the natural, human languages in use today, along with many well-known ancient, extinct, and historical languages, including written and signed languages. It also identifies the codes found in 639-2 that represent families or groups of languages rather than a single human language, depending on the perspective of the consumer.

The Registration Authority for ISO 639-1 is the International Information Centre for Terminology, ISO 639-1/RA. This organization is responsible for maintenance of Part-1, and more information can be found at http://www.infoterm.info/standardization/iso_639_1_2002.php, although the actual code set is maintained by the US Library of Congress, together with the code set for ISO 639-2.

The Registration Authority for ISO 639-2 is the Library of Congress, ISO 639-2/RA. The Library of Congress is responsible for maintenance of Part-2, at http://www.loc.gov/standards/iso639-2/iso639-2ra.html. Current code sets for ISO 639-1 and ISO 639-2 are available from this site, as mentioned above. In addition to the material covered in the basic standard, the Library of Congress also publishes the German names for all languages, which is reflected in the properties given below. See http://loc.gov/standards/iso639-2/php/code_list.php for the latest release.

The Registration Authority for ISO 639-3 is SIL International, ISO 639-3/RA. SIL International is responsible for maintenance of Part-3, and more information can be found at http://www.sil.org/iso639-3/default.asp.

The codes included herein also correspond to the language element of the Language Tag specified in BCP 47 (RFC 4646, RFC 4647), and can be used for matching or other application development purposes (e.g., use of language identifier literals in applications that build up the RFC 4646 based tags).

This ontology (Language Representation) defines the model for the standard, based in part on ISO 639-4, with individual codes for the other parts of the standard represented in dependent models.

Table 8.2: Language Representation Ontology Metadata

Metadata Term	Value
sm:filename	LanguageRepresentation.rdf
sm:fileAbbreviation	lcc-lr
OntologyIRI	https://www.omg.org/spec/LCC/Languages/LanguageRepresentation/
owl:versionIRI	https://www.omg.org/spec/LCC/20190201/Languages/LanguageRepresentation/
sm:directSource	ISO 639-1 Codes for the representation of names of languages - Part 1: Alpha-2 code, First edition, 2002-07-15 ISO 639-2 Codes for the representation of names of languages - Part 2: Alpha-3 code, First edition, 1998-11-01 ISO 639-3 Codes for the representation of names of languages - Part 3: Alpha-3 code for comprehensive coverage of languages, First edition, 2007-02-01 ISO 639-4 Codes for the representation of names of languages - Part 4: General principles of coding of the representation of names of languages and related entities, and application guidelines, First edition, 2010-07-15 ISO 639-5 Codes for the representation of names of languages - Part 5: Alpha-3 code for language families and groups, First edition, 2008-05-15 ISO 639-6 Codes for the representation of names of languages - Part 6: Alpha-4 code for comprehensive coverage of language variants, First edition, 2009-12-01
sm:relatedSpecification	BCP 47, Tags for Identifying Languages, see http://tools.ietf.org/html/bcp47
sm:historyNote	This ontology is ultimately intended to represent all of ISO 639 for reference purposes, and to be sufficiently

extensible to accommodate new sections or modifications as they are published. The current version of the ontology (including subordinate modules containing the language names and codes) provides a unique English name (i.e., the reference name from 639-3) for each language, with UTF-8 encoded literals specifying alternates in English, French, and Indigenous languages where present in the standard, and in German corresponding to the names on the LoC web site.
1. Where multiple English names occur in 639-1 and 639-2, we have used the primary name specified in 639-2:1998 superseded by the latest revision posted by the registration authority, or, where multiples are specified by the registration authority, the reference name from ISO 639-3 as the 'named individual name' for a given language. For languages specified in ISO 639-1, there is at least one English name and at least one French name for every language, corresponding to exactly one alpha-2 code. Most languages from ISO 639-1 have at least one indigenous name. Most languages with codes available from the Library of Congress also have at least one German name. The correspondence between the alpha-2 codes and languages are made explicit in the individuals representing the codes themselves, and can be inferred for the languages using an OWL DL reasoner.
2. This release of the ontology covers all languages specified in parts 1 and 2 of the standard, and categorizes the alpha-3 codes from part 2 according to the categorization scheme provided in parts 3 and 4. Subsequent releases of the ontology will address additional languages covered in part 3, as well as additional components of the standard, such as equivalence to standards representing relevant scripts, as they become available, and the language groups covered by ISO 639-5.
3. We have used individuals to represent all alpha-2 and alpha-3 codes, which, in turn, have matching strings (tags) associated with them for use in a variety of applications to facilitate reasoning and mapping. The strings are provided as datatype properties of the individuals to support applications that may require them for RFC 4646-style tagging.
4. Note that some tools, including certain UML tools, are case insensitive. Thus, in cases where a language name collides with an alpha-2 or alpha-3 code, (i.e., Ga, Ewe, Fon, Ido, Lao, Tiv, Twi, Vai, and Yao), the names for the individual codes have been extended with '_' (e.g., 'ewe_1').
5. We found a few anomalies in the standards while developing this ontology. These include:
(1) Bihari is included in the 2002 version of 639-1, in the 1998 version of 639-2, and in the online codes posted by the Library of Congress in 2007 for parts 1 and 2, with part 1 code of 'bh' and part 2 bibliographic and terminology codes of 'bih'. At that time, there was no discussion stating that Bihari is a collective language, although it was omitted from the downloadable data for 639-3. Since then, the language element has been renamed 'Bihari languages', in both English and French, without change to the corresponding language codes. The latest version of the code sets reflect this modification. Our assumption is that the trigraph for Bihari is a collective language code, which is supported by online research in Eastern Indic languages.

	(2) Serbo-Croatian was included in the 2002 version of 639-1, with part 1 code 'sh'. It was not mentioned in the 1998 version of 693-2, but appears in 639-3 with a language identifier of 'hbs', without codes for 639-2. As of 2010, Serbo-Croation has been eliminated from ISO 639-1 and 639-2 codes altogether, and the ontology reflects this. (3) Other changes in the latest version of the ontology include elimination of the 639-1 code for Moldavian, merging the language with Romanian, and additional English and French names for some languages, such as Dutch (to include Flemish, flamais), among others. (4) German names for languages in ISO 639-2 were added to the Library of Congress in 2014, and are supported in this version of the ontology. 6. The LCC 1.0 version of this ontology, published in advance of the 2017 New Orleans OMG Technical Meeting, was current as of 31 July 2017 with respect to the ISO 639-1 and 639-2 codes included herein.
skos:changeNote	The http://www.omg.org/spec/LCC/20171801/Languages/LanguageRepresentation.rdf version of this ontology was revised to loosen the range constraints on the hasName properties to enable use of language tags, as stated in the LCC 1.1 RTF report.

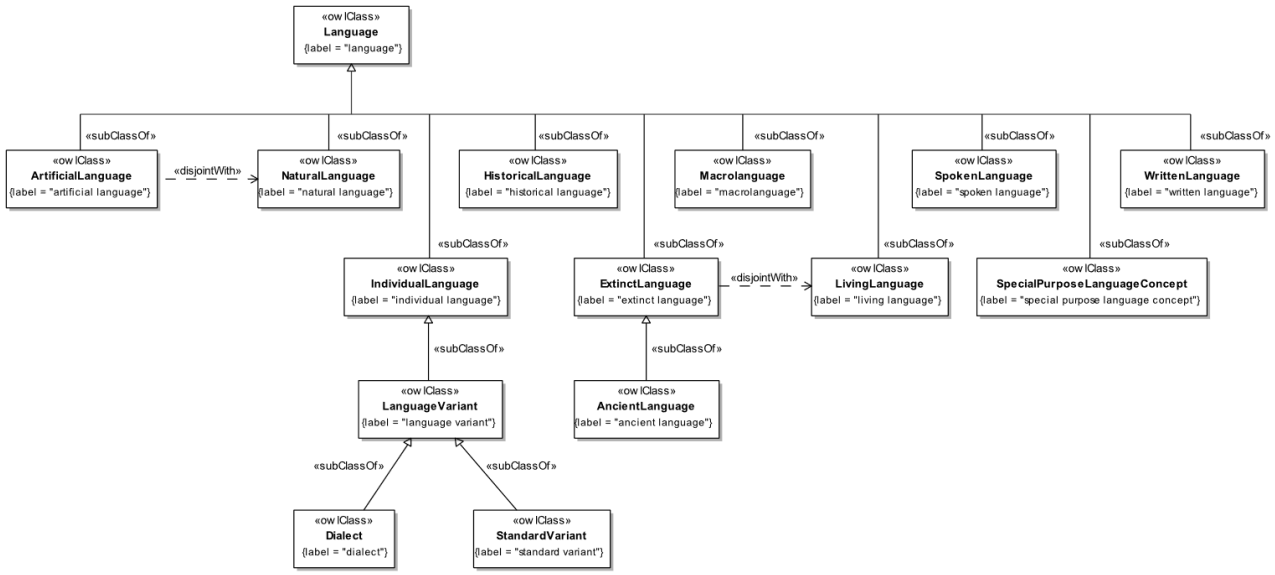

Figure 8.1 Language Class Hierarchy

Figure 8.1 provides the primary inheritance hierarchy for languages, including the disjoint relationship between extinct and living languages.

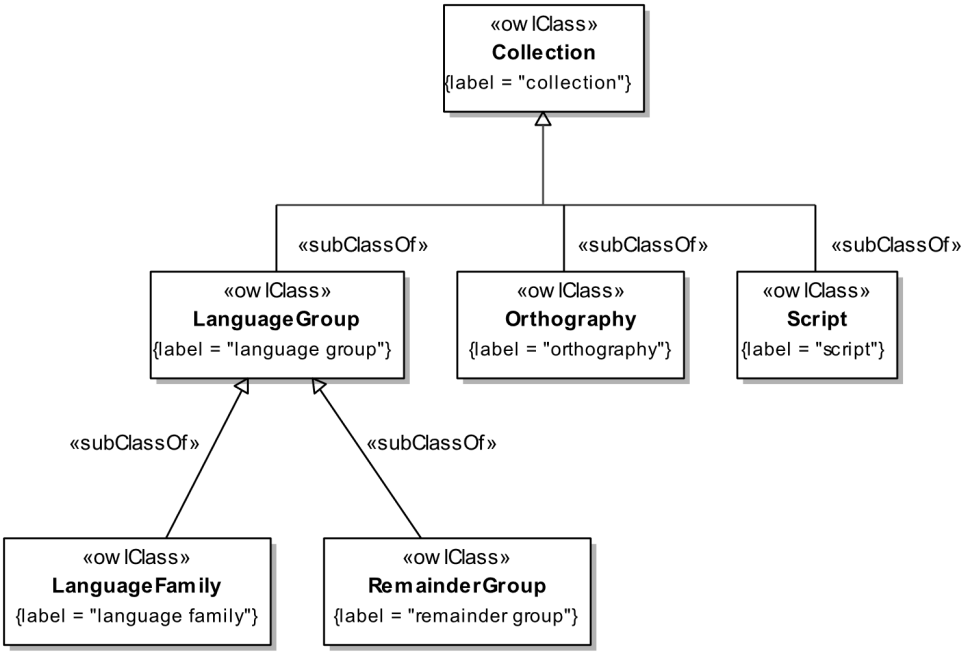

Figure 8.2 Collection Class Hierarchy

The primary collection concepts are shown in Figure 8.2. These include not only language groups of various sorts but the concept of an orthography for a language and one or more scripts for a language, which are collections of rules and symbols.

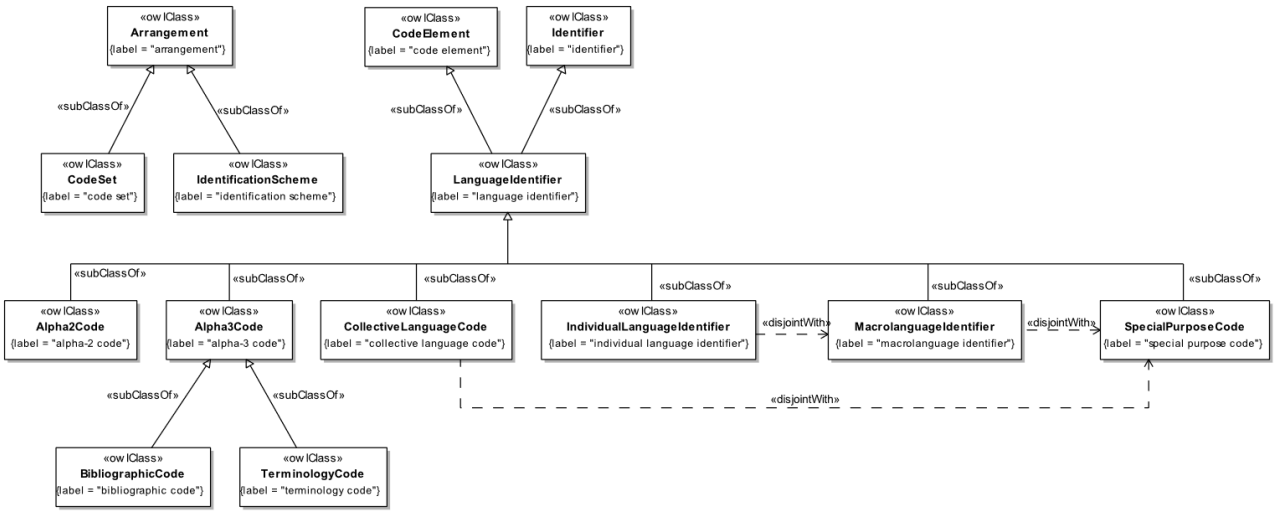

Figure 8.3 Identifier and Code Class Hierarchy

Figure 8.3 provides a view of the identifier and code concepts in the ontology, including disjoint relationships among the three-character language codes.

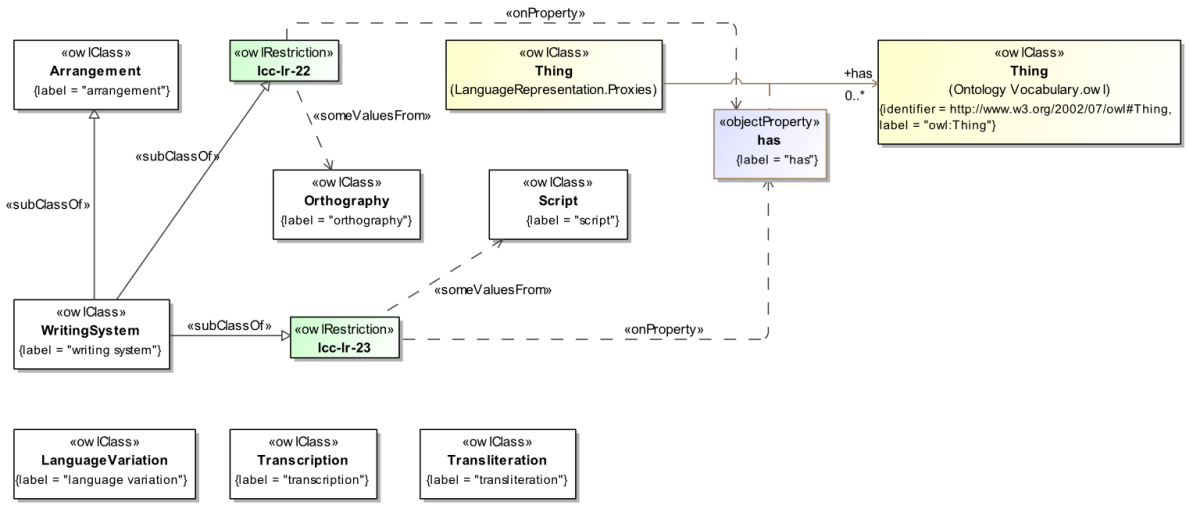

Figure 8.4 Systems and Processes in Language Analysis

The remaining concepts defined in ISO 639, for several processes and systems related to language, are given in Figure 8.4.

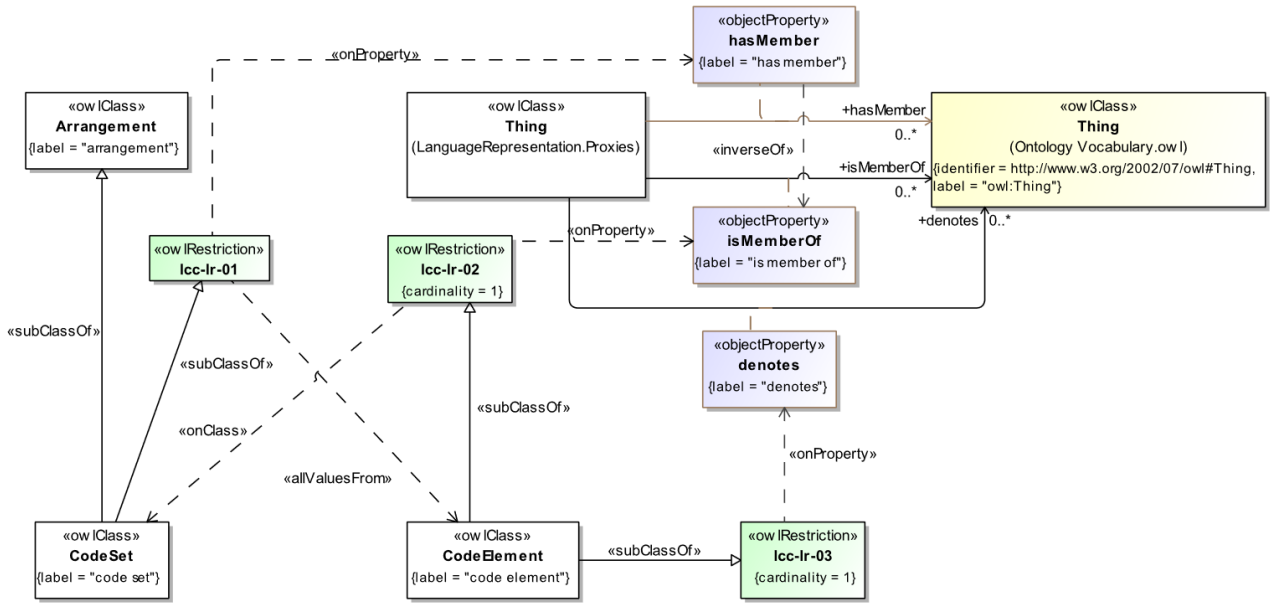

Figure 8.5 Definition of Code Set and Code Element

Figure 8.5 elaborates the definitions for code sets and code elements, which are fundamental to both ISO 639 and ISO 3166.

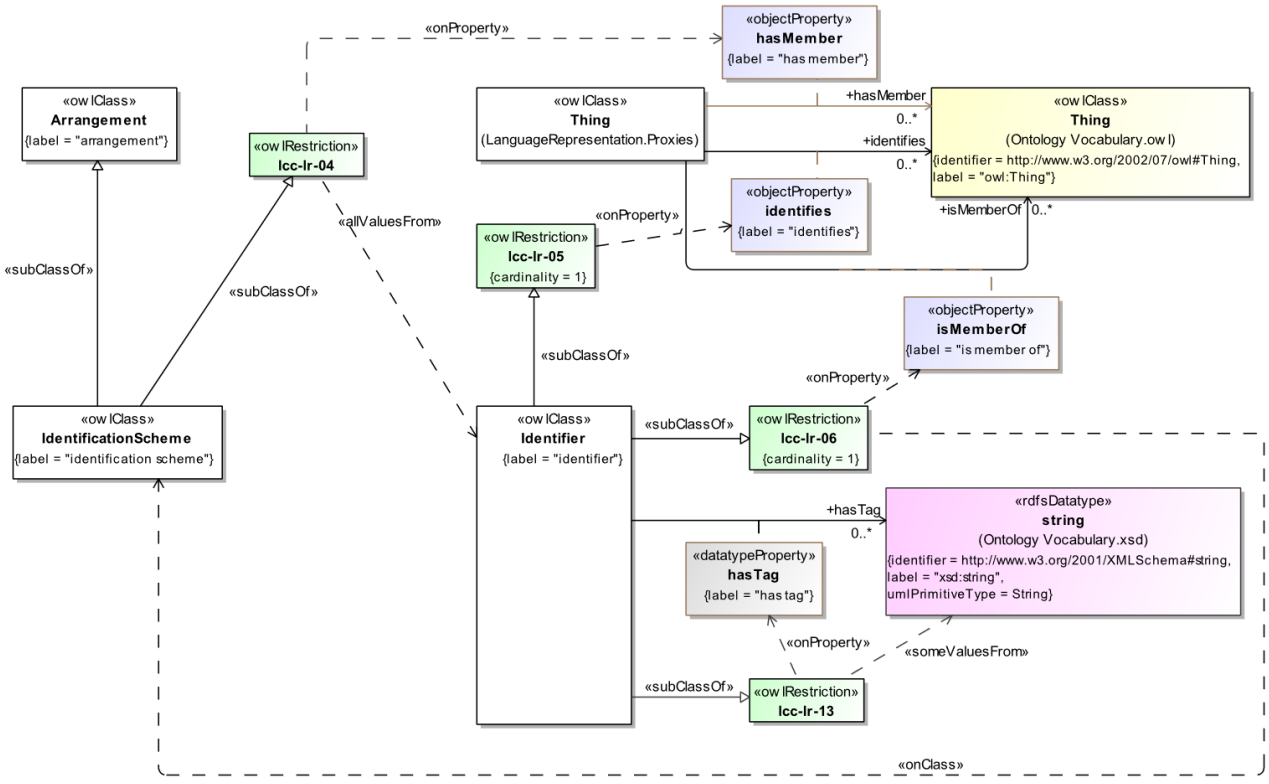

Figure 8.6 Definition of Identification Schemes and Identifiers

Figure 8.6 defines identification schemes and identifiers, which are also fundamental to both ISO 639 and ISO 3166.

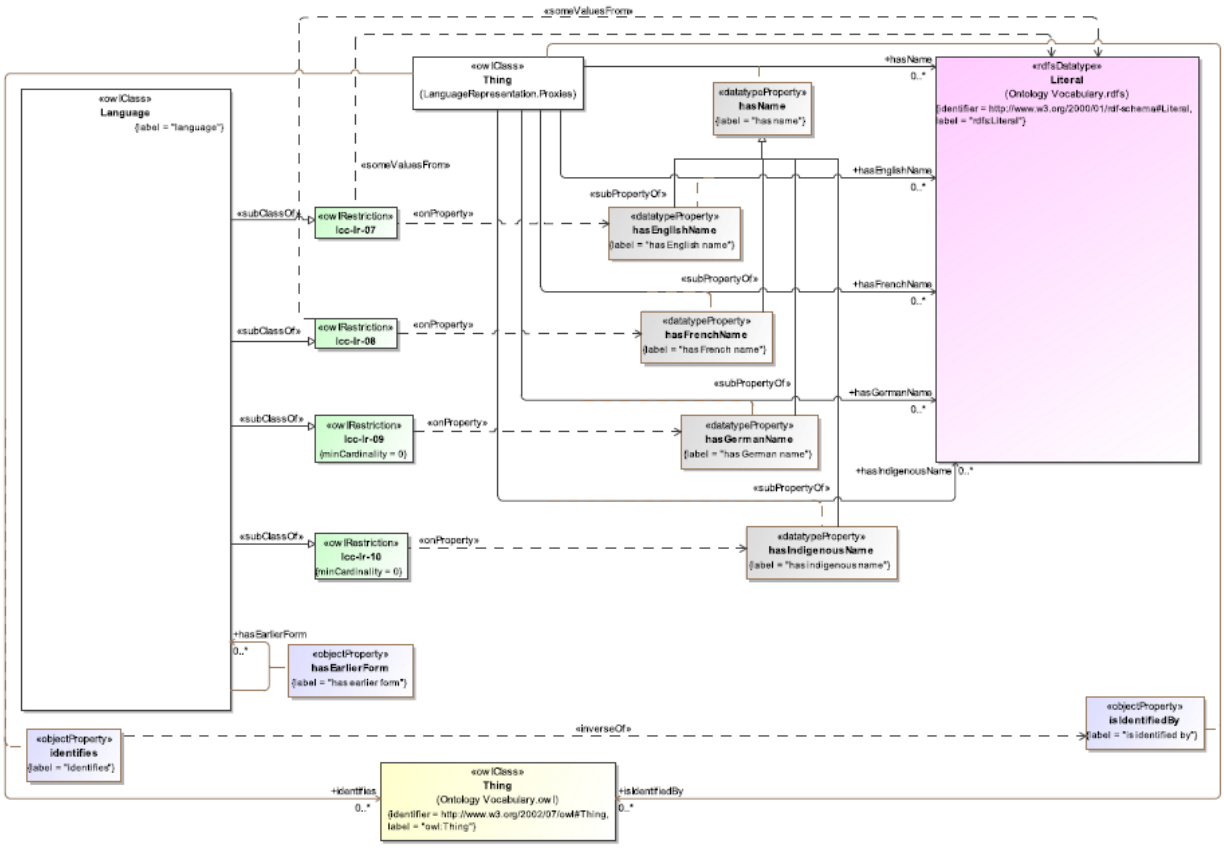

Figure 8.7 Definition of Language

As shown in Figure 8.7, there are a number of potential names associated with a given language as specified in the ISO 639 standard. German names have been added to the standard on the registration authority web sites.

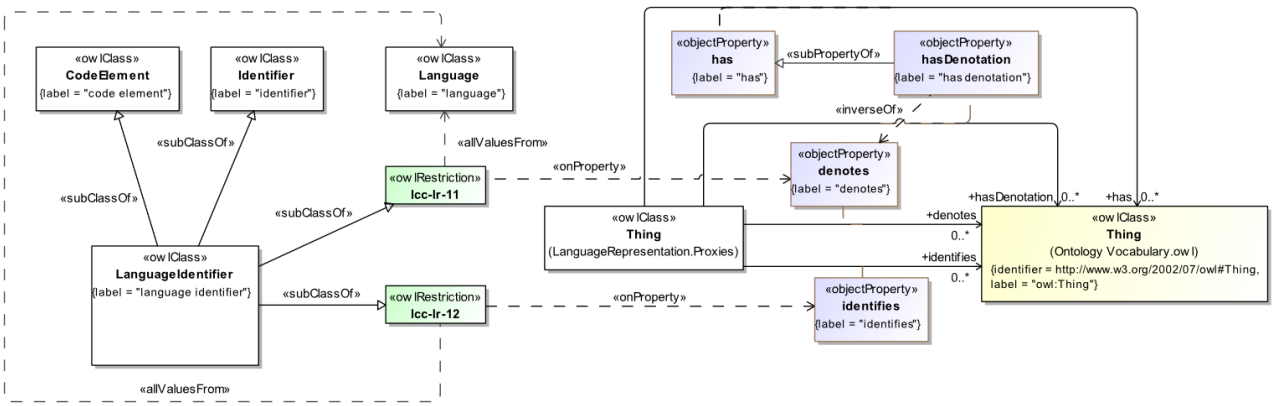

Figure 8.8 Definition of Language Identifier

Figure 8.8 provides the full definition of a language identifier, which the various kinds of ISO 639 language codes inherit.

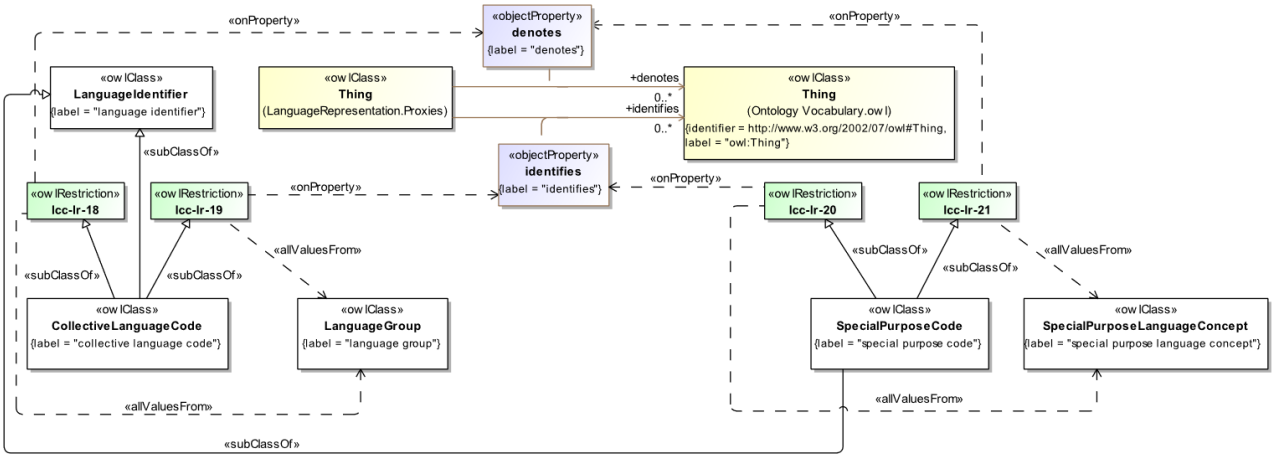

Figure 8.9 Definition of Identifiers for Language Groups and Special Purpose Concepts

ISO 639 differentiates between individual language and macrolanguages, including between the respective identifiers, where a macrolanguage represents multiple individual languages in some contexts, but is treated as a single language in ISO 639-2, as shown in Figure 8.8.

Finally, Figure 8.9 provides the definitions for the identifiers specific to language groups and special purpose concepts, as used in ISO 639.

The detailed annotations and axioms that comprise the ontology are provided in Table 8.3, below.

Table 8.3: Language Representation Ontology Details

Classes

Name	Annotations	Class Expressions
Alpha2Code (alpha-2 code)	Definition: a language identifier for a human language as defined by ISO 639-1, that is, a two-letter combination of characters used to represent a language or languages Note: In the ISO 639-1 language code, each language identifier is composed of two letters (lower case letters from the Latin alphabet, corresponding to characters 97 through 122 of the UTF-8 encoding), without diacritical marks or other encodings of any kind. Scope note: The identifiers are not abbreviations for the languages they identify. They are derived in some way from the indigenous language name or from preferences of the relevant speech community. Source: Section 4.1, ISO 639-1 See also: https://en.wikipedia.org/wiki/UTF-8	Parent Class: LanguageIdentifier
Alpha3Code (alpha-3 code)	Definition: a language identifier for a human language as defined by ISO 639, that is, a three-letter combination of characters used to represent a language or languages Note: In the ISO 639-2 language code, each language identifier is composed of three letters (lower case letters from the Latin alphabet, corresponding to characters 97 through 122 of the UTF-8 encoding), without diacritical marks or other encodings of any kind. Note: Two code sets are provided in ISO 639-2, one for bibliographic applications and one for terminology applications. Some of these are considered collective language codes, referring to a family of languages, and there are a few special purpose codes for use in various applications. ISO 639-3 provides a single, three character code for each individual language or macrolanguage. Additional codes for language families and groups are specified in other parts of the standard. Source: Section 3.2, ISO 639-2 See also: https://en.wikipedia.org/wiki/UTF-8	Parent Class: LanguageIdentifier
AncientLanguage (ancient language)	Definition: an extinct language that has an attested literature and is recognized as having special status in the academic community Note: Ancient languages may have either individual or collective language codes. See section 4.1.5, ISO 639-2, for an explanation of the latter case. Source: Section 3.25 and 4.7, ISO 639-4	Parent Class: ExtinctLanguage
Arrangement (arrangement)	Definition: a structure or means of organizing information such as a schema, numbering system, organization scheme, measurement system, taxonomy, or language for organizing information	
ArtificialLanguage (artificial language)	Definition: a language for human communication that has been artificially devised Note: Artificial languages do not include reconstructed languages or computer programming languages.	Parent Class: Language Class Axiom: ¬ NaturalLanguage

	Source: Section 3.28 and 4.8, ISO 639-4	
BibliographicCode (bibliographic code)	Definition: an alpha-3 code that is a member of the set of bibliographic codes in ISO 639-2	Parent Class: Alpha3Code
CodeElement (code element)	Definition: a sequence of characters denoting something that it is associated with for some purpose, within a specified context, according to some rule set Source: ISO/IEC 11179-3 Information technology - Metadata registries (MDR) - Part 3: Registry metamodel and basic attributes, Third edition, 2013-02-15	Property Restriction: = 1 isMemberOf.CodeSet (lcc-lr-02) Property Restriction: = 1 denotes (lcc-lr-03)
CodeSet (code set, coding scheme)	Definition: a system of alpha-numeric symbols, or combinations of symbols, that stand for specified values in some context Source: ISO/IEC 11179-3 Information technology - Metadata registries (MDR) - Part 3: Registry metamodel and basic attributes, Third edition, 2013-02-15	Parent Class: Arrangement Property Restriction: ∀ hasMember.CodeElement (lcc-lr-01)
Collection (collection)	Definition: a grouping of some variable number of things (may be zero) that have some shared significance	
CollectiveLanguageCode (collective language code)	Definition: a language identifier or code used to represent a group of languages Note: See section 4.1.1, ISO 639-2, for an explanation of the usage of such codes, and section 4.1.3 to gain understanding of the distinction between collective language and macrolanguage codes. Source: Sections 3.3 and 4.1.1, and 4.1.3, ISO 639-2; Section 4.6, ISO 639-4	Parent Class: LanguageIdentifier Class Axiom: ¬ SpecialPurposeCode Property Restriction: ∀ denotes.LanguageGroup (lcc-lr-18) Property Restriction: ∀ identifies.LanguageGroup (lcc-lr-19)
Dialect (dialect)	Definition: a language variant that is specific to a geographical region or speech community Note: Dialects are typically represented via the same language code as the code for the primary language, with a few exceptions for well-known dialects. See sections 4.1.3 and 4.1.4, ISO 639-2 for additional details on the treatment of dialects in the standard. Source: Sections 3.8, 4.2, and 4.5, ISO 639-4; Sections 4.1.3 and 4.1.4, ISO 639-2	Parent Class: LanguageVariant
ExtinctLanguage (extinct language)	Definition: an individual language or variant that is no longer in use and has no current descendant Source: Section 3.24 and 4.7, ISO 639-4	Parent Class: Language Class Axiom: ¬ LivingLanguage
HistoricalLanguage (historical language)	Definition: a well-known prior version of a living or extinct language Source: Section 3.26 and 4.7, ISO 639-4	Parent Class: Language
IdentificationScheme (identification scheme)	Definition: a system for allocating identifiers to objects Source: ISO/IEC 11179-3 Information technology - Metadata registries (MDR) - Part 3: Registry metamodel and basic attributes, Third edition, 2013-02-15	Parent Class: Arrangement Property Restriction: ∀ hasMember.Identifier (lcc-lr-04)
Identifier (identifier)	Definition: a sequence of characters uniquely identifying something that it is associated with for some purpose and within a specified context Note: Text-valued tags are included here as they may be useful for automated transformation or encoding systems, such as those used to produce IETF compliant language tags in XML.	Property Restriction: = 1 isMemberOf.IdentificationScheme (lcc-lr-06) Property Restriction: = 1 identifies (lcc-lr-05) Property Restriction: ∃ hasTag.string (lcc-lr-13)

	Source: ISO/IEC 11179-3 Information technology - Metadata registries (MDR) - Part 3: Registry metamodel and basic attributes, Third edition, 2013-02-15	
IndividualLanguage (individual language)	Definition: a language that can be distinguished from another language by some set of rules Note: Identifiers in Parts 1, 2, and 3 of ISO 639 are assumed to denote distinct individual languages, unless the language name explicitly refers to a language group. See section 4.2 in ISO 639-4 for a detailed explanation of the definition of individual language in the context of the ISO 639 standard. Source: Section 3.7, ISO 639-4	Parent Class: Language
IndividualLanguageIdentifier (individual language identifier)	Definition: a language identifier whose scope is that of an individual (distinct) language Source: Section 3.7, ISO 639-3	Parent Class: LanguageIdentifier Class Axiom: ¬ MacrolanguageIdentifier Property Restriction: ∀ denotes.IndividualLanguage (lcc-lr-14) Property Restriction: ∀ identifies.IndividualLanguage (lcc-lr-15)
Language (language)	Definition: a systematic use of sounds, characters, symbols or signs to communicate meaning Source: Section 3.6, ISO 639-4	Property Restriction: ≥ 1 hasEnglishName (lcc-lr-07) Property Restriction: ≥ 1 hasFrenchName (lcc-lr-08) Property Restriction: ε 0 hasGermanName (lcc-lr-9) Property Restriction: ≥ 0 hasIndigenousName (lcc-lr-10)
LanguageFamily (language family)	Definition: a group of individual languages related to each other through common ancestry Source: Section 3.11, ISO 639-4	Parent Class: LanguageGroup
LanguageGroup (language group)	Definition: a collection of two or more individual languages, treated as a group for some purpose Note: See section 4.6 in ISO 639-4 for additional explanatory material for language groups. Direct source: Section 3.10, ISO 639-4	Parent Class: Collection
LanguageIdentifier (language identifier, language symbol)	Definition: a string of characters that uniquely identifies a linguistic entity Scope note: In the language codes of Parts 1, 2, 3, and 5 of ISO 639, each language identifier is composed of two or three letters. Source: Section 3.5, ISO 639-4	Parent Class: CodeElement Parent Class: Identifier Property Restriction: ∀ denotes.Language (lcc-lr-11) Property Restriction: ∀ identifies.Language (lcc-lr-12)
LanguageVariant (language variant)	Definition: a variation of an individual language that is sufficiently unique that it can be identified and named Source: Section 3.14, ISO 639-4	Parent Class: IndividualLanguage
LanguageVariation (language variation)	Definition: continuous variation within and between individual languages Note: Language variation may include change over time, space, cultural affiliation, etc. Source: Section 3.13, ISO 639-4	
LivingLanguage (living language)	Definition: an individual language or variant in use today by some speech community Source: Section 3.23, ISO 639-4	Parent Class: Language
Macrolanguage (macrolanguage)	Definition: a language that may be viewed in some circumstances as an individual language, but actually represents two or more individual languages Note: See sections 4.1 and 4.3 of ISO 639-4 for an	Parent Class: Language

	extensive description of macrolanguages and how they are different from language groups. Source: Section 3.9, ISO 639-4	
MacrolanguageIdentifier (macrolanguage identifier)	Definition: a language identifier whose scope is that of a macrolanguage Source: Section 3.7, ISO 639-3	Parent Class: LanguageIdentifier Class Axiom: ¬ SpecialPurposeCode Property Restriction: ∀ denotes.Macrolanguage (lcc-lr-17) Property Restriction: ∀ identifies.Macrolanguage (lcc-lr-16)
NaturalLanguage (natural language)	Definition: a language used in human communications that is not artificial in nature Source: Section 3.27, ISO 639-4	Parent Class: Language
Orthography (orthography)	Definition: a set of conventions and rules for representing language in written form Note: The orthographic rules for a given language may include rules of spelling, hyphenation, capitalization, word breaks, emphasis, and punctuation. Languages that have multiple writing systems may have distinct orthographies and scripts. Source: Section 3.27, ISO 639-4	Parent Class: Collection
RemainderGroup (remainder group)	Definition: a group of languages that explicitly excludes certain individual languages Source: Section 3.12, ISO 639-4	Parent Class: LanguageGroup
Script (script)	Definition: a set of graphic characters used to represent one or more languages in writing Note: Use of multiple writing systems does not mean that multiple language identifiers are necessary for a language. ISO 639 language identifiers may be combined with script identifiers from ISO 15924 (e.g., BCP 47). Source: Section 3.17, ISO 639-4	Parent Class: Collection
SpecialPurposeCode (special purpose code)	Definition: a language identifier whose scope is that of a special purpose language construct Source: Section 3.7, ISO 639-3	Parent Class: LanguageIdentifier Property Restriction: ∀ denotes.SpecialPurposeLanguageConcept (lcc-lr-21) Property Restriction: ∀ identifies.SpecialPurposeLanguageConcept (lcc-lr-20)
SpecialPurposeLanguageConcept (special purpose language concept)	Definition: a language concept introduced in ISO 639-3 to satisfy special-purpose requirements, typically to support application constraints Source: Section 4.2.6, ISO 639-3	Parent Class: Language
SpokenLanguage (spoken language)	Definition: an individual language or language variant that is articulated through speech (oral or vocal) sounds Source: Section 3.22, ISO 639-4	Parent Class: Language
StandardVariant (standard variant)	Definition: a language variant with a high degree of status and normalization, typically used in public discourse, centers of government and commerce Source: Section 3.15, ISO 639-4	Parent Class: LanguageVariant
TerminologyCode (terminology code)	Definition: a language identifier whose scope is that of terminological codes Source: Section 3.7, ISO 639-3	Parent Class: Alpha3Code
Transcription (transcription)	Definition: the representation of speech or signing in written form Note: The resulting text is also referred to as a transcription.	

	Source: Section 3.19, ISO 639-4	
Transliteration (transliteration)	Definition: the conversion of text from one script to another without loss of information Note: The resulting text is also referred to as a transliteration. Source: Section 3.20, ISO 639-4	
WritingSystem (writing system)	Definition: a system for writing a language, including the requisite script and character set Source: Section 3.16, ISO 639-4	Parent Class: Arrangement Property Restriction: ∃ has.Orthography (lcc-lr-22) Property Restriction: ∃ has.Script (lcc-lr-23)
WrittenLanguage (written language)	Definition: the representation of a language via a writing system, with a relatively normalized orthography Source: Section 3.21, ISO 639-4	Parent Class: Language

Properties

Name	Annotations	Property Axioms
denotes (denotes)	Definition: serves as a linguistic expression of the notion of, means	
has (has)	Definition: indicates that someone (or something) possesses something, as a characteristic, attribute, feature, capability, and so forth	
hasDenotation (has denotation)	Definition: has meaning, expresses	Parent Property*:* has Inverse*:* denotes
hasEarlierForm (has earlier form)	Definition: relates a language to an earlier form (historically significant) of that same language	Parent Property*:* has Domain*:* Language Range: Language
hasMember (has member)	Definition: relates something, typically a collection, group or organization, to some discrete thing identified as a member of it	Inverse*:* isMemberOf
identifies (identifies)	Definition: recognizes or establishes within some context	
isIdentifiedBy (is identified by)	Definition: has an indicator or label, that is unique within some context	Inverse*:* identifies
isMemberOf (is member of)	Definition: belongs, either individually or collectively, to a group	
hasName (has name)	Definition: associates a name, reference name, or appellation with an individual concept Source: Section 3.4, ISO 639-3	
hasEnglishName (has English name)	Definition: associates a name in English with an individual concept Source: Section 3.4, ISO 639-3	Parent Property: hasName
hasFrenchName (has French name)	Definition: associates a name in French with an individual concept Source: Section 3.4, ISO 639-3	Parent Property: hasName
hasGermanName (has German name)	Definition: associates a name in German with an individual concept	Parent Property: hasName
hasIndigenousName (has indigenous name)	Definition: associates a local regional or cultural name with an individual concept Source: Section 3.4, ISO 639-3	Parent Property: hasName
hasTag (has tag)	Definition: a unique combination of alphanumeric characters corresponding to the identifier Source: Section 3.4, ISO 639-3	Domain: Identifier Range*:* string

8.4 Ontology: ISO 639-1 Language Codes

This ontology represents the subset of the ISO 639 standard that provides the language names and actual codes for ISO 639-1, updated to reflect changes identified on the Library of Congress site as of the month and year of the versionIRI.

Table 8.4: ISO 639-1 Language Codes Ontology Metadata

Metadata Term	Value
sm:filename	ISO639-1-LanguageCodes.rdf
sm:fileAbbreviation	lcc-639-1
OntologyIRI	https://www.omg.org/spec/LCC/Languages/ISO639-1-LanguageCodes/
owl:versionIRI	https://www.omg.org/spec/LCC/20190201/Languages/ISO639-1-LanguageCodes/
sm:dependsOn	https://www.omg.org/spec/LCC/Languages/LanguageRepresentation/
skos:changeNote	The http://www.omg.org/spec/LCC/20151101/Languages/ISO639-1-LanguageCodes.rdf version of this ontology has been revised to reflect the issues addressed by the LCC 1.0 FTF report. The codes themselves are current as of 31 July 2017, based on the US Library of Congress site.
skos:changeNote	The http://www.omg.org/spec/LCC/20190201/Languages/ISO639-1-LanguageCodes.rdf version of this ontology is current as of 14 February 2019, based on the US Library of Congress site.

Note that this ontology consists entirely of individuals representing the ISO 639-1 code set, language, and language codes, and therefore is not modeled herein. The contents of this ontology are considered normative, however, and are provided in machine-readable form.

8.5 Ontology: ISO 639-2 Language Codes

This ontology represents the subset of the ISO 639 standard that provides the language names and actual codes for ISO 639-2, updated to reflect changes identified on the Library of Congress site as of the month and year of the versionIRI.

Table 8.5: ISO 639-2 Language Codes Ontology Metadata

Metadata Term	Value
sm:filename	ISO639-2-LanguageCodes.rdf
sm:fileAbbreviation	lcc-639-2
OntologyIRI	https://www.omg.org/spec/LCC/Languages/ISO639-2-LanguageCodes/
owl:versionIRI	https://www.omg.org/spec/LCC/20190201/Languages/ISO639-2-LanguageCodes/
sm:dependsOn	https://www.omg.org/spec/LCC/Languages/LanguageRepresentation/ https://www.omg.org/spec/LCC/Languages/ISO639-1-LanguageCodes/
skos:changeNote	The http://www.omg.org/spec/LCC/20151101/Languages/ISO639-2-LanguageCodes.rdf version of this ontology has been revised to reflect the issues addressed by the LCC 1.0 FTF report. The codes themselves are current as of 31 July 2017, based on the US Library of Congress site.

skos:changeNote	The http://www.omg.org/spec/LCC/20190201/Languages/ISO639-2-LanguageCodes.rdf version of this ontology has been revised to reflect addition of the languages Standard Moroccan Tamazight (code zgh) and Montenegrin (code cnr). The codes themselves are current as of 14 February 2019, based on the US Library of Congress site.

Note that this ontology consists entirely of individuals representing the ISO 639-2 code set, language, and language codes, and therefore is not modeled herein. The contents of this ontology are considered normative, however, and are provided in machine-readable form.

9 Country Ontologies

9.1 Overview

This section defines the terms, definitions, relationships, and additional logic specified in the ontologies that make up the Countries Module.

9.2 Module: Countries

Table 9.1: Countries Module Metadata

Metadata Term	Value
sm:filename	AboutCountries.rdf
sm:fileAbbreviation	lcc-cty
OntologyIRI	https://www.omg.org/spec/LCC/Countries/AboutCountries/
owl:versionIRI	https://www.omg.org/spec/LCC/20190901/Countries/AboutCountries/
sm:moduleName	Countries
sm:moduleAbbreviation	LCC-CTY
sm:moduleVersion	1.0
sm:moduleAbstract	This module contains ontologies representing countries, territories, subdivisions, and other geopolitical entities commonly used in business, scientific, and government systems and applications. The main body of the module is designed to support ISO 3166 and the U.N. M49 region codes as normative a-box extensions, as well as the country element of the Language Tag specified in BCP 47 (RFC 4646, RFC 4647). It is intended to provide a systematic description of the vocabulary used for country representation in applications requiring geophysical and geopolitical concepts derived from, or in compliance with ISO 3166 and M49, including but not limited to web-based applications. It is also compatible with the GeoNames ontology, but represents only a subset of the content provided in GeoNames.

9.3 Ontology: Country Representation

The purpose of the Country Representation ontology, based on ISO 3166 and other representations of geographic regions and countries, such as the ISO Online Browsing Platform, UN M49 Region codes, SWIFT registry, UN FAO and CIA World Factbook, FIFA and International Olympics codes for countries, and GeoNames, is to provide a systematic description of the vocabulary used for country and geopolitical entity representation (based strictly on requirements for business applications, not broader geographic or political uses). A few additional properties to support geophysical coordinates, identified in the UN FAO and CIA World Factbook as well as from the well-known GeoNames ontology, have been added, but extensions to support other coding systems, such as the FAOSTAT code, have not been included.

ISO 3166 provides widely, though not universally, applicable coded representations of names of countries, dependencies, and other areas of particular geopolitical interest and their subdivisions, including:

- ISO 3166-1 (Country codes) establishes codes that represent the current names of countries, dependencies, and other areas of particular geopolitical interest, on the basis of lists of country names obtained from the United Nations.
- ISO 3166-2 (Country subdivision codes) establishes codes that represents the names of the principal administrative divisions, or similar areas, of the countries, etc. included in the ISO 3166-1 standard.
- ISO 3166-3 (Code for formerly used names of countries) establishes codes that represents non-current country names, i.e., the country names deleted from ISO 3166 since its first publication in 1974.

The United Nations Standard Country or Area Codes for Statistical Use (M49), described at https://unstats.un.org/unsd/methodology/m49/, provides further regional classification for countries by continent, region within a continent, and sub-regions within regions that are widely used as well, and so this ontology is designed to support the M49 code set as well. M49 reuses the ISO 3166 codes for countries and some regions, and augments that with additional, broader regional codes. This ontology provides a reference model to support the first two parts of ISO 3166, along with the other coding systems mentioned above.

Table 9.2: Country Representation Ontology Metadata

Metadata Term	Value
sm:filename	CountryRepresentation.rdf
sm:fileAbbreviation	lcc-cr
OntologyIRI	https://www.omg.org/spec/LCC/Countries/CountryRepresentation/
owl:versionIRI	https://www.omg.org/spec/LCC/20190201/Countries/CountryRepresentation/
sm:relatedSpecification	ISO 3166-1 Codes for the representation of names of countries and their subdivisions- Part 1: Country codes, Second edition, 2006-11-15 ISO 3166-2 Codes for the representation of names of countries and their subdivisions- Part 2: Country subdivision code, First edition, 1998-12-15 ISO 3166-3 Codes for the representation of names of countries and their subdivisions- Part 3: Code for formerly used names of countries, First edition, 1998-03-01
sm:relatedSpecification	Food and Agriculture Organization of the United Nations, see http://www.fao.org/countryprofiles/en/ Society for Worldwide Interbank Financial Telecommunication (SWIFT) Online Directories, see http://www.swift.com/bsl/index.faces CIA World Factbook, see https://www.cia.gov/library/publications/the-world-factbook/
sm:dependsOn	https://www.omg.org/spec/LCC/Languages/LanguageRepresentation/
skos:changeNote	The http://www.omg.org/spec/LCC/20171801/Countries/CountryRepresentation.rdf version of this ontology was revised to loosen the range constraints on the hasName properties to enable use of language tags, as stated in the LCC 1.1 RTF report.

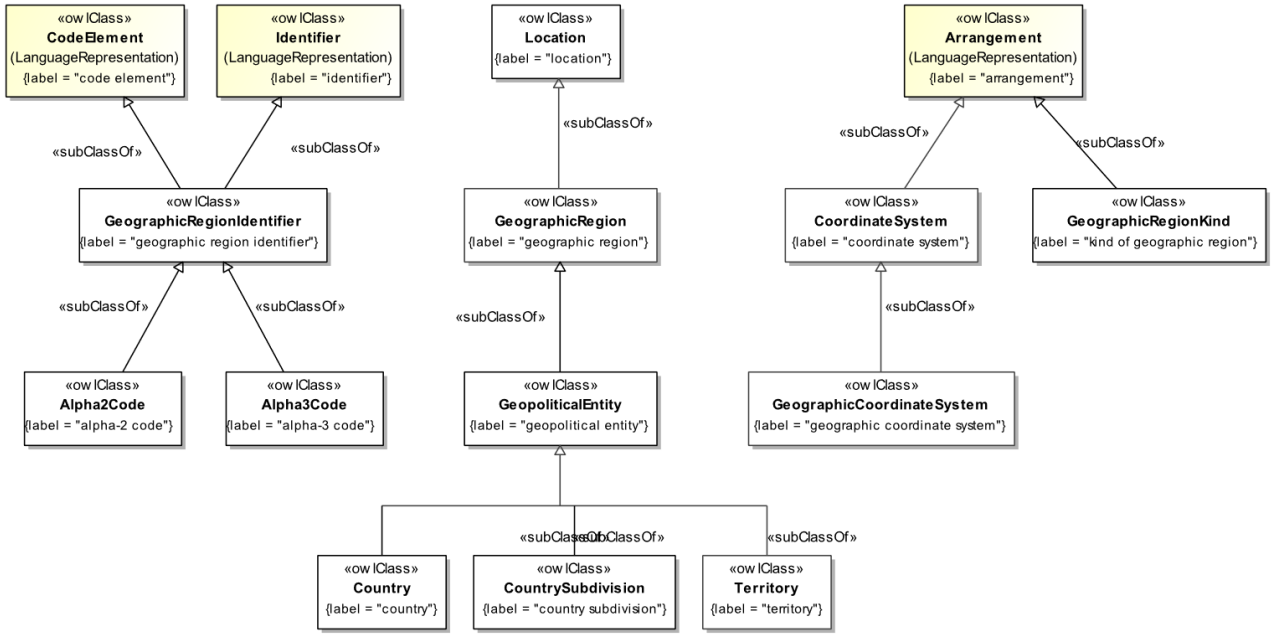

Figure 9.1 Country Representation Class Hierarchy

Figure 9.1 provides an overview of the concepts in the Country Representation ontology, including the primary inheritance relationships.

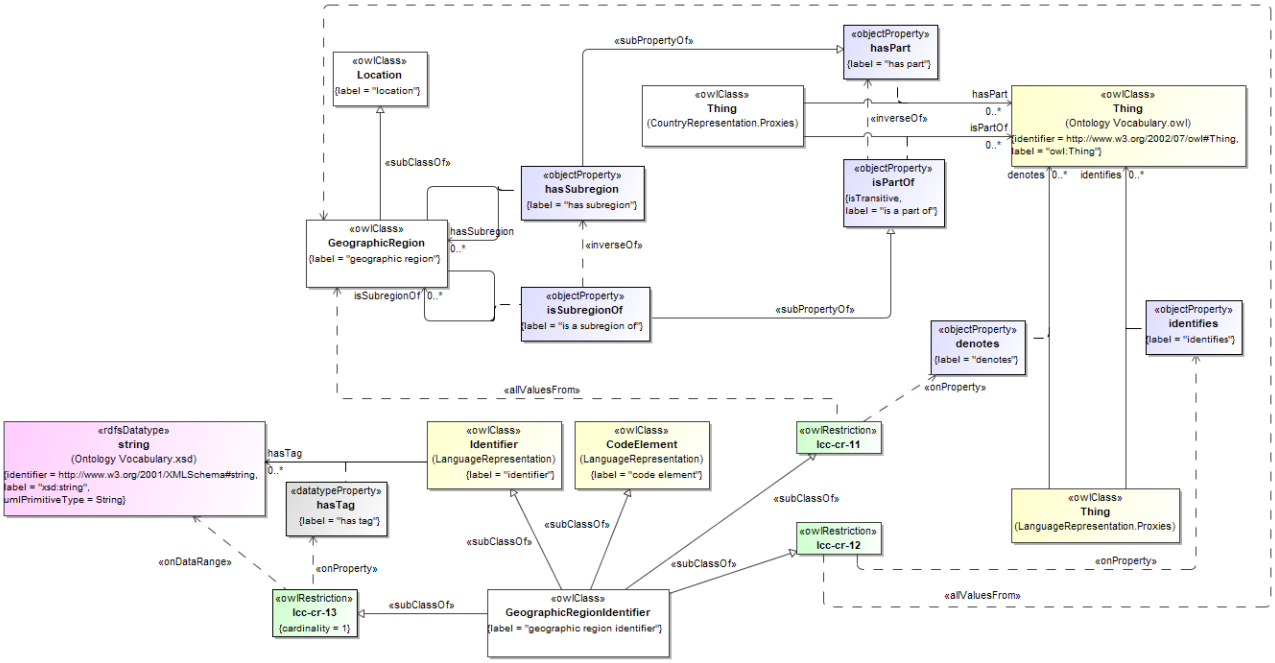

Figure 9.2 Geographic Regions

Figure 9.2 defines a geographic region as a location that may have sub-regions and may be identified by a geographic region identifier.

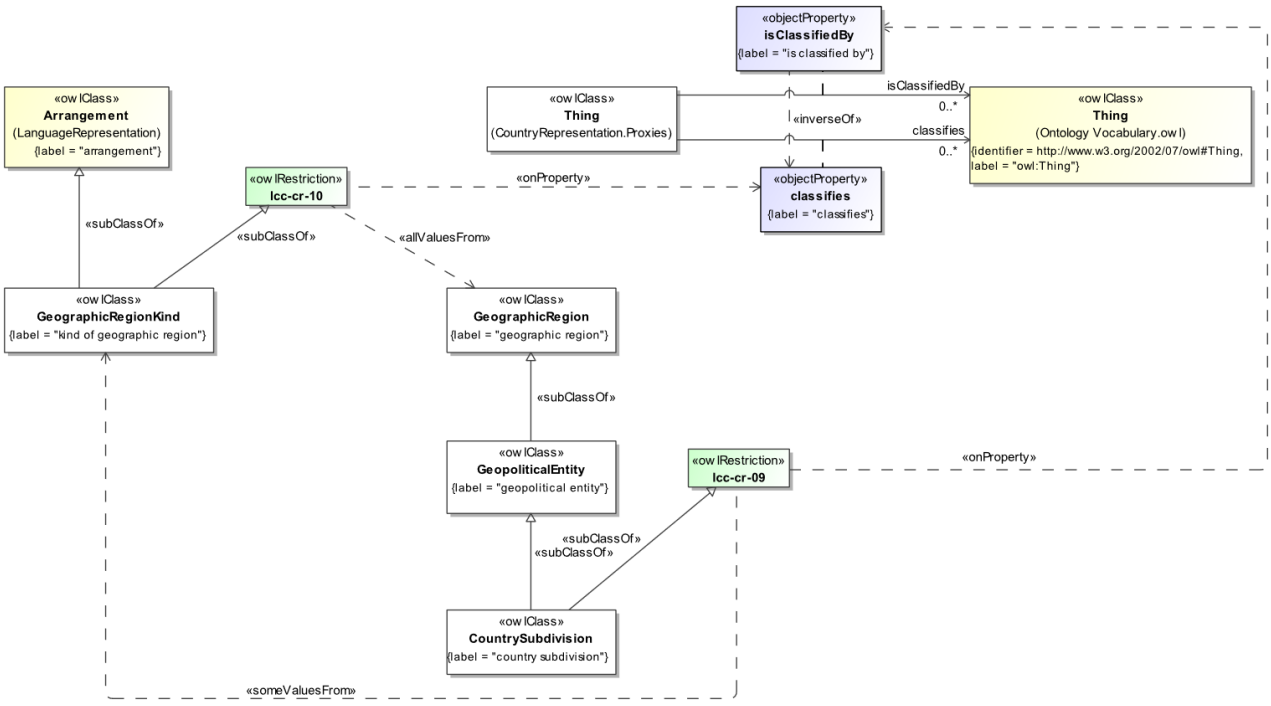

Figure 9.3 Classifying Geographic Regions

Figure 9.3 defines a geographic region kind as an arrangement that classifies geographic regions, and shows how, specifically, a country subdivision is classified by a geographic region kind (for example, as a province, state, district, territory, or other sub-region kind).

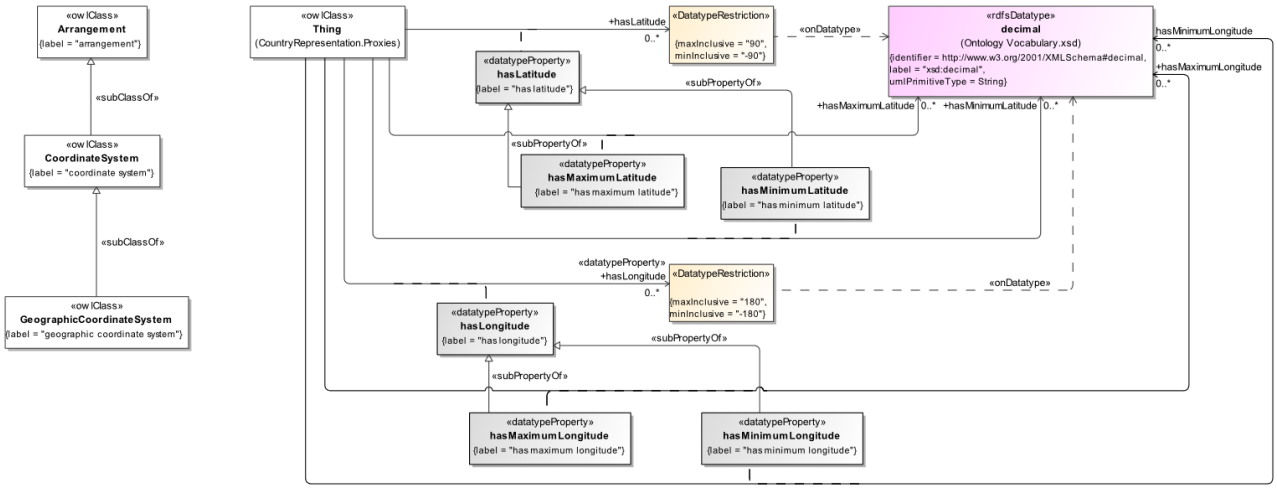

Figure 9.4 Locations and Coordinates

Figure 9.4 defines concepts relevant to geographic coordinate systems, including properties for representation of latitude and longitude for use in mapping to geographic region descriptions that include this information, such as the CIA World Factbook and Geonames.

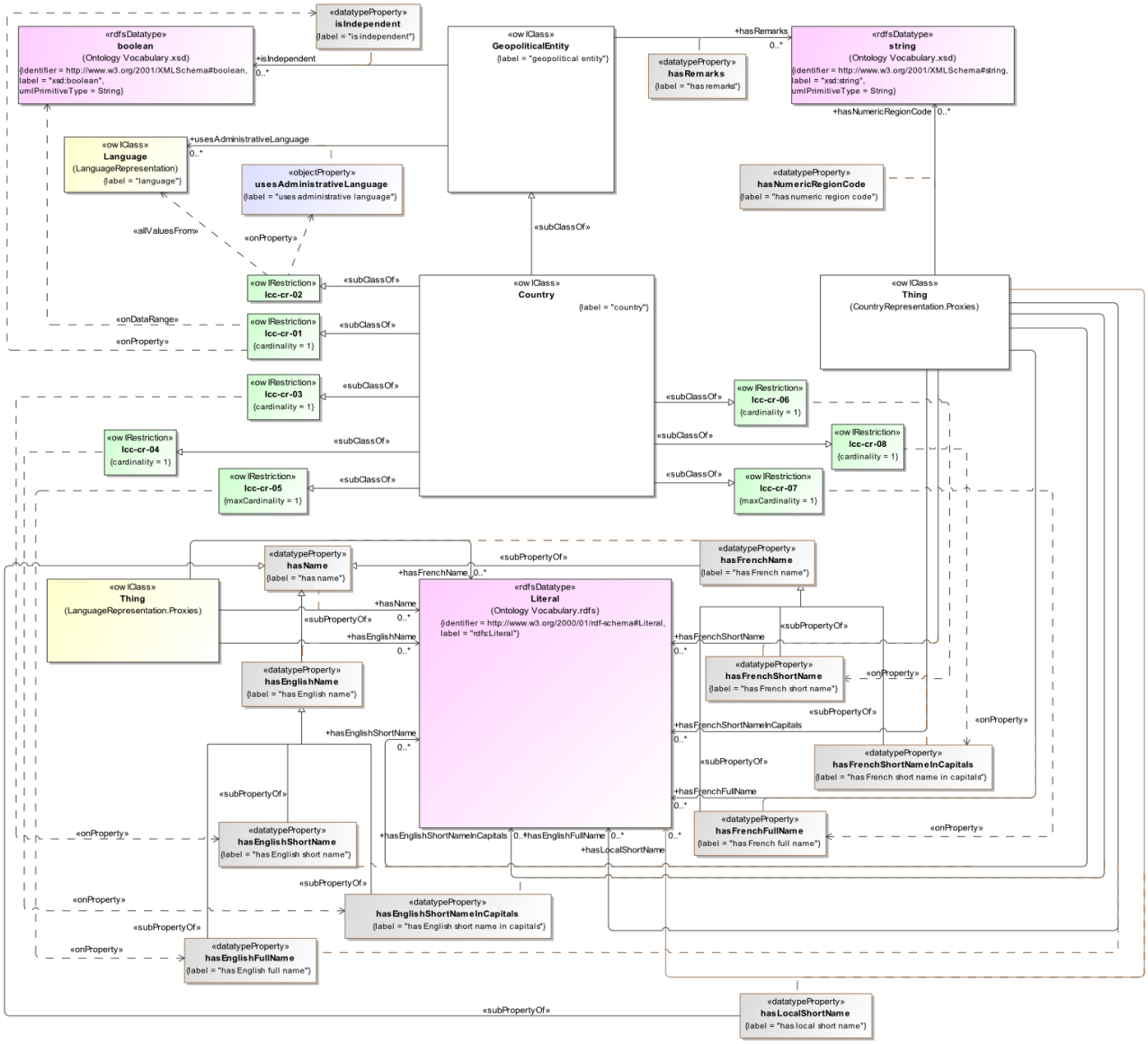

Figure 9.5 Definition of Country

Figure 9.5 expands on the definition of a country, including constraints indicating that the some of the English and French names are required.

The detailed annotations and axioms that comprise the ontology are provided in Table 9.3, below.

Table 9.3: Country Representation Ontology Details

Classes

Name	Annotations	Class Expressions
Alpha2Code (alpha-2 code)	Definition: a digraph representing a country or geographic region	Parent Class: GeographicRegionIdentifier
Alpha3Code (alpha-3 code)	Definition: a trigraph representing a country or geographic region	Parent Class: GeographicRegionIdentifier
CoordinateSystem (coordinate system)	Definition: a system that uses one or more numbers, or coordinates, to uniquely determine the position of a point or other geometric element on a planar or spherical surface Note: Without a concise definition of the coordinate system used to represent a point, it is difficult to change to a new coordinate system. Changing coordinate systems is required when integrating data from different sources into a common coordinate system. Source: http://edndoc.esri.com/arcsde/9.1/general_topics/what_coord_sys.htm Source: https://en.wikipedia.org/wiki/Coordinate_system	Parent Class: Arrangement
Country (country)	Definition: a geopolitical entity representing a country or dependent territory	Parent Class: GeopoliticalEntity Property Restriction: = 1 hasEnglishShortName (lcc-cr-03) Property Restriction: ≤ 1 hasEnglishFullName (lcc-cr-04) Property Restriction: = 1 hasEnglishShortNameInCapitals (lcc-cr-05) Property Restriction: = 1 hasFrenchShortName (lcc-cr-06) Property Restriction: ≤ 1 hasFrenchFullName (lcc-cr-07) Property Restriction: = 1 hasFrenchShortNameInCapitals (lcc-cr-08) Property Restriction: ∀ usesAdministrativeLanguage.Language (lcc-cr-02) Property Restriction: = 1 isIndependent.boolean (lcc-cr-01)
CountrySubdivision (country subdivision)	Definition: a geopolitical entity, typically a division of a country, dependency, or other area of special geopolitical interest related to a country or other geopolitical entity	Parent Class: GeopoliticalEntity Property Restriction: ∃ isClassifiedBy.GeographicRegionKind (lcc-cr-09)
GeographicCoordinateSystem (geographic coordinate system)	Definition: a three-dimensional reference system that locates points on the Earth's surface Note: The unit of measure is usually decimal degrees. A point has two coordinate values, latitude and longitude. Latitude and longitude measure angles. Example: The three most widely used systems for indicating point locations in the United States are (1) latitude and longitude [and optionally elevation], (2) Universal Transverse Mercator (UTM) system, and (3) State Plane Coordinate Systems (SPCS). Source: http://edndoc.esri.com/arcsde/9.1/general_topics/what_	Parent Class: CoordinateSystem

	coord_sys.htm Source: https://pubs.usgs.gov/circ/1983/0878b/report.pdf	
GeographicRegion (geographic region)	Definition: an area, especially part of a country or the world having definable characteristics but not always fixed boundaries Source: https://en.oxforddictionaries.com/definition/region	Parent Class: Location
GeographicRegionIdentifier (geographic region identifier)	Definition: a string of letters assigned to a country or other geographic region for the purpose of uniquely representing it	Parent Class: CodeElement Parent Class: Identifier Property Restriction: ∀ denotes.GeographicRegion (lcc-cr-11) Property Restriction: ∀ identifies.GeographicRegion (lcc-cr-12)
GeographicRegionKind (geographic region kind)	Definition: a classification scheme for geographic regions, including but not limited to subdivisions of a geopolitical entity, as (noting that there may be more than one kind for a given country or other entity)	Parent Class: Arrangement Property Restriction: ∀ classifies.GeographicRegion (lcc-cr-10)
GeopoliticalEntity (geopolitical entity)	Definition: any country, federal province, city or other administrative unit that represents a geophysical location and has some political identity	Parent Class: GeographicRegion
Location (location)	Definition: a place or position in time and/or space, including a virtual place	
Territory (territory)	Definition: a geopolitical entity, typically considered an area of special geopolitical interest, related to a country or other geopolitical entity Note: Certain territories are included in the ISO 3166-2 code set without an alpha 2 or alpha 3 code. In these cases, the numeric code for the subregion may have more than 3 characters in their corresponding numeric region codes.	Parent Class: GeopoliticalEntity

Properties

Name	Annotations	Property Axioms
classifies (classifies)	Definition: arranges in categories according to shared characteristics	
hasPart (has part)	Definition: indicates any portion of something, regardless of whether the portion itself is attached to the remainder or detached; cognitively salient or arbitrarily demarcated; self-connected or disconnected; homogeneous or gerrymandered; material or immaterial; extended or unextended; spatial or temporal Direct source: Stanford Encyclopedia of Philosophy at http://plato.stanford.edu/entries/mereology/	
hasSubregion (has subregion)	Definition: relates a geographic region to another geographic region that is a designated subregion of it	Parent Property: hasPart Domain: GeographicRegion Range: GeographicRegion
isClassifiedBy (is classified by)	Definition: indicates the classifier used to characterize something	Inverse: classifies
isPartOf (is a part of)	Definition: relates something to another thing that it is some	Property axiom: Transitive Inverse: hasPart

	component or portion of, regardless of how that whole-part relationship is manifested, i.e., attached to the remainder or detached; cognitively salient or arbitrarily demarcated; self-connected or disconnected; homogeneous or gerrymandered; material or immaterial; extended or unextended; spatial or temporal; the most generic part relation, reflexive, asymmetric, and transitive Direct source: Stanford Encyclopedia of Philosophy at http://plato.stanford.edu/entries/mereology/	
isSubregionOf (is a subregion of)	Definition: relates a geographic region to another geographic region that it is a part of	Parent Property: isPartOf Domain: GeographicRegion Range: GeographicRegion Inverse: hasSubregion
isUsedBy (is used by)	Definition: is employed by in the process of accomplishing something	
uses (uses)	Definition: employs as a means of accomplishing some task or achieving some result	Inverse: isUsedBy
usesAdministrativeLanguage uses administrative language)	Definition: relates a country or geopolitical entity to the administrative language(s) that entity uses for international communications	Parent Property: uses Domain: Country Range: Language
hasEnglishFullName (has English full name)	Definition: the full name, if different from the short form of the country name, in lower case	Parent Property: hasEnglishName
hasEnglishShortName (has English short name)	Definition: the short form of the country name, in English	Parent Property: hasEnglishName
hasEnglishShortNameInCapitals (has English short name in capitals)	Definition: the short form of the country name, in English (capitals)	Parent Property: hasEnglishName
hasFrenchFullName (has French full name)	Definition: the full name, if different from the short form of the country name, in lower case	Parent Property: hasFrenchName
hasFrenchShortName (has French short name)	Definition: the short form of the country name, in French	Parent Property: hasFrenchName
hasFrenchShortNameInCapitals (has French short name in captials)	Definition: the short form of the country name, in French (capitals)	Parent Property: hasFrenchName
hasLatitude (has latitude)	Definition: the angle formed by the intersection of a line perpendicular to the Earth's surface at a point and the plane of the Equator Note: Points north of the Equator have positive latitude values, while points south have negative values. Latitude values range from minus 90 to plus 90 degrees. Lines of latitude are also called parallels because a particular value of latitude forms a circle parallel to the Equator. Source: http://edndoc.esri.com/arcsde/9.1/general_topics/what_coord_sys.htm	Range: xsd:decimal [>= -90, <=90]
hasLocalShortName (has local short name)	Definition: the local, regional, cultural, or indigenous short form of	Parent Property: hasName Range: string

	the country name	
hasLongitude (has longitude)	Definition: the angle between a plane that passes through the point and the North and South poles, and a reference plane Note: The reference plane is known as the prime meridian. The most common prime meridian passes through Greenwich, United Kingdom. Other examples of prime meridians in use pass through Paris and Bogota. Longitude values range from minus 180 to plus 180 degrees." Source: http://edndoc.esri.com/arcsde/9.1/general_topics/what_coord_sys.htm	Range: xsd:decimal [>= -180, <=180]
hasMaximumLatitude (has maximum latitude)	Definition: a maximum latitude with respect to a range	Parent Property: hasLatitude Range: xsd:decimal
hasMaximumLongitude (has maximum longitude)	Definition: a maximum longitude with respect to a range	Parent Property: hasLongitude Range: xsd:decimal
hasMinimumLatitude (has minimum latitude)	Definition: a minimum latitude with respect to a range	Parent Property: hasLatitude Range: xsd:decimal
hasMinimumLongitude (has minimum longitude)	Definition: a minimum longitude with respect to a range	Parent Property: hasLongitude Range: xsd:decimal
hasNumericCountryRegionCode (has numeric region code)	Definition: a three-digit numeric code assigned to a region according to some code set Note: For certain territories that do not have an alternate designation (*i.e.* country or country subdivision code in ISO 3166), the corresponding numeric code may have four digits.	Range: string
hasRemarks (has remarks)	Definition: remarks, such as other widely-used country names, names of geographically separated territories, and so forth	Domain: GeopoliticalEntity Range: string
isIndependent (is independent)	Definition: indicates whether a geopolitical entity stands alone or is part of another country from an international political perspective	Domain: GeopoliticalEntity Range: boolean

9.4 Ontology: ISO 3166-1 Country Codes

This ontology represents the subset of the ISO 3166 standard that include the actual ISO 3166-1 country codes, with the ontology and codes for the other parts of the standard represented in dependent models.

Table 9.4: ISO 3166-1 Country Codes Ontology Metadata

Metadata Term	Value
sm:filename	ISO3166-1-CountryCodes.rdf
sm:fileAbbreviation	lcc-3166-1
OntologyIRI	https://www.omg.org/spec/LCC/Countries/ISO3166-1-CountryCodes/
owl:versionIRI	https://www.omg.org/spec/LCC/20190201/Countries/ISO3166-1-CountryCodes/
sm:dependsOn	https://www.omg.org/spec/LCC/Languages/LanguageRepresentation/ https://www.omg.org/spec/LCC/Languages/ISO639-1-LanguageCodes/ https://www.omg.org/spec/LCC/Countries/CountryRepresentation/
skos:changeNote	The http://www.omg.org/spec/LCC/20151101/Countries/ISO3166-1-CountryCodes.rdf version of this ontology has been revised to reflect the issues addressed by the LCC 1.0 FTF report. The country codes and related metadata contained herein are current as of the July 2017 revision to the online code set.
skos:changeNote	The https://www.omg.org/spec/LCC/20190201/Countries/ISO3166-1-CountryCodes.rdf version of this ontology has been revised to reflect the issues addressed by the LCC 1.1 RTF report. The country codes and related metadata contained herein are current as of the February 2019 revision to the online code set.
dct:issues	2019-02-14T00:48:51.124818+01:00

Note that this ontology consists entirely of individuals representing the ISO 3166-1 code set, countries, and country codes, and therefore is not modeled herein. The contents of this ontology are considered normative, however, and are provided in machine-readable form.

There is an additional, convenience, informative ontology ISO3166-1-CountryCodes-Adjunct which allows the countries to be referenced using a URI based on their 2 character code, which is often simpler to construct from external data sources. Each such URI has an owl:sameAs link to the full official URI based on the country name.

9.5 Ontology: ISO 3166-2 Subdivision Codes

This ontology represents the subset of the ISO 3166 standard that include the actual ISO 3166-2 subdivision codes, with the ontology and codes for the other parts of the standard represented in models that this ontology depends on.

Table 9.5: ISO 3166-2 Subdivision Codes Ontology Metadata

Metadata Term	Value
sm:filename	ISO3166-2-SubdivisionCodes.rdf
sm:fileAbbreviation	lcc-3166-2
OntologyIRI	https://www.omg.org/spec/LCC/Countries/ISO3166-2-SubdivisionCodes/
owl:versionIRI	https://www.omg.org/spec/LCC/20190201/Countries/ISO3166-2-SubdivisionCodes/
sm:dependsOn	https://www.omg.org/spec/LCC/Languages/LanguageRepresentation/ https://www.omg.org/spec/LCC/Languages/ISO639-1-LanguageCodes/ https://www.omg.org/spec/LCC/Countries/CountryRepresentation/ https://www.omg.org/spec/LCC/Countries/ISO3166-1-CountryCodes/
skos:changeNote	The http://www.omg.org/spec/LCC/20151101/Countries/ISO3166-2-SubdivisionCodes.rdf version of this ontology has been revised to reflect the issues addressed by the LCC 1.0 RTF report. The subdivision codes and related metadata contained herein are current as of the July 2017 revision to the online code set.

Note that the basic ISO 3166-2 ontology defines common code-related individuals only, and does not include any regional content. Regional content is included, by country, in the Regions sub-module. This module includes one ontology per country that submitted region codes to the United Nations / ISO in the latest release of the codes. See Table 7.2 for the structure of the URIs corresponding to the regional code ontologies and Annex B for a complete list of the namespaces and corresponding countries for which region codes are available.

There is an additional, convenience, informative ontology ISO3166-2-SubdivisionCodes-Adjunct which allows the subdivisions to be referenced using a URI based on their code, which is often simpler to construct from external data sources. Each such URI has a owl:sameAs link to the full official URI based on the subdivision name.

9.6 Ontology: Standard Country or Area Codes for Statistical Use (M49)

This ontology represents the United Nations publication 'Standard Country or Area Codes for Statistical Use' originally published as Series M, No. 49 and now commonly referred to as the M49 standard. The assignment of countries or areas to specific groupings is for statistical convenience and does not imply any assumption regarding political or other affiliation of countries or territories by the United Nations. The codes included herein are current as of the version IRI for this ontology.

Table 9.6: M49 Region Codes Ontology Metadata

Metadata Term	Value
sm:filename	UN-M49-RegionCodes.rdf
sm:fileAbbreviation	lcc-m49
OntologyIRI	https://www.omg.org/spec/LCC/Countries/UN-M49-RegionCodes/
owl:versionIRI	https://www.omg.org/spec/LCC/20190201/Countries/UN-M49-RegionCodes/
sm:dependsOn	https://www.omg.org/spec/LCC/Languages/LanguageRepresentation/ https://www.omg.org/spec/LCC/Countries/CountryRepresentation/ https://www.omg.org/spec/LCC/Countries/ISO3166-1-CountryCodes/
skos:changeNote	The https://www.omg.org/spec/LCC/20190201/Countries/UN-M49-RegionCodes/ version of this ontology has been revised to reflect the issues addressed by the LCC 1.1 RTF report. The country codes and related metadata contained herein are current as of the February 2019 revision to the online code set.
dct:issued	2019-02-14T22:26:02.631805+02:00

Note that this ontology consists entirely of individuals representing the UN M49 region code set, and therefore is not modeled herein. The contents of this ontology are considered normative, however, and are provided in machine-readable form.

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Annex A: Deliverables

(normative)

The LCC ontologies are delivered as (1) RDF/XML serialized OWL (normative and definitive), (2) UML XMI, serialized from UML with the ODM profiles for RDF and OWL applied (normative), (3) ODM XMI, serialized based on the ODM MOF metamodels for RDF and OWL (normative), and (4) Visual Ontology Modeler (VOM) model files, based on the VOM plug-in to MagicDraw (ancillary). If there are differences between the OWL files, ODM XMI, and UML XMI, the OWL files take precedence, followed by the UML XMI, and finally the ODM XMI.

Regardless of their form, each of the ontologies included in Languages, Countries and Codes (LCC) makes normative reference to the DCMI Dublin Core Metadata Terms [Dublin Core], W3C Simple Knowledge Organization System (SKOS) Recommendation [SKOS], and the OMG Architecture Board's Specification Metadata Recommendation [OMG AB Specification Metadata], which are not part of this specification.

The individual RDF/XML files are organized by module (directory), and within a given module, alphabetically by name, as shown in the URI structure for each individual OWL file. These files are UTF-8 conformant XML files that are also OWL 2 compliant, and may be examined using any text editor, XML editor, or RDF or OWL editor. They have been verified for syntactic correctness via the W3C RDF Validator and University of Manchester OWL 2 Validator. They have also been checked for logical consistency using the Pellet OWL 2 reasoner from Stardog Union (formerly Complexible, and prior to that, Clark & Parsia) as well as the HermiT OWL 2 reasoner from Oxford University. It is anticipated that the OWL ontologies will be dereference-able, together with technical documentation (HTML) from the OMG site.

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Annex B: ISO 3166-2 Regions

(normative)

This Annex lists the machine-readable files for country subdivisions, which are a normative part of the Languages, Countries, and Codes (LCC) specification. There is one file for each country that has subdivisions or territories as defined by ISO 3166. As stated in clause 9.5, these files are all in a module (subdirectory) called Regions, and are named according to the 2 character ISO-3166 code for the country. The files are automatically generated from the ISO 3166 XML file according to the algorithm described in Annex C.

Table B.1 lists the ontologies that contain the subdivision codes that comprise the ISO 3166-2 code set, by country, including their namespace prefix, country name, and canonical namespace.

Table B 1: ISO 3166-2 Country Subdivision Ontologies

Namespace Prefix	Country	Namespace
lcc-3166-2-ad	Andorra	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-AD/
lcc-3166-2-ae	United Arab Emirates	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-AE/
lcc-3166-2-af	Afghanistan	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-AF/
lcc-3166-2-ag	Antigua and Barbuda	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-AG/
lcc-3166-2-al	Albania	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-AL/
lcc-3166-2-am	Armenia	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-AM/
lcc-3166-2-ao	Angola	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-AO/
lcc-3166-2-ar	Argentina	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-AR/
lcc-3166-2-as	American Samoa	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-AS/
lcc-3166-2-at	Austria	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-AT/
lcc-3166-2-au	Australia	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-AU/
lcc-3166-2-az	Azerbaijan	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-AZ/
lcc-3166-2-ba	Bosnia and Herzegovina	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-BA/
lcc-3166-2-bb	Barbados	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-BB/
lcc-3166-2-bd	Bangladesh	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-BD/
lcc-3166-2-be	Belgium	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-BE/
lcc-3166-2-bf	Burkina Faso	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-BF/
lcc-3166-2-bg	Bulgaria	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-BG/
lcc-3166-2-bh	Bahrain	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-BH/
lcc-3166-2-bi	Burundi	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-BI/
lcc-3166-2-bj	Benin	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-BJ/

lcc-3166-2-bn	Brunei Darussalam	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-BN/
lcc-3166-2-bo	Bolivia	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-BO/
lcc-3166-2-bq	Bonaire, Sint Eustatius and Saba	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-BQ/
lcc-3166-2-br	Brazil	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-BR/
lcc-3166-2-bs	Bahamas	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-BS/
lcc-3166-2-bt	Bhutan	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-BT/
lcc-3166-2-bw	Botswana	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-BW/
lcc-3166-2-by	Belarus	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-BY/
lcc-3166-2-bz	Belize	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-BZ/
lcc-3166-2-ca	Canada	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-CA/
lcc-3166-2-cd	Congo, Democratic Republic Of	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-CD/
lcc-3166-2-cf	Central African Republic	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-CF/
lcc-3166-2-cg	Congo	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-CG/
lcc-3166-2-ch	Switzerland	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-CH/
lcc-3166-2-ci	Côte d'Ivoire	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-CI/
lcc-3166-2-ck	Cook Islands	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-CK/
lcc-3166-2-cl	Chile	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-CL/
lcc-3166-2-cm	Cameroon	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-CM/
lcc-3166-2-cn	China	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-CN/
lcc-3166-2-co	Colombia	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-CO/
lcc-3166-2-cr	Costa Rica	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-CR/
lcc-3166-2-cu	Cuba	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-CU/
lcc-3166-2-cv	Cabo Verde	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-CV/
lcc-3166-2-cy	Cyprus	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-CY/
lcc-3166-2-cz	Czechia	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-CZ/
lcc-3166-2-de	Germany	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-DE/
lcc-3166-2-dj	Djibouti	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-DJ/
lcc-3166-2-dk	Denmark	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-DK/
lcc-3166-2-dm	Dominica	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-DM/
lcc-3166-2-do	Dominican Republic	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-DO/
lcc-3166-2-dz	Algeria	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-DZ/
lcc-3166-2-	Ecuador	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-

ec		2-SubdivisionCodes-EC/
lcc-3166-2-ee	Estonia	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-EE/
lcc-3166-2-eg	Egypt	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-EG/
lcc-3166-2-er	Eritrea	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-ER/
lcc-3166-2-es	Spain	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-ES/
lcc-3166-2-et	Ethiopia	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-ET/
lcc-3166-2-fi	Finland	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-FI/
lcc-3166-2-fj	Fiji	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-FJ/
lcc-3166-2-fm	Micronesia	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-FM/
lcc-3166-2-fr	France	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-FR/
lcc-3166-2-ga	Gabon	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-GA/
lcc-3166-2-gb	United Kingdom of Great Britain and Northern Ireland	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-GB/
lcc-3166-2-gd	Grenada	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-GD/
lcc-3166-2-ge	Georgia	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-GE/
lcc-3166-2-gg	Guernsey	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-GG/
lcc-3166-2-gh	Ghana	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-GH/
lcc-3166-2-gl	Greenland	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-GL/
lcc-3166-2-gm	Gambia	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-GM/
lcc-3166-2-gn	Guinea	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-GN/
lcc-3166-2-gp	Guadeloupe	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-GP/
lcc-3166-2-gq	Equatorial Guinea	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-GQ/
lcc-3166-2-gr	Greece	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-GR/
lcc-3166-2-gs	South Georgia and the South Sandwich Islands	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-GS/
lcc-3166-2-gt	Guatemala	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-GT/
lcc-3166-2-gw	Guinea-Bissau	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-GW/
lcc-3166-2-gy	Guyana	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-GY/
lcc-3166-2-hm	Heard Island and McDonald Islands	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-HM/
lcc-3166-2-hn	Honduras	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-HN/
lcc-3166-2-hr	Croatia	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-HR/
lcc-3166-2-ht	Haiti	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-HT/
lcc-3166-2-hu	Hungary	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-HU/
lcc-3166-2-	Indonesia	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-

id		2-SubdivisionCodes-ID/
lcc-3166-2-ie	Ireland	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-IE/
lcc-3166-2-il	Israel	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-IL/
lcc-3166-2-in	India	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-IN/
lcc-3166-2-io	British Indian Ocean Territory	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-IO/
lcc-3166-2-iq	Iraq	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-IQ/
lcc-3166-2-ir	Iran	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-IR/
lcc-3166-2-is	Iceland	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-IS/
lcc-3166-2-it	Italy	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-IT/
lcc-3166-2-jm	Jamaica	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-JM/
lcc-3166-2-jo	Jordan	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-JO/
lcc-3166-2-jp	Japan	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-JP/
lcc-3166-2-ke	Kenya	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-KE/
lcc-3166-2-kg	Kyrgyzstan	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-KG/
lcc-3166-2-kh	Cambodia	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-KH/
lcc-3166-2-ki	Kiribati	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-KI/
lcc-3166-2-km	Comoros	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-KM/
lcc-3166-2-kn	Saint Kitts and Nevis	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-KN/
lcc-3166-2-kp	Korea, Democratic Peoples Republic Of	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-KP/
lcc-3166-2-kr	Korea, Republic Of	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-KR/
lcc-3166-2-kw	Kuwait	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-KW/
lcc-3166-2-ky	Cayman Islands	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-KY/
lcc-3166-2-kz	Kazakhstan	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-KZ/
lcc-3166-2-la	Lao People's Democratic Republic	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-LA/
lcc-3166-2-lb	Lebanon	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-LB/
lcc-3166-2-lc	Saint Lucia	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-LC/
lcc-3166-2-li	Liechtenstein	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-LI/
lcc-3166-2-lk	Sri Lanka	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-LK/
lcc-3166-2-lr	Liberia	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-LR/
lcc-3166-2-ls	Lesotho	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-LS/
lcc-3166-2-lt	Lithuania	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-LT/
lcc-3166-2-lu	Luxembourg	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-LU/

lcc-3166-2-lv	Latvia	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-LV/
lcc-3166-2-ly	Libya	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-LY/
lcc-3166-2-ma	Morocco	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-MA/
lcc-3166-2-mc	Monaco	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-MC/
lcc-3166-2-md	Moldova	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-MD/
lcc-3166-2-me	Montenegro	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-ME/
lcc-3166-2-mf	Saint Martin	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-MF/
lcc-3166-2-mg	Madagascar	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-MG/
lcc-3166-2-mh	Marshall Islands	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-MH/
lcc-3166-2-mk	Macedonia	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-MK/
lcc-3166-2-ml	Mali	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-ML/
lcc-3166-2-mm	Myanmar	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-MM/
lcc-3166-2-mn	Mongolia	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-MN/
lcc-3166-2-mp	Northern Mariana Islands	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-MP/
lcc-3166-2-mr	Mauritania	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-MR/
lcc-3166-2-mt	Malta	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-MT/
lcc-3166-2-mu	Mauritius	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-MU/
lcc-3166-2-mv	Maldives	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-MV/
lcc-3166-2-mw	Malawi	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-MW/
lcc-3166-2-mx	Mexico	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-MX/
lcc-3166-2-my	Malaysia	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-MY/
lcc-3166-2-mz	Mozambique	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-MZ/
lcc-3166-2-na	Namibia	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-NA/
lcc-3166-2-nc	New Caledonia	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-NC/
lcc-3166-2-ne	Niger	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-NE/
lcc-3166-2-ng	Nigeria	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-NG/
lcc-3166-2-ni	Nicaragua	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-NI/
lcc-3166-2-nl	Netherlands	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-NL/
lcc-3166-2-no	Norway	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-NO/
lcc-3166-2-np	Nepal	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-NP/
lcc-3166-2-nr	Nauru	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-NR/
lcc-3166-2-	New Zealand	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-

nz		2-SubdivisionCodes-NZ/
lcc-3166-2-om	Oman	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-OM/
lcc-3166-2-pa	Panama	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-PA/
lcc-3166-2-pe	Peru	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-PE/
lcc-3166-2-pf	French Polynesia	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-PF/
lcc-3166-2-pg	Papua New Guinea	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-PG/
lcc-3166-2-ph	Philippines	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-PH/
lcc-3166-2-pk	Pakistan	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-PK/
lcc-3166-2-pl	Poland	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-PL/
lcc-3166-2-pm	Saint Pierre and Miquelon	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-PM/
lcc-3166-2-pn	Pitcairn	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-PN/
lcc-3166-2-ps	Palestine	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-PS/
lcc-3166-2-pt	Portugal	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-PT/
lcc-3166-2-pw	Palau	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-PW/
lcc-3166-2-py	Paraguay	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-PY/
lcc-3166-2-qa	Qatar	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-QA/
lcc-3166-2-ro	Romania	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-RO/
lcc-3166-2-rs	Serbia	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-RS/
lcc-3166-2-ru	Russian Federation	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-RU/
lcc-3166-2-rw	Rwanda	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-RW/
lcc-3166-2-sa	Saudi Arabia	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-SA/
lcc-3166-2-sb	Solomon Islands	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-SB/
lcc-3166-2-sc	Seychelles	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-SC/
lcc-3166-2-sd	Sudan	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-SD/
lcc-3166-2-se	Sweden	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-SE/
lcc-3166-2-sg	Singapore	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-SG/
lcc-3166-2-sh	Saint Helena, Ascension and Tristan da Cunha	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-SH/
lcc-3166-2-si	Slovenia	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-SI/
lcc-3166-2-sj	Svalbard and Jan Mayen	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-SJ/
lcc-3166-2-sk	Slovakia	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-SK/
lcc-3166-2-sl	Sierra Leone	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-SL/
lcc-3166-2-sm	San Marino	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-SM/

lcc-3166-2-sn	Senegal	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-SN/
lcc-3166-2-so	Somalia	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-SO/
lcc-3166-2-sr	Suriname	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-SR/
lcc-3166-2-ss	South Sudan	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-SS/
lcc-3166-2-st	Sao Tome and Principe	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-ST/
lcc-3166-2-sv	El Salvador	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-SV/
lcc-3166-2-sy	Syrian Arab Republic	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-SY/
lcc-3166-2-sz	Eswatini	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-SZ/
lcc-3166-2-tc	Turks and Caicos Islands	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-TC/
lcc-3166-2-td	Chad	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-TD/
lcc-3166-2-tf	French Southern Territories	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-TF/
lcc-3166-2-tg	Togo	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-TG/
lcc-3166-2-th	Thailand	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-TH/
lcc-3166-2-tj	Tajikistan	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-TJ/
lcc-3166-2-tl	Timor-Leste	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-TL/
lcc-3166-2-tm	Turkmenistan	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-TM/
lcc-3166-2-tn	Tunisia	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-TN/
lcc-3166-2-to	Tonga	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-TO/
lcc-3166-2-tr	Turkey	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-TR/
lcc-3166-2-tt	Trinidad and Tobago	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-TT/
lcc-3166-2-tv	Tuvalu	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-TV/
lcc-3166-2-tw	Taiwan	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-TW/
lcc-3166-2-tz	Tanzania	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-TZ/
lcc-3166-2-ua	Ukraine	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-UA/
lcc-3166-2-ug	Uganda	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-UG/
lcc-3166-2-um	United States Minor Outlying Islands	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-UM/
lcc-3166-2-us	United States of America	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-US/
lcc-3166-2-uy	Uruguay	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-UY/
lcc-3166-2-uz	Uzbekistan	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-UZ/
lcc-3166-2-vc	Saint Vincent and the Grenadines	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-VC/
lcc-3166-2-ve	Venezuela	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-VE/
lcc-3166-2-	Virgin Islands, British	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-

vg		2-SubdivisionCodes-VG/
lcc-3166-2-vi	Virgin Islands, US	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-VI/
lcc-3166-2-vn	Viet Nam	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-VN/
lcc-3166-2-vu	Vanuatu	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-VU/
lcc-3166-2-wf	Wallis and Futuna	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-WF/
lcc-3166-2-ws	Samoa	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-WS/
lcc-3166-2-ye	Yemen	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-YE/
lcc-3166-2-za	South Africa	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-ZA/
lcc-3166-2-zm	Zambia	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-ZM/
lcc-3166-2-zw	Zimbabwe	https://www.omg.org/spec/LCC/Countries/Regions/ISO3166-2-SubdivisionCodes-ZW/

The following list is of the OWL files corresponding to the namespaces listed in Table B.1, above, which are in RDF/XML format.

ISO3166-2-SubdivisionCodes-AD.rdf
ISO3166-2-SubdivisionCodes-AE.rdf
ISO3166-2-SubdivisionCodes-AF.rdf
ISO3166-2-SubdivisionCodes-AG.rdf
ISO3166-2-SubdivisionCodes-AL.rdf
ISO3166-2-SubdivisionCodes-AM.rdf
ISO3166-2-SubdivisionCodes-AO.rdf
ISO3166-2-SubdivisionCodes-AR.rdf
ISO3166-2-SubdivisionCodes-AS.rdf
ISO3166-2-SubdivisionCodes-AT.rdf
ISO3166-2-SubdivisionCodes-AU.rdf
ISO3166-2-SubdivisionCodes-AZ.rdf
ISO3166-2-SubdivisionCodes-BA.rdf
ISO3166-2-SubdivisionCodes-BB.rdf
ISO3166-2-SubdivisionCodes-BD.rdf
ISO3166-2-SubdivisionCodes-BE.rdf
ISO3166-2-SubdivisionCodes-BF.rdf
ISO3166-2-SubdivisionCodes-BG.rdf
ISO3166-2-SubdivisionCodes-BH.rdf
ISO3166-2-SubdivisionCodes-BI.rdf
ISO3166-2-SubdivisionCodes-BJ.rdf
ISO3166-2-SubdivisionCodes-BN.rdf
ISO3166-2-SubdivisionCodes-BO.rdf
ISO3166-2-SubdivisionCodes-BQ.rdf
ISO3166-2-SubdivisionCodes-BR.rdf
ISO3166-2-SubdivisionCodes-BS.rdf
ISO3166-2-SubdivisionCodes-BT.rdf
ISO3166-2-SubdivisionCodes-BW.rdf
ISO3166-2-SubdivisionCodes-BY.rdf
ISO3166-2-SubdivisionCodes-BZ.rdf
ISO3166-2-SubdivisionCodes-CA.rdf
ISO3166-2-SubdivisionCodes-CD.rdf
ISO3166-2-SubdivisionCodes-CF.rdf
ISO3166-2-SubdivisionCodes-CN.rdf
ISO3166-2-SubdivisionCodes-CO.rdf
ISO3166-2-SubdivisionCodes-CR.rdf
ISO3166-2-SubdivisionCodes-CU.rdf
ISO3166-2-SubdivisionCodes-CV.rdf
ISO3166-2-SubdivisionCodes-CY.rdf
ISO3166-2-SubdivisionCodes-CZ.rdf
ISO3166-2-SubdivisionCodes-DE.rdf
ISO3166-2-SubdivisionCodes-DJ.rdf
ISO3166-2-SubdivisionCodes-DK.rdf
ISO3166-2-SubdivisionCodes-DM.rdf
ISO3166-2-SubdivisionCodes-DO.rdf
ISO3166-2-SubdivisionCodes-DZ.rdf
ISO3166-2-SubdivisionCodes-EC.rdf
ISO3166-2-SubdivisionCodes-EE.rdf
ISO3166-2-SubdivisionCodes-EG.rdf
ISO3166-2-SubdivisionCodes-ER.rdf
ISO3166-2-SubdivisionCodes-ES.rdf
ISO3166-2-SubdivisionCodes-ET.rdf
ISO3166-2-SubdivisionCodes-FI.rdf
ISO3166-2-SubdivisionCodes-FJ.rdf
ISO3166-2-SubdivisionCodes-FM.rdf
ISO3166-2-SubdivisionCodes-FR.rdf
ISO3166-2-SubdivisionCodes-GA.rdf
ISO3166-2-SubdivisionCodes-GB.rdf
ISO3166-2-SubdivisionCodes-GD.rdf
ISO3166-2-SubdivisionCodes-GE.rdf
ISO3166-2-SubdivisionCodes-GG.rdf
ISO3166-2-SubdivisionCodes-GH.rdf
ISO3166-2-SubdivisionCodes-GL.rdf
ISO3166-2-SubdivisionCodes-GM.rdf
ISO3166-2-SubdivisionCodes-GN.rdf
ISO3166-2-SubdivisionCodes-GP.rdf
ISO3166-2-SubdivisionCodes-HN.rdf
ISO3166-2-SubdivisionCodes-HR.rdf
ISO3166-2-SubdivisionCodes-HT.rdf
ISO3166-2-SubdivisionCodes-HU.rdf
ISO3166-2-SubdivisionCodes-ID.rdf
ISO3166-2-SubdivisionCodes-IE.rdf
ISO3166-2-SubdivisionCodes-IL.rdf
ISO3166-2-SubdivisionCodes-IN.rdf
ISO3166-2-SubdivisionCodes-IO.rdf
ISO3166-2-SubdivisionCodes-IQ.rdf
ISO3166-2-SubdivisionCodes-IR.rdf
ISO3166-2-SubdivisionCodes-IS.rdf
ISO3166-2-SubdivisionCodes-IT.rdf
ISO3166-2-SubdivisionCodes-JM.rdf
ISO3166-2-SubdivisionCodes-JO.rdf
ISO3166-2-SubdivisionCodes-JP.rdf
ISO3166-2-SubdivisionCodes-KE.rdf
ISO3166-2-SubdivisionCodes-KG.rdf
ISO3166-2-SubdivisionCodes-KH.rdf
ISO3166-2-SubdivisionCodes-KI.rdf
ISO3166-2-SubdivisionCodes-KM.rdf
ISO3166-2-SubdivisionCodes-KN.rdf
ISO3166-2-SubdivisionCodes-KP.rdf
ISO3166-2-SubdivisionCodes-KR.rdf
ISO3166-2-SubdivisionCodes-KW.rdf
ISO3166-2-SubdivisionCodes-KY.rdf
ISO3166-2-SubdivisionCodes-KZ.rdf
ISO3166-2-SubdivisionCodes-LA.rdf
ISO3166-2-SubdivisionCodes-LB.rdf
ISO3166-2-SubdivisionCodes-LC.rdf
ISO3166-2-SubdivisionCodes-LI.rdf
ISO3166-2-SubdivisionCodes-LK.rdf
ISO3166-2-SubdivisionCodes-LR.rdf

ISO3166-2-SubdivisionCodes-CG.rdf
ISO3166-2-SubdivisionCodes-CH.rdf
ISO3166-2-SubdivisionCodes-CI.rdf
ISO3166-2-SubdivisionCodes-CK.rdf
ISO3166-2-SubdivisionCodes-CL.rdf
ISO3166-2-SubdivisionCodes-CM.rdf
ISO3166-2-SubdivisionCodes-GQ.rdf
ISO3166-2-SubdivisionCodes-GR.rdf
ISO3166-2-SubdivisionCodes-GS.rdf
ISO3166-2-SubdivisionCodes-GT.rdf
ISO3166-2-SubdivisionCodes-GW.rdf
ISO3166-2-SubdivisionCodes-GY.rdf
ISO3166-2-SubdivisionCodes-HM.rdf
ISO3166-2-SubdivisionCodes-LS.rdf
ISO3166-2-SubdivisionCodes-LT.rdf
ISO3166-2-SubdivisionCodes-LU.rdf
ISO3166-2-SubdivisionCodes-LV.rdf
ISO3166-2-SubdivisionCodes-LY.rdf
ISO3166-2-SubdivisionCodes-MA.rdf
ISO3166-2-SubdivisionCodes-MC.rdf

ISO3166-2-SubdivisionCodes-MD.rdf
ISO3166-2-SubdivisionCodes-ME.rdf
ISO3166-2-SubdivisionCodes-MF.rdf
ISO3166-2-SubdivisionCodes-MG.rdf
ISO3166-2-SubdivisionCodes-MH.rdf
ISO3166-2-SubdivisionCodes-MK.rdf
ISO3166-2-SubdivisionCodes-ML.rdf
ISO3166-2-SubdivisionCodes-MM.rdf
ISO3166-2-SubdivisionCodes-MN.rdf
ISO3166-2-SubdivisionCodes-MP.rdf
ISO3166-2-SubdivisionCodes-MR.rdf
ISO3166-2-SubdivisionCodes-MT.rdf
ISO3166-2-SubdivisionCodes-MU.rdf
ISO3166-2-SubdivisionCodes-MV.rdf
ISO3166-2-SubdivisionCodes-MW.rdf
ISO3166-2-SubdivisionCodes-MX.rdf
ISO3166-2-SubdivisionCodes-MY.rdf
ISO3166-2-SubdivisionCodes-MZ.rdf
ISO3166-2-SubdivisionCodes-NA.rdf
ISO3166-2-SubdivisionCodes-NC.rdf
ISO3166-2-SubdivisionCodes-NE.rdf
ISO3166-2-SubdivisionCodes-NG.rdf
ISO3166-2-SubdivisionCodes-NI.rdf
ISO3166-2-SubdivisionCodes-NL.rdf
ISO3166-2-SubdivisionCodes-PK.rdf
ISO3166-2-SubdivisionCodes-PL.rdf
ISO3166-2-SubdivisionCodes-PM.rdf
ISO3166-2-SubdivisionCodes-PN.rdf
ISO3166-2-SubdivisionCodes-PS.rdf
ISO3166-2-SubdivisionCodes-PT.rdf
ISO3166-2-SubdivisionCodes-PW.rdf
ISO3166-2-SubdivisionCodes-PY.rdf
ISO3166-2-SubdivisionCodes-QA.rdf
ISO3166-2-SubdivisionCodes-RO.rdf
ISO3166-2-SubdivisionCodes-RS.rdf
ISO3166-2-SubdivisionCodes-RU.rdf
ISO3166-2-SubdivisionCodes-RW.rdf
ISO3166-2-SubdivisionCodes-SA.rdf
ISO3166-2-SubdivisionCodes-SB.rdf
ISO3166-2-SubdivisionCodes-SC.rdf
ISO3166-2-SubdivisionCodes-SD.rdf
ISO3166-2-SubdivisionCodes-SE.rdf
ISO3166-2-SubdivisionCodes-SG.rdf
ISO3166-2-SubdivisionCodes-SH.rdf
ISO3166-2-SubdivisionCodes-SI.rdf
ISO3166-2-SubdivisionCodes-SJ.rdf
ISO3166-2-SubdivisionCodes-SK.rdf
ISO3166-2-SubdivisionCodes-SL.rdf
ISO3166-2-SubdivisionCodes-TD.rdf
ISO3166-2-SubdivisionCodes-TF.rdf
ISO3166-2-SubdivisionCodes-TG.rdf
ISO3166-2-SubdivisionCodes-TH.rdf
ISO3166-2-SubdivisionCodes-TJ.rdf
ISO3166-2-SubdivisionCodes-TL.rdf
ISO3166-2-SubdivisionCodes-TM.rdf
ISO3166-2-SubdivisionCodes-TN.rdf
ISO3166-2-SubdivisionCodes-TO.rdf
ISO3166-2-SubdivisionCodes-TR.rdf
ISO3166-2-SubdivisionCodes-TT.rdf
ISO3166-2-SubdivisionCodes-TV.rdf
ISO3166-2-SubdivisionCodes-TW.rdf
ISO3166-2-SubdivisionCodes-TZ.rdf
ISO3166-2-SubdivisionCodes-UA.rdf
ISO3166-2-SubdivisionCodes-UG.rdf
ISO3166-2-SubdivisionCodes-UM.rdf
ISO3166-2-SubdivisionCodes-US.rdf
ISO3166-2-SubdivisionCodes-UY.rdf
ISO3166-2-SubdivisionCodes-UZ.rdf
ISO3166-2-SubdivisionCodes-VC.rdf
ISO3166-2-SubdivisionCodes-VE.rdf
ISO3166-2-SubdivisionCodes-VG.rdf
ISO3166-2-SubdivisionCodes-VI.rdf

ISO3166-2-SubdivisionCodes-NO.rdf
ISO3166-2-SubdivisionCodes-NP.rdf
ISO3166-2-SubdivisionCodes-NR.rdf
ISO3166-2-SubdivisionCodes-NZ.rdf
ISO3166-2-SubdivisionCodes-OM.rdf
ISO3166-2-SubdivisionCodes-PA.rdf
ISO3166-2-SubdivisionCodes-PE.rdf
ISO3166-2-SubdivisionCodes-PF.rdf
ISO3166-2-SubdivisionCodes-PG.rdf
ISO3166-2-SubdivisionCodes-PH.rdf
ISO3166-2-SubdivisionCodes-SM.rdf
ISO3166-2-SubdivisionCodes-SN.rdf
ISO3166-2-SubdivisionCodes-SO.rdf
ISO3166-2-SubdivisionCodes-SR.rdf
ISO3166-2-SubdivisionCodes-SS.rdf
ISO3166-2-SubdivisionCodes-ST.rdf
ISO3166-2-SubdivisionCodes-SV.rdf
ISO3166-2-SubdivisionCodes-SY.rdf
ISO3166-2-SubdivisionCodes-SZ.rdf
ISO3166-2-SubdivisionCodes-TC.rdf
ISO3166-2-SubdivisionCodes-VN.rdf
ISO3166-2-SubdivisionCodes-VU.rdf
ISO3166-2-SubdivisionCodes-WF.rdf
ISO3166-2-SubdivisionCodes-WS.rdf
ISO3166-2-SubdivisionCodes-YE.rdf
ISO3166-2-SubdivisionCodes-ZA.rdf
ISO3166-2-SubdivisionCodes-ZM.rdf
ISO3166-2-SubdivisionCodes-ZW.rdf

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Annex C: Generating Ontologies from External Code Definitions

(informative)

C.1 Overview

This Annex describes how the OWL (RDF/XML) files in this specification are generated from the published ISO and UN Sources. This enables the automated generation of updated ontologies when ISO/UN publish their updates.

C.2 ISO 3166

The source is the XML file published by ISO (and available via subscription) as iso_country_codes.xml. This XML file is processed by two separate XSL files (details below) to produce the OWL files. There are common algorithms used by each of these files, as follows:

C.2.1 Camel Case

This turns a published country, subdivision or territory name into a camel case name used for the URI of the ontology element (a NamedIndividual). The steps are as follows:

- Split the name into tokens using the space character
- Convert initial character of each token to uppercase
- Normalize Unicode characters using the NFD algorithm and omit any characters outside the Basic Latin character set
- Remove apostrophes and periods
- Truncate the string at the first character that is not alphanumeric or hyphen

C.2.2 Country Name Overrides

In general, the URIs for countries use the above Camel Case algorithm applied to the published short name of the country (the English short name if there are many).

To ensure uniqueness of URIs, following countries are overridden before applying the above algorithm. Table C.1 shows the ISO 3166-1 two-character code and the name used.

Table C. 1: ISO 3166-1 Overrides

ISO 3166-1 Alpha 2 Code	Country Name
CC	Cocos Keeling Islands
CD	Congo Democratic Republic Of
KP	Korea Democratic Peoples Republic Of
KR	Korea Republic Of
VG	Virgin Islands British
VI	Virgin Islands US

C.2.3 Country Codes Processing

The file ISO-3166-1-CountryCodes.rdf is produced using the XSL file ISO-3166-Countries.xsl.

The outline of processing as follows:

- Generate the Ontology element
    1. Include boiler plate information using OMG's Specification metadata ontology.
    2. Insert the timestamp from the ISO XML file as the Dublin Core issued date of the ontology.
    3. Generate a versionIRI using a hard-coded OMG-format timestamp (needs to be updated each version)
- Generate Individuals for the two CodeSets (2 and 3-character alpha codes)
- Generate sameAs statements to allow use of URIs in the adopted version of the LCC Standard: United States, UnitedKingdom and CzechRepublic
- Generate Individuals for 3 Languages which are referenced by Country elements in ISO-3166 but not yet included in the ISO 639-2 Languages standard. They have language codes of 001, 002 and crs. The latter is included in ISO 639-3, but the 639-3 codes are not provided as a part of the LCC language ontologies in the LCC 1.0 Specification due to questions with respect to intellectual property rights defined on the registration authority (SIL) web site.
- Process each Country as follows:
    1. Generate URI using Country Name Overrides and Camel Case algorithms in previous section
    2. Process labels for country using specific ontology properties for English and French names (short, long, upper case) with other labels represented using hasLocalName
    3. Process each language marked as Administrative. Look up the 3-character language code from the ISO file in the LCC languages ontology file in order to find the correct LCC URI to link to.
    4. Include any Remarks in English as values of the hasRemarks property.
    5. Process the 2- and 3-character codes as separate NamedIndividuals of type Alpha2Code and Alpha3Code respectively.

C.2.4 Subdivision Codes Processing

The XSL file ISO-3166-Subdivisions.xsl produces many ontology files in the subdirectory Regions, each with the name ISO3166-2-SubdivisionCodes-XX.rdf where XX is the 2-character code for the country. A file is only produced if the country has reported subdivisions or territories.

A further output is the list of such files which is incorporated into the About file by adding boilerplate.

The outline of processing is as follows:

- For each country that has a subdivision or territory
    1. Create a file in the Regions subdirectory
    2. Generate the Ontology element

        a) Include boiler plate information using OMG's Specification metadata ontology.

b) Insert the timestamp from the ISO XML file as the Dublin Core issued date of the ontology.

c) Generate a versionIRI using a hard-coded OMG-format timestamp (needs to be updated each version)

d) For each category (e.g., “county”, “district”) for the country in the ISO XML file:

- Generate an Individual of class GeographicRegionKind. The URI is the English name of the category converted to Camel Case and appended to the URI of the country-specific ontology.

e) For each subdivision in the ISO XML file

- Generate an individual of class CountrySubdivision. The URI is the English name of the subdivision converted to Camel Case and appended to the URI of the country-specific ontology. The overrides provided in Table C-2, below, are required to ensure uniqueness, where a country has subdivisions with the same name at different levels.

Table C. 2: ISO 3166-2 Country Subdivision / Code Overrides

ISO 3166-2 Code	Country Subdivision Name
AZ-SA	Ski-Municipality
AZ-YE	Yevlax-Municipality
AZ-LA	Lnkran-Municipality
BG-22	SofiaStolitsa
HU-VM	Veszprem-City
LA-VT	Viangchan-Prefecture
MU-PU	PortLouis-City
MZ-MPM	Maputo-City
SB-CT	CapitalTerritoryHoniara
TW-HSZ	Hsinchu-City
TW-CYI	Chiayi-City
UZ-TK	Toshkent-City

Link to the category via isClassifiedBy property

- Link to the country and any parent subdivision
- If the ISO file has property subdivision-related-country then create a sameAs link to the element in the ISO-3166-1 ontology
- Process the subdivision code as an Individual of class GeographicRegionIdentifier
- Recursively process any subdivisions of the subdivision

f) For each territory in the ISO XML file

- Generate an individual of class Territory
- Link to the category “Territory” via isClassifiedBy property
- Link to the country

C.3 UN M49 Region Codes

The UN M49 information is used to create regions at different levels. The processing is as follows, and makes use of two tools prior to applying XSL.

- TARQL, to convert from CSV to RDF (Turtle). Available at `https://github.com/tarql/tarql/releases`. Note that release 1.2 or later is required.
- Rapper (part of Raptor), to convert from turtle to RDF/XML. Available from `http://download.librdf.org/source/`. Version used was 2.0.15.

The steps are:

- Download the English CSV file as M49.csv from the UN site `https://unstats.un.org/unsd/methodology/m49/overview/`
- Edit the column headers in Row 1 to remove all spaces and hyphens
- Run TARQL on the CSV file using the SPARQL file M49.sparql included in this specification. The command line is as follows:

  ```
  tarql -dedup 1000 M49.sparql M49.csv >m49.rdf
  ```

- Run rapper to convert to RDF/XML. The command line is as follows.

  ```
  rapper -I turtle -o rdfxml-abbrev m49.rdf >m49.xml
  ```

- Apply M49-Format.xsl to the output to clean up the ontology and add boiler plate.

Overall the conversion is as follows: in general, each populated column in the CSV file results in an extra level of GeographicRegion Individual; each is linked to its parent using property isSubregionOf.

At the lowest level, that of countries, new individuals are not created, but triples are added linking the counties in the ISO3166-CountryCodes ontology to the M49 ontology. The 3-letter country code from the CSV file is used to look up the correct country URI in the ISO3166-CountryCodes.rdf file.

For each column in the original CSV file the following table states the corresponding ontology element. Columns not mentioned here are ignored. Where a value is repeated only one element is created (e.g., Africa appears in many rows but only one Individual is created). The ontology also includes declarations of Individuals for four GeographicRegionKinds which are used as per Table C.3, below.

Table C. 3: ISO 3166-2 Country Subdivision / Code Overrides

Column	Ontology Mapping
`Global Name`	`GeographicRegionKind = Planet`
`Region Name`	`GeographicRegionKind = Continent`
`Subregion Name`	`GeographicRegionKind = Region`
`Intermediate Region Name`	`GeographicRegionKind = Subregion`
`Country or Area`	`Used to lookup country in ISO3166-CountryCodes.rdf`
`M49 Code`	`NumericRegionCode property`

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