Model Report

DataTypeModels

Version 1.0 ● Proposed

Table of Contents

1   Draft DataType Model

1.1   Diagrams

1.1.1 Attribute-ImplementationElement diagram

Class diagram in package 'Draft DataType Model'
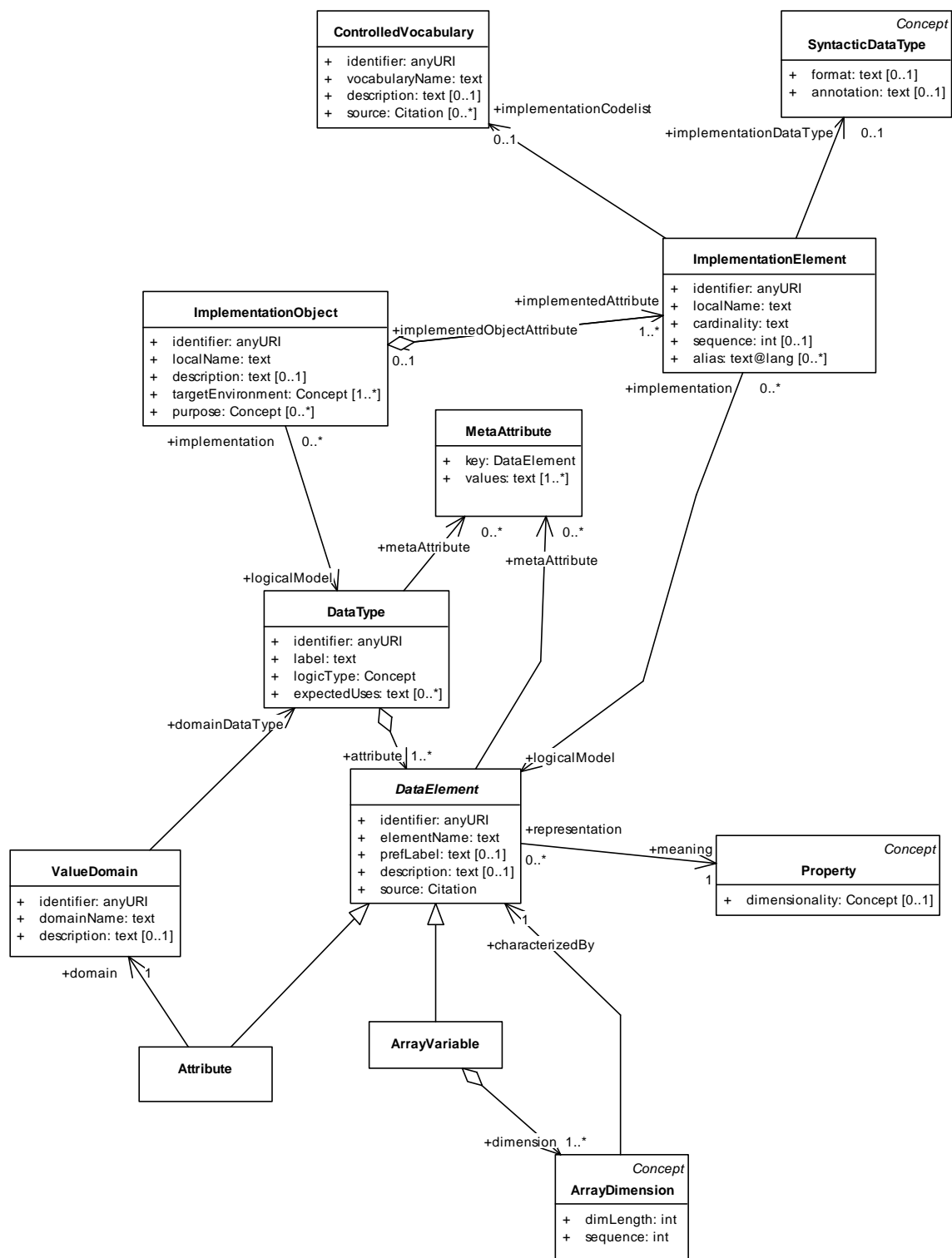
Figure 1:   Attribute-ImplementationElement

1.1.2 Conceptual representation diagram

Class diagram in package 'Draft DataType Model'

Conceptual representation

ObjectClass, Property, MeasureClass, and UnitOfMeasure are all subtypes of Concept.
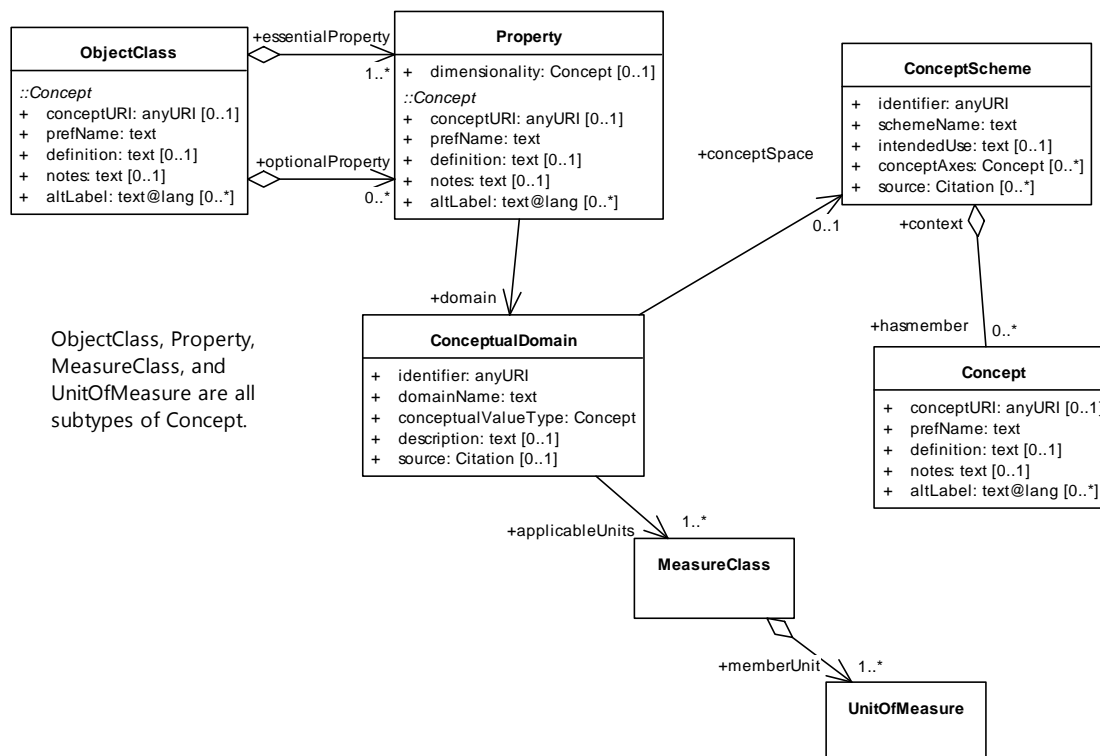
Figure 2:   Conceptual representation

1.1.3 DataType-ImplementationObject diagram

Class diagram in package 'Draft DataType Model'

DataType-ImplementationObject
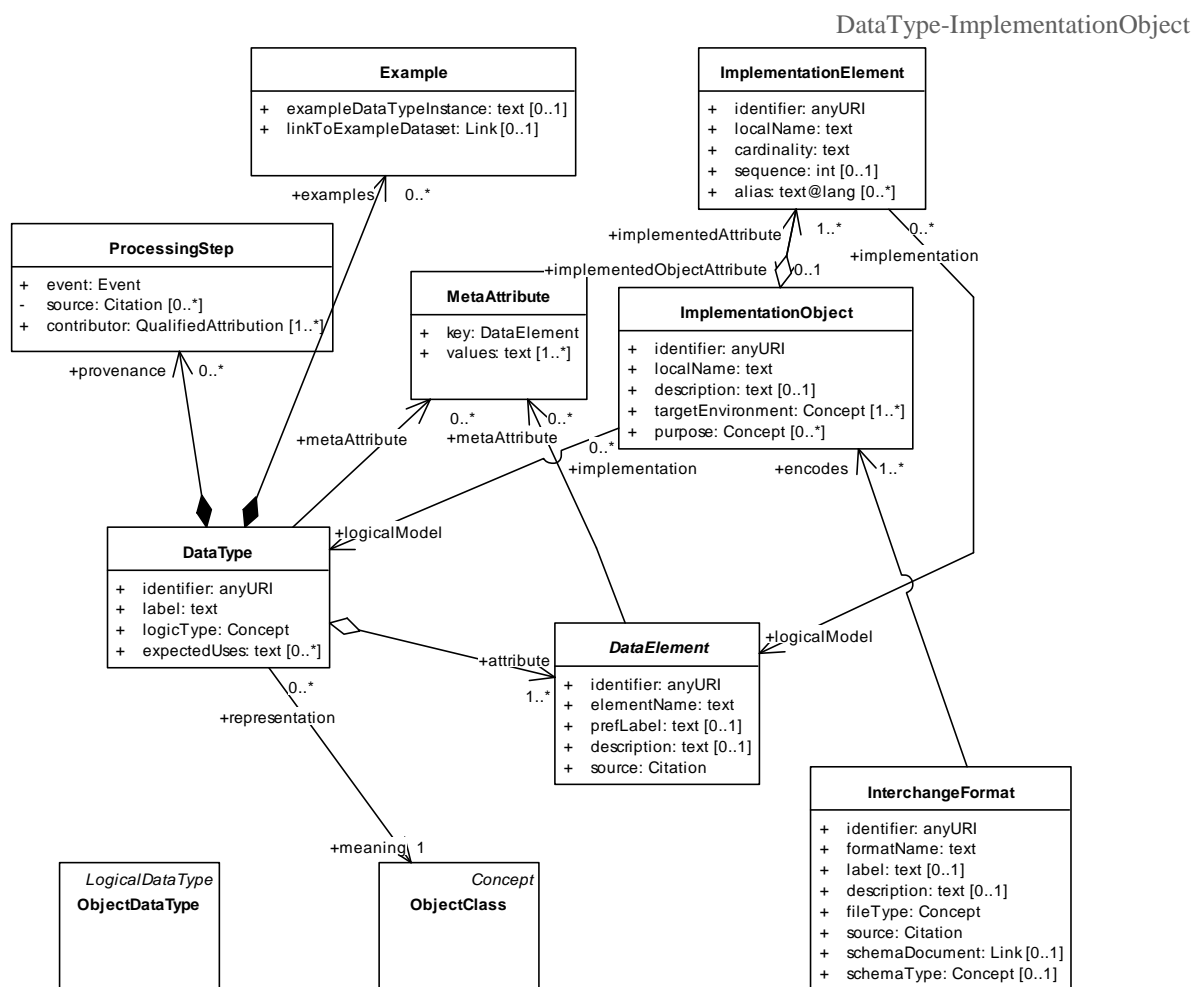
Figure 3:   DataType-ImplementationObject

1.1.4 PhysicalImplementation diagram

Class diagram in package 'Draft DataType Model'

PhysicalImplementation

Only properties that are inherent in the ObjectClass should be specified by element associations. Incidental properties should be specified as attributes of DataObjects that represent the ObjectClass for some particular application.

a DataObject must have attribute.DataElement association that bind at least one DataElement whose meaning.Property is also an element.Property of the meaning.ObjectClass associated with the DataObject

The source property of the SyntacticDataType concept link its definition to a standard in which the datatype is defined, e.g. OGC10-090r3, ISO19103, W3C XML specification...

Figure 4:   PhysicalImplementation

1.1.5 DataTypeOverview diagram

Class diagram in package 'Draft DataType Model'

DataTypeOverview
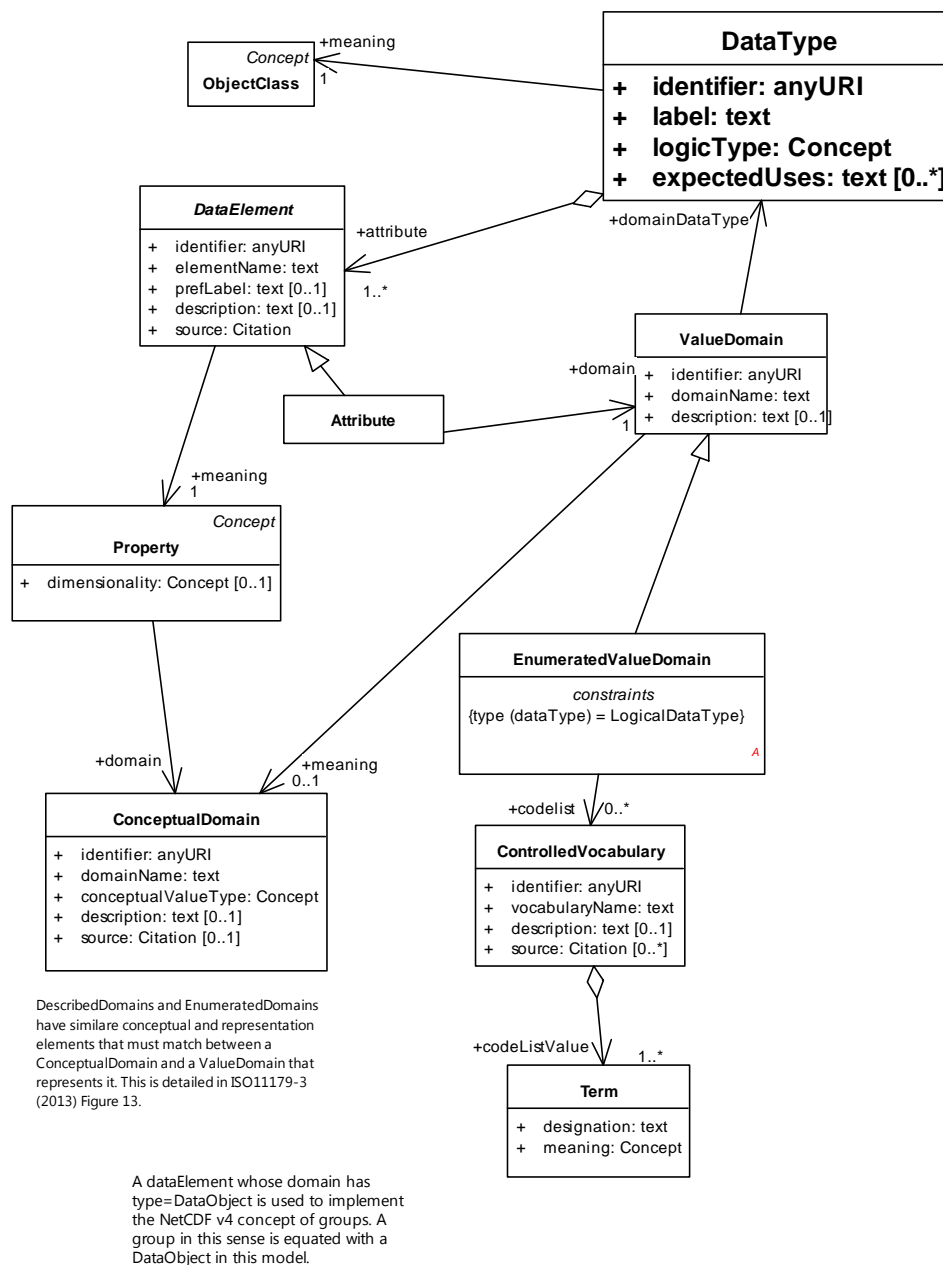
Figure 5:   DataTypeOverview

1.1.6 Concepts diagram

Class diagram in package 'Draft DataType Model'
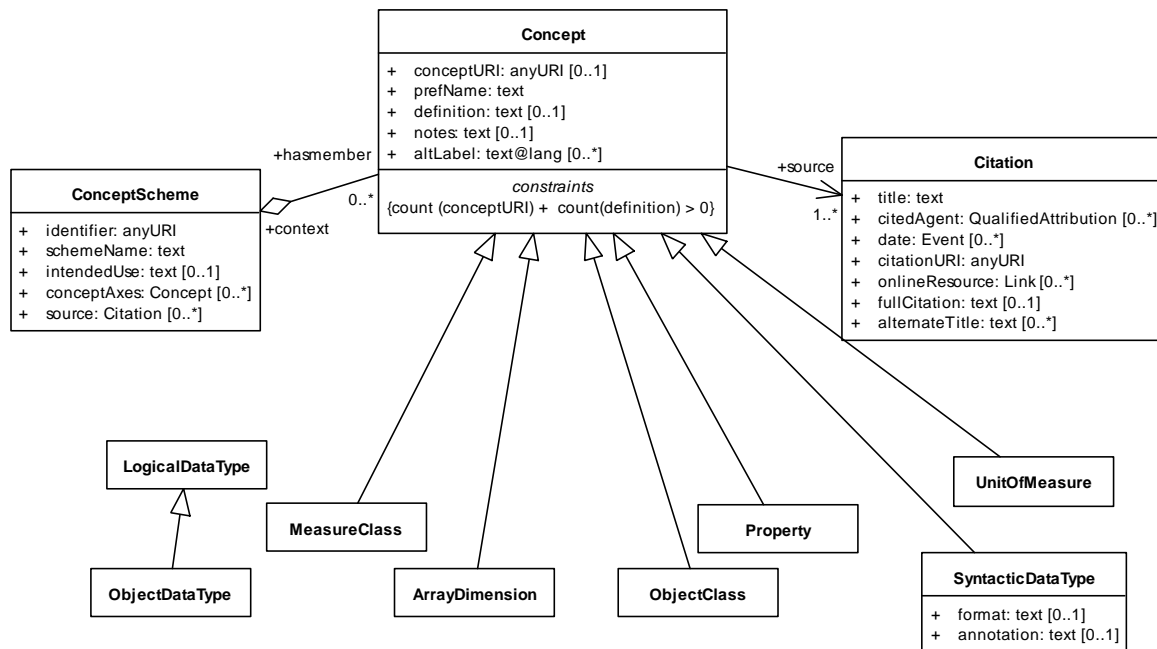
Concepts

Figure 6:   Concepts

1.1.7 Context:ArrayVariable diagram

Class diagram in package 'Draft DataType Model'

Context:ArrayVariable

Figure 7:   Context:ArrayVariable

1.1.8 Context:Attribute diagram

Class diagram in package 'Draft DataType Model'

Context:Attribute

Figure 8:   Context:Attribute

1.1.9 Context:DataElementConcept diagram

Class diagram in package 'Draft DataType Model'

Figure 9:   Context:DataElementConcept

1.1.10   Context:DataObject diagram

Class diagram in package 'Draft DataType Model'

Context:DataObject

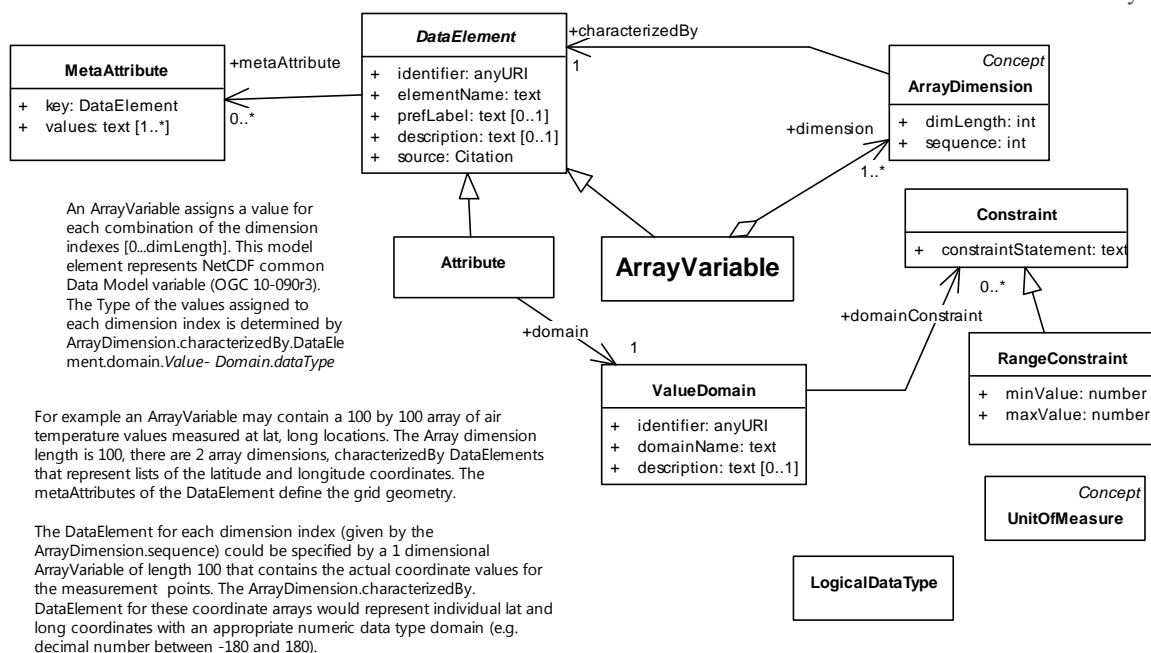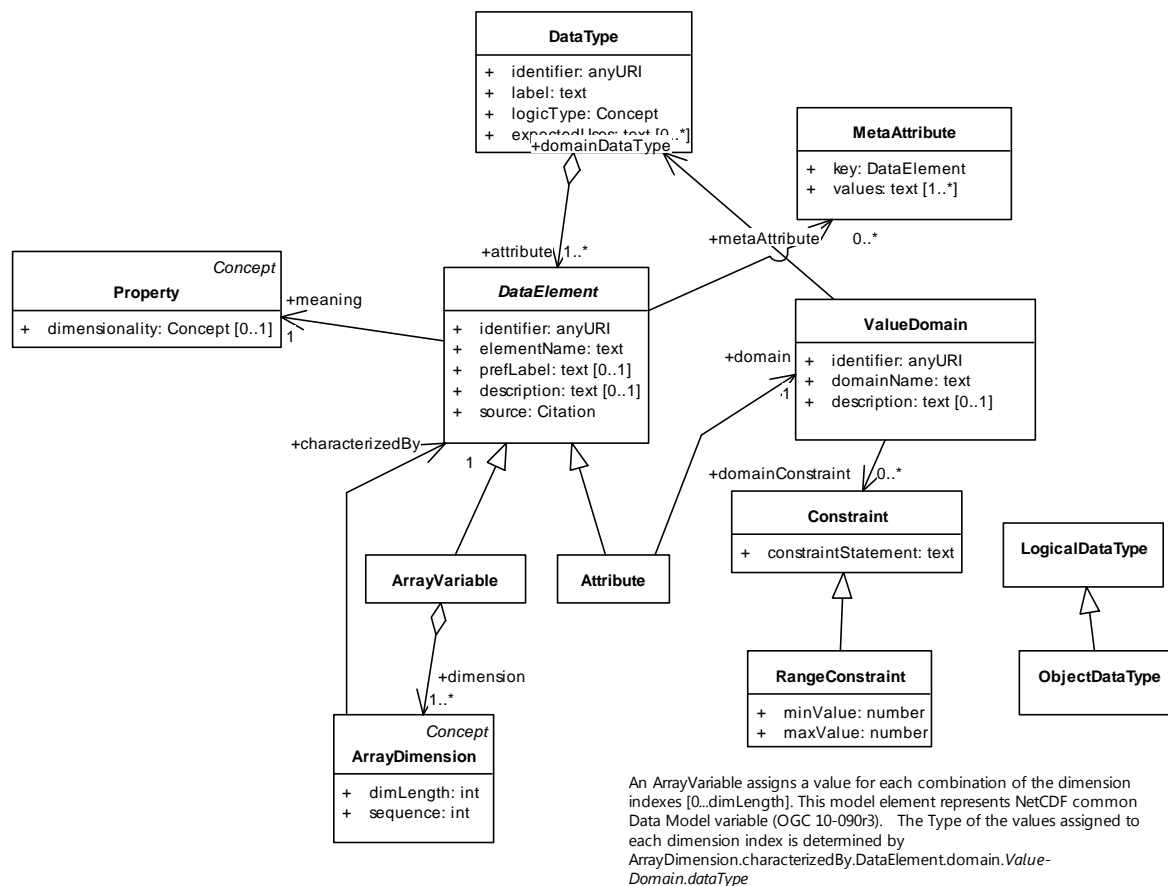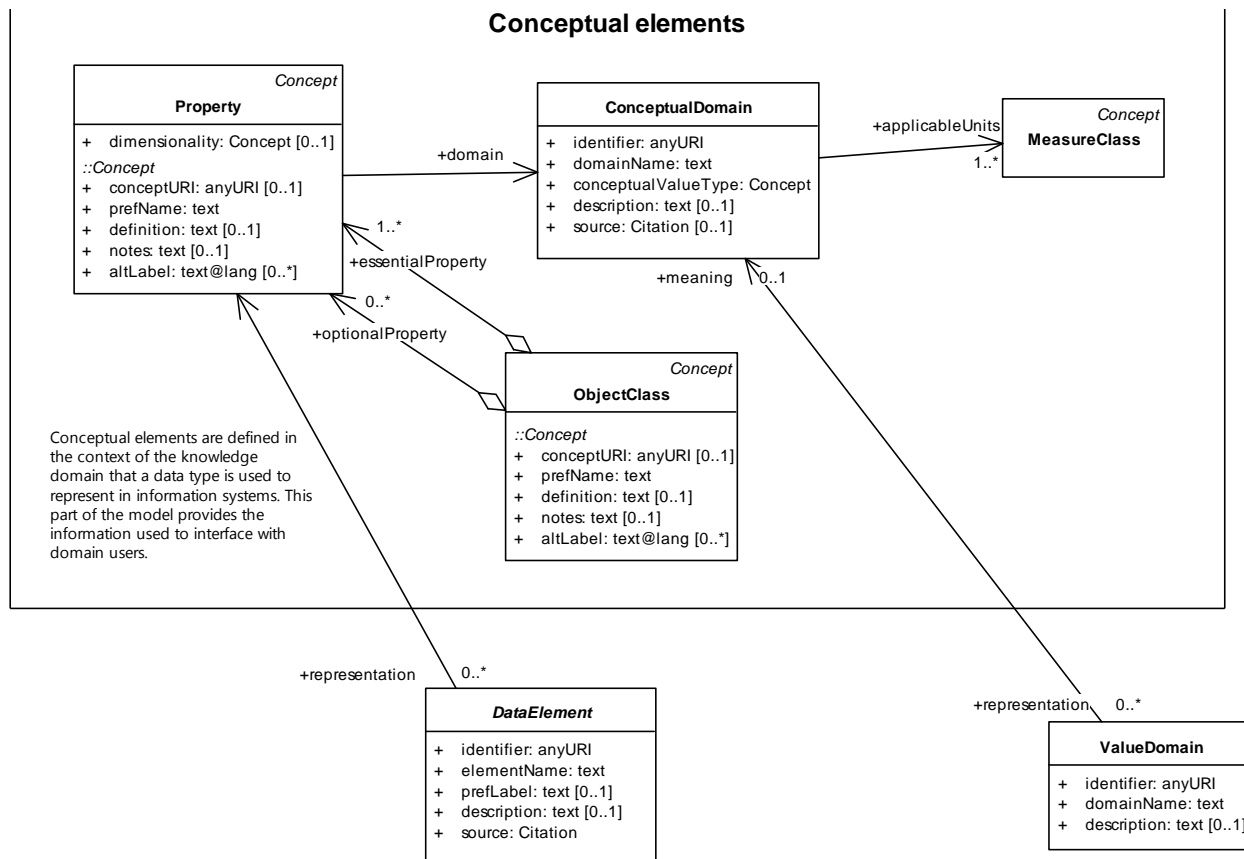A DataObject is a DataType that provides an implementable representation of an ObjectClass. The ObjectClass represents the concept of some entity in a domain of interest that is to be represented in an information system.

The attribute.DataElements associated with the DataObject SHALL implement DataElementConcepts that fill element roles from the ObjectClass represented by the DataObject.

Example and ProcessingStep are optional content that provides details about the object. These are defined by the RDA DataType model.

Implementation Elements

LogicalDataType
ObjectDataType

MetaAttribute
+   key: DataElement
+   values: text [1..*]

+metaAttribute

0..*

DataType
+   identifier: anyURI
+   label: text
+   logicType: Concept
+   expectedUses: text [0..*]

DataObject.metaAttribute elements contains information about properties of all instances of the DataObject. These global attributes may be used to record properties of all the data in a file, such as processing history or conventions used, geometryType, samplingScheme.

+attribute

DataElement
+   identifier: anyURI
+   elementName: text
+   prefLabel: text [0..1]
+   description: text [0..1]
+   source: Citation

1..*

Conceptual

+meaning   1

Concept
ObjectClass

0..*

+examples   0..*

Example
+   exampleDataTypeInstance: text [0..1]
+   linkToExampleDataset: Link [0..1]

+provenance   0..*

ProcessingStep
+   event: Event
-   source: Citation [0..*]
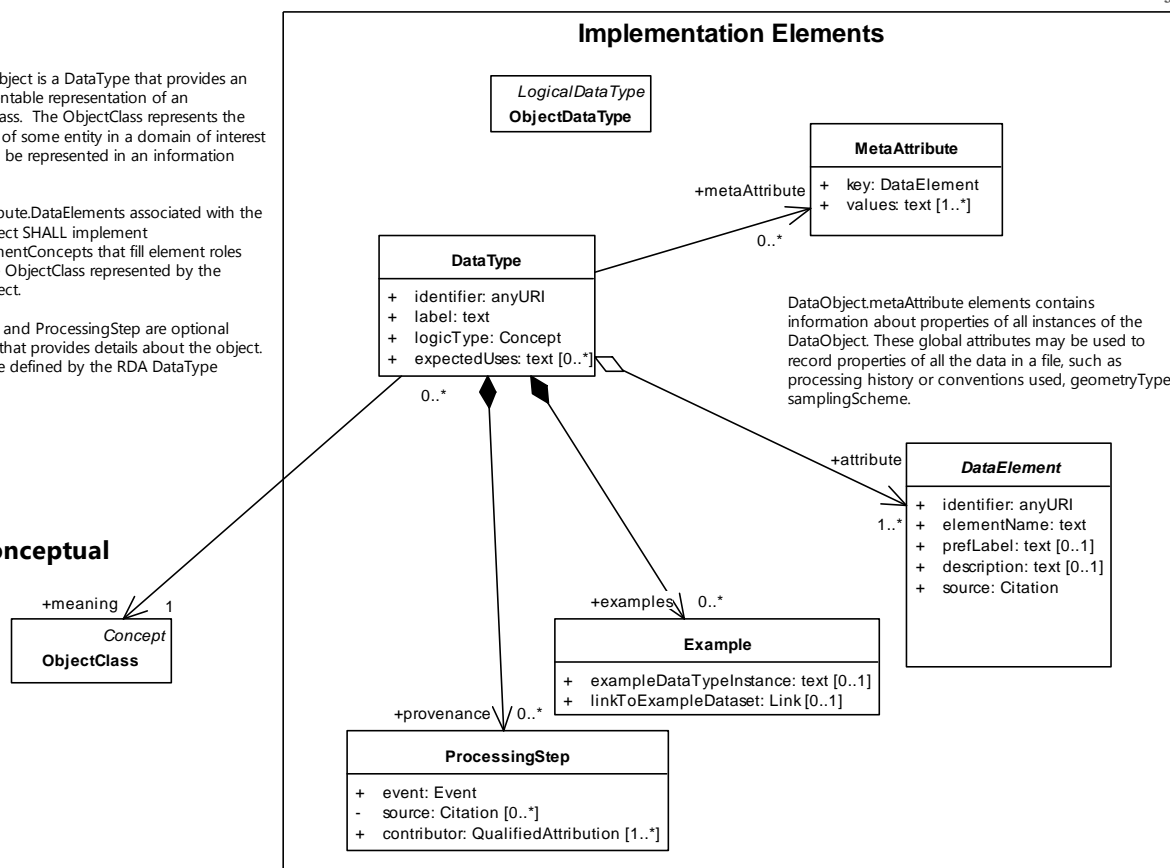+   contributor: QualifiedAttribution [1..*]

Figure 10: Context:DataObject

1.1.11   Context:ValueDomain diagram

Class diagram in package 'Draft DataType Model'

Context:ValueDomain

Concept
MeasureClass

+applicableUnits   1..*

ConceptualDomain
+ identifier: anyURI
+ domainName: text
+ conceptualValueType: Concept
+ description: text [0..1]
+ source: Citation [0..1]

Conceptual

+meaning   0..1

DataElement
+ identifier: anyURI
+ elementName: text
+ prefLabel: text [0..1]
+ description: text [0..1]
+ source: Citation

Attribute

+domain
1

ValueDomain
+ **identifier: anyURI**
+ **domainName: text**
+ **description: text [0..1]**

+domainConstraint

0..*

Valid values in the domain are specified by constraints. Extensions to constraints should be used to represent other specific kinds of machine-actionable constrains. Logical constraints that require more complex validation should be explained in the constraintStatement

Constraint
+ constraintStatement: text

RangeConstraint
+ minValue: number
+ maxValue: number

+domainDataType

DataType
+ identifier: anyURI
+ label: text
+ logicType: Concept
+ expectedUses: text [0..*]

EnumeratedValueDomain
constraints
{type (dataType) = LogicalDataType}
A

+codelist   0..*

ControlledVocabulary
+ identifier: anyURI
+ vocabularyName: text
+ description: text [0..1]
+ source: Citation [0..*]

logically, multiple controlled vocabularies might be available that represent a particular enumerated domain. At the implementation level, a specific vocabulary must be specified. The implementation vocabulary SHALL be logically compatible with a vocabulary specified at the logical level.
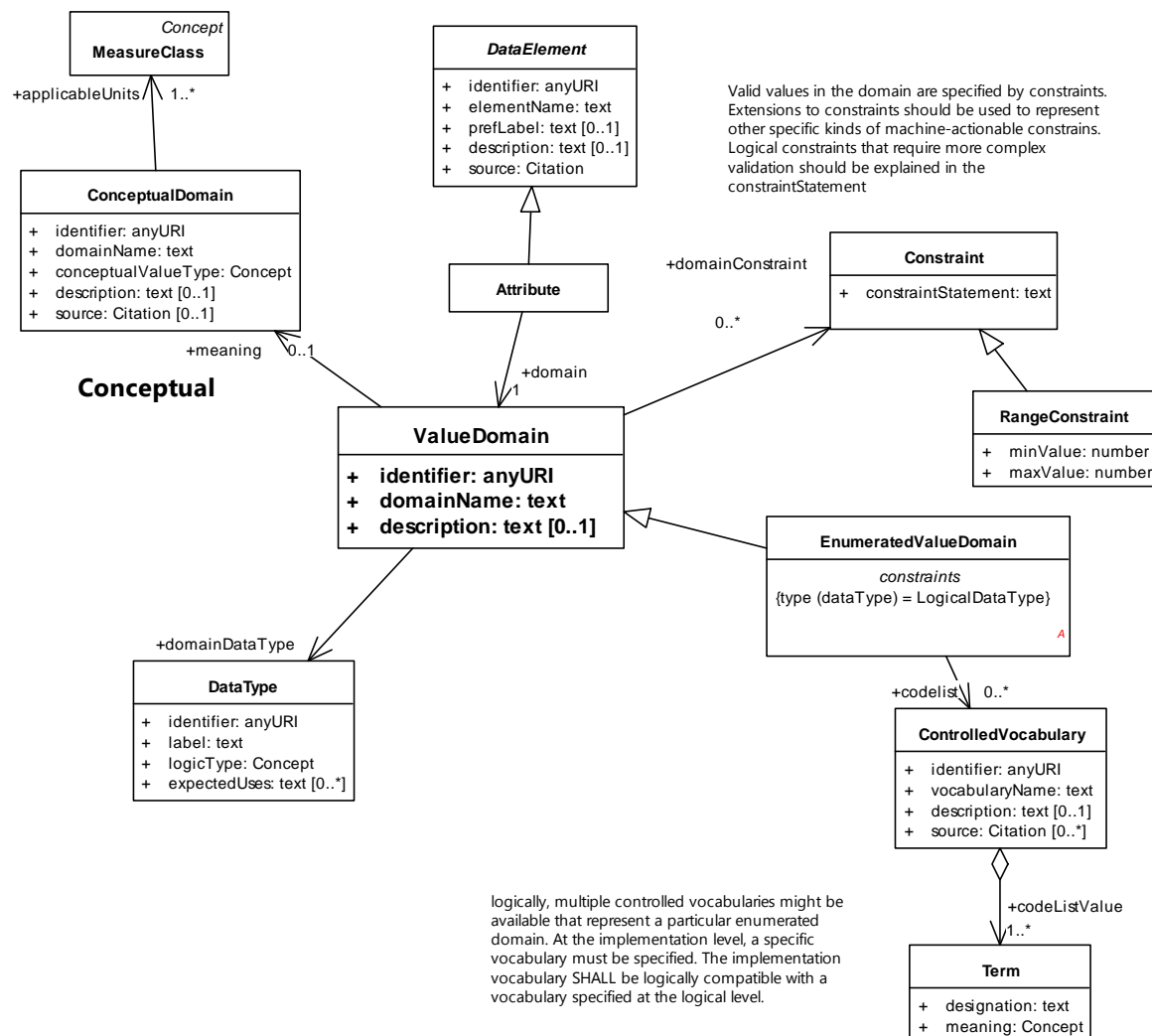
+codeListValue
1..*

Term
+ designation: text
+ meaning: Concept

Figure 11: Context:ValueDomain

1.2   Classes

1.2.1 ArrayDimension

Class in package 'Draft DataType Model'

NetCDF common data model 'Dimension'. One of the dimensions of an array, has an associated dataTypeValue that assigns meaning.

ArrayDimension
Version 1.0 Phase 1.0 Proposed
OGC10-090r3 created on 1/14/2016. Last modified 1/14/2016
Extends Concept

OUTGOING STRUCTURAL RELATIONSHIPS
⬅ Generalization from ArrayDimension to Concept   [Direction is 'Source -> Destination'.]
⬅ Aggregation from ArrayDimension to ArrayVariable   [Direction is 'Destination -> Source'.]

ATTRIBUTES
◆ dimLength : int Public   the number of values allowed for this dimension in the array.   [Is static False. Containment is Not Specified.]
◆ sequence : int Public   non negative integer that orders the dimensions in the array coordinate scheme   [Is static False. Containment is Not Specified.]

ASSOCIATIONS	
✎ Association (direction: Source -> Destination)	
Source: Public (Class) ArrayDimension	Target: Public characterizedBy (Class) DataElement Cardinality: [1]

1.2.2 ArrayVariable

Class in package 'Draft DataType Model'

A dataElement that represents a multidimensional array of values of the same type (OGC 10-090r3). The dimension properties associated with the variable define the axes of the array. ArrayVariable.metaAttribute properties describe the gridding scheme used to assign values to the dimension coordinates for the array cells; this part of the model is not detailed here and should be treated as an extension to the metaAttribute class. Array variables are used to represent a coverage (see ISO19123).

ArrayVariable

Version 1.0 Phase 1.0 Proposed
OGC10-090r3 created on 1/14/2016. Last modified 3/8/2016
Extends DataElement

CONSTRAINTS

🔩 Invariant. dimension.ArrayDimension.characterizedBy is NOT self

an ArrayVariable dimenstion SHALL not be characterized by the same ArrayVariable

[Approved, Weight is 0.]

OUTGOING STRUCTURAL RELATIONSHIPS

⬅ Generalization from ArrayVariable to DataElement

[Direction is 'Source -> Destination'.]

INCOMING STRUCTURAL RELATIONSHIPS

➡ Aggregation from ArrayDimension to ArrayVariable

[Direction is 'Destination -> Source'.]

1.2.3 Attribute

Class in package 'Draft DataType Model'

a data element represented by a single value, which may be a primitive data type or an object Data type.

Attribute
Version 1.0 Phase 1.0 Proposed
srichard created on 3/8/2016. Last modified 3/8/2016
Extends DataElement

OUTGOING STRUCTURAL RELATIONSHIPS

⬅ Generalization from Attribute to DataElement

[Direction is 'Source -> Destination'.]

ASSOCIATIONS

✏ Association (direction: Source -> Destination)

Source: Public (Class) Attribute   Target: Public domain (Class) ValueDomain
                                                     Cardinality: [1]

1.2.4 Citation

Class in package 'HelperClasses'

a resolvable reference to an information source. Not detailed here, Should include a text string providing guidance on how to cite the source, a title, bibliographic information if appropriate, a URI for the source resource, and Links to access representations of the resource online, and optionally a relation concept explaining the relationship between the source and the citing element.

Citation
Version 1.0 Phase 1.0 Proposed
srichard created on 1/16/2016. Last modified 1/20/2016

ATTRIBUTES

🔹 title : text Public

[Is static False. Containment is Not Specified.]

🔹 citedAgent : QualifiedAttribution Public
Multiplicity: ([0..*], Allow duplicates: 0, Is ordered: False)

implement CI_Responsibility using QualifiedAttribution based on PROV

[Is static False. Containment is Not Specified.]

🔹 date : Event Public
Multiplicity: ([0..*], Allow duplicates: 0, Is ordered: False)

[Is static False. Containment is Not Specified.]

🔹 citationURI : anyURI Public

URIs, ISBN, ISSN, other alternate identifiers for the cited resource.

[Is static False. Containment is Not Specified.]

🔹 onlineResource : Link Public
Multiplicity: ([0..*], Allow duplicates: 0, Is ordered: False)

implements ISO19115 onlineResource and graphic properties of CI_Citation. Browse graphic is implemented as a link to an online graphic.

[Is static False. Containment is Not Specified.]

🔹 fullCitation : text Public
Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

suggested citation text to use in referencing or citing this resource in text. This property includes edition, editionDate, series, otherCitationDetails from ISO19115-1 CI_Citation.

[Is static False. Containment is Not Specified.]

🔹 alternateTitle : text Public
Multiplicity: ([0..*], Allow duplicates: 0, Is ordered: False)

[Is static False. Containment is Not Specified.]

ASSOCIATIONS

✏️ Association (direction: Source -> Destination)

Source: Public (Class) Concept   Target: Public source (Class) Citation
                                                                         Cardinality: [1..*]

1.2.5 Concept

Class in package 'Draft DataType Model'

Concept
Version 1.0 Phase 1.0 Proposed
ISO11179 created on 1/6/2016. Last modified 1/20/2016

CONSTRAINTS

Invariant. count (conceptURI) + count(definition) > 0

either a conceptURI or a definition SHALL be provided for each concept.

[Approved, Weight is 0.]

OUTGOING STRUCTURAL RELATIONSHIPS

Aggregation from Concept to ConceptScheme

[Direction is 'Source -> Destination'.]

INCOMING STRUCTURAL RELATIONSHIPS

Generalization from MeasureClass to Concept

[Direction is 'Source -> Destination'.]

Generalization from ArrayDimension to Concept

[Direction is 'Source -> Destination'.]

Generalization from UnitOfMeasure to Concept

[Direction is 'Source -> Destination'.]

Generalization from Property to Concept

[Direction is 'Source -> Destination'.]

Generalization from ObjectClass to Concept

[Direction is 'Source -> Destination'.]

Generalization from SyntacticDataType to Concept

[Direction is 'Source -> Destination'.]

ATTRIBUTES

conceptURI : anyURI Public
Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

a URI that identifies the concept.

[Is static False. Containment is Not Specified.]

prefName : text Public

preferred name for humans to use when talking about this concept.

[Is static False. Containment is Not Specified.]

ATTRIBUTES

◆ definition : text Public
  Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

[Is static False. Containment is Not Specified.]

◆ notes : text Public
  Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

non normative information about the derivation of the concept

[Is static False. Containment is Not Specified.]

◆ altLabel : text@lang Public
  Multiplicity: ([0..*], Allow duplicates: 0, Is ordered: False)

other language-localized text strings by which the concept may be know in other contexts.

[Is static False. Containment is Not Specified.]

ASSOCIATIONS

✏ Association (direction: Source -> Destination)

Source: Public (Class) Concept   Target: Public source (Class) Citation
                                                         Cardinality: [1..*]

1.2.6 ConceptScheme

Class in package 'Draft DataType Model'

ConceptScheme
Version 1.0 Phase 1.0 Proposed
srichard created on 1/11/2016. Last modified 1/20/2016

INCOMING STRUCTURAL RELATIONSHIPS

⇒ Aggregation from Concept to ConceptScheme

[Direction is 'Source -> Destination'.]

ATTRIBUTES

◆ identifier : anyURI Public

[Is static False. Containment is Not Specified.]

◆ schemeName : text Public

[Is static False. Containment is Not Specified.]

◆ intendedUse : text Public
  Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

[Is static False. Containment is Not Specified.]

◆ conceptAxes : Concept Public
  Multiplicity: ([0..*], Allow duplicates: 0, Is ordered: False)

ATTRIBUTES

if axes are specified, implication is that every concept that is a member of the scheme denotes some value or range of values for each axis.

[Is static False. Containment is Not Specified.]

🔹 source : Citation Public
Multiplicity: ([0..*], Allow duplicates: 0, Is ordered: False)

[Is static False. Containment is Not Specified.]

ASSOCIATIONS

✏️ Association (direction: Source -> Destination)

Source: Public (Class) ConceptualDomain

Target: Public conceptSpace (Class) ConceptScheme
Cardinality: [0..1]

1.2.7 ConceptualDomain

Class in package 'Draft DataType Model'

a set of **value meanings** which may either be enumerated or expressed via a description. In ISO11179, *Conceptual_Domain* is an abstract class, which has two possible subclasses: *Enumerated_Conceptual_Domain* and *Described Conceptual_Domain.* Every *Conceptual_Domain* instance must be either an *Enumerated_Conceptual_Domain* or a *Described Conceptual_Domain* or a combination of the two. These subtypes are not modeled here.

ConceptualDomain
Version 1.0 Phase 1.0 Proposed
ISO11179 created on 1/6/2016. Last modified 1/19/2016

ATTRIBUTES

🔹 identifier : anyURI Public

[Is static False. Containment is Not Specified.]

🔹 domainName : text Public

[Is static False. Containment is Not Specified.]

🔹 conceptualValueType : Concept Public

high level categorization of the kind of values in this domain:
e.g. narrative text, count, coordinate measurement, ratio measurement, interval measurement, concept, truth value, DateTime, Date, Time, vector, continuous field, sequence, name, rate
(see 19103, maybe ISO80000?)

[Is static False. Containment is Not Specified.]

🔹 description : text Public
Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

[Is static False. Containment is Not Specified.]

🔹 source : Citation Public

ATTRIBUTES

Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

[Is static False. Containment is Not Specified.]

ASSOCIATIONS

Association (direction: Source -> Destination)

Source: Public (Class) ConceptualDomain   Target: Public conceptSpace (Class)
                                                        ConceptScheme
                                                            Cardinality: [0..1]

Association (direction: Destination -> Source)

Source: Public meaning (Class) ConceptualDomain   Target: Public representation (Class) ValueDomain
    Cardinality: [0..1]   Cardinality: [0..*]

Association (direction: Source -> Destination)

Source: Public (Class) ConceptualDomain   Target: Public applicableUnits (Class)
                                                        MeasureClass
                                                            Cardinality: [1..*]

Association (direction: Source -> Destination)

Source: Public (Class) Property   Target: Public domain (Class) ConceptualDomain

1.2.8 Constraint

Class in package 'Draft DataType Model'

constraints on the instances of the dataType in this data element--range, required units, other logical constraints.

Constraint
Version 1.0 Phase 1.0 Proposed
srichard created on 1/8/2016. Last modified 1/14/2016

INCOMING STRUCTURAL RELATIONSHIPS

➡ Generalization from RangeConstraint to Constraint

[Direction is 'Source -> Destination'.]

ATTRIBUTES

◆ constraintStatement : text Public

statement of the constraint

[Is static False. Containment is Not Specified.]

ASSOCIATIONS

Association (direction: Source -> Destination)

ASSOCIATIONS	
Source: Public (Class) ValueDomain	Target: Public domainConstraint (Class) Constraint
	Cardinality: [0..*]

1.2.9 ControlledVocabulary

Class in package 'Draft DataType Model'

A collection of terms used as the allowable values for an enumeratedValueDomain. Implements a concept scheme by specifying specific designations (strings) for each concept in the scheme.

ControlledVocabulary
Version 1.0 Phase 1.0 Proposed
srichard created on 8/18/2015. Last modified 3/8/2016

INCOMING STRUCTURAL RELATIONSHIPS
⇒ Aggregation from Term to ControlledVocabulary
[Direction is 'Destination -> Source'.]

ATTRIBUTES
◆ identifier : anyURI Public
[Is static False. Containment is Not Specified.]
◆ vocabularyName : text Public
[Is static False. Containment is Not Specified.]
◆ description : text Public Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)
[Is static False. Containment is Not Specified.]
◆ source : Citation Public Multiplicity: ([0..*], Allow duplicates: 0, Is ordered: False)
[Is static False. Containment is Not Specified.]

ASSOCIATIONS	
✎ Association (direction: Source -> Destination)	
Source: Public (Class) EnumeratedValueDomain	Target: Public codelist (Class) ControlledVocabulary
	Cardinality: [0..*]
	role name from ISO19115 used here
✎ Association (direction: Source -> Destination)	
Source: Public (Class) ImplementationElement	Target: Public implementationCodelist (Class) ControlledVocabulary
	Cardinality: [0..1]

1.2.10   DataElement

Class in package 'Draft DataType Model'

An information object that represents a unit of data that quantifies a property in the context of an ObjectClass. The identity of a DataElement is based on its meaning and domain. The intention is that a DataElement does not denote a particular implementation environment, corresponding to 'logical model' data modeling approaches. (ISO11179 DataElement)

<div align="right">

DataElement
Version 1.0 Phase 1.0 Proposed
ISO11179 created on 1/6/2016. Last modified 3/8/2016

</div>

OUTGOING STRUCTURAL RELATIONSHIPS

⬅ Aggregation from DataElement to DataType

[Direction is 'Destination -> Source'.]

INCOMING STRUCTURAL RELATIONSHIPS

➡ Generalization from Attribute to DataElement

[Direction is 'Source -> Destination'.]

➡ Generalization from ArrayVariable to DataElement

[Direction is 'Source -> Destination'.]

ATTRIBUTES

◆ identifier : anyURI Public

URI that identifies this DataElement

[Is static False. Containment is Not Specified.]

◆ elementName : text Public

full name to designate this DataElement in the context of the containing DataType.

[Is static False. Containment is Not Specified.]

◆ prefLabel : text Public
   Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

Optional label suggested for use to identify the DataElement in tables for computer use; generally a shorter version of the full elementName.

[Is static False. Containment is Not Specified.]

◆ description : text Public
   Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

documentation of any special considerations for the logical representation of the dataElementConcept by this element.

[Is static False. Containment is Not Specified.]

◆ source : Citation Public

[Is static False. Containment is Not Specified.]

ASSOCIATIONS

✎ Association (direction: Source -> Destination)

Source: Public (Class) DataElement	Target: Public metaAttribute (Class) MetaAttribute
	Cardinality: [0..*]

✎ Association (direction: Source -> Destination)

Source: Public representation (Class) DataElement	Target: Public meaning (Class) Property
Cardinality: [0..*]	Cardinality: [1]

✎ Association (direction: Destination -> Source)

Source: Public logicalModel (Class) DataElement	Target: Public implementation (Class) ImplementationElement
	Cardinality: [0..*]

✎ Association (direction: Source -> Destination)

Source: Public (Class) ArrayDimension	Target: Public characterizedBy (Class) DataElement
	Cardinality: [1]

1.2.11   DataMetaAttributes

Class in package 'Draft DataType Model'

Example attributes that might be associated with a DataObject. From ISO11179

DataMetaAttributes
Version 1.0 Phase 1.0 Proposed
srichard created on 8/17/2015. Last modified 1/14/2016

ATTRIBUTES

🔹 samplingBasisURI : anyURI Public
   Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

[Is static False. Containment is Not Specified.]

🔹 samplingBasisName : text Public
   Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

name of the entity (samplingFeature) that is the basis for assigning property values to the feature of interest. Examples include borehole interval, ground sampling cell (for a remote sensing image), outcrop station, physical sample, outcrop area, instrument, aggregation (of other data). The spatial representation section describes how the sampling features are geolocated

[Is static False. Containment is Not Specified.]

🔹 samplingBasisDescription : text Public
   Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

[Is static False. Containment is Not Specified.]

🔹 dElemGroupURI : anyURI Public
   Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

ATTRIBUTES

document a group definition as a separate attribute, requires an assigned attributeURI for the group, then use that URI here to aggregate attributes in a group. The GroupURI may be externally defined, but the URI must dereference to provide an explanation of the group

[Is static False. Containment is Not Specified.]

◆ geometryTypeName : text Public
   Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

term that specifies the type of geometry represented by this property, should be linked to a controlled vocabulary. Example (ISO19107 geometryType codelist): curve, line, point, polygon, solid, surface, grid. Should distinguish 2D and 3D point

[Is static False. Containment is Not Specified.]

◆ geometryTypeURI : anyURI Public

[Is static False. Containment is Not Specified.]

◆ geometryTypeVocabularyURI : anyURI Public
   Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

Unique identifier for the vocabulary within which the geometry type is identified; if the geometryTypeURI identifier type allows resolution of the vocabulary, this is redundant; for some schemes the TypeURI value may be a toke that is appended to the vocabulary URI to obtain the full TypeURI

[Is static False. Containment is Not Specified.]

◆ discreteSamplingSchemaType : text Public
   Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

Term or identifier that categorizes the schema used to describe the sampling structure for a gridded/array type data (discrete coverage), using a short string for machine processing. Typically the various dimensions map to some conceptual domain like space or time, sampled at some interval, See ISO19123, ISO19115-1 and 19115-2 MD_CoverageDescription and MD_GridSpatialRepresentation

[Is static False. Containment is Not Specified.]

◆ discreteSamplingExplanation : text Public
   Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

explanation of how the discrete coverage is represented and what kind of content is encoded here, for human reader. Actual discreteSamplingDescription is unconstrained JSON blob included following this element.

[Is static False. Containment is Not Specified.]

◆ discreteSamplingDescription : JSONobject Public
   Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

JSON content that describes the discrete sampling geometry, according to the description type specified by discreteSamplingDescriptionType

[Is static False. Containment is Not Specified.]

1.2.12   DataType

Class in package 'Draft DataType Model'

An information object that represents an entity of interest (ObjectClass in this model, based on ISO11179) in some domain; the representation consists of a collection of DataElements that are used to quantify properties of instances of the entity. Corresponds to 'dataType' in ISO11179, Entity in Entity-Relationship models, Object in object models, 'document' in document type noSQL databases (e.g. CouchDb, MongoDb), 'Variable' in the netCDF common data model (OGC 10-090r3).

<div align="right">

DataType
Version 1.0 Phase 1.0 Proposed
srichard created on 1/6/2016. Last modified 3/7/2016

</div>

CONSTRAINTS

Invariant. A DataObject SHALL have attribute associations that correspond to the element.Property associations for the meaning.ObjectClass associated with the DataObject.

Basically, a DataObject must have attribute.DataElement association that bind at least one DataElement whose meaning.Property is also an element.Property of the meaning.ObjectClass associated with the DataObject

<div align="right">

[Approved, Weight is 0.]

</div>

INCOMING STRUCTURAL RELATIONSHIPS

➡ Aggregation from DataElement to DataType

<div align="right">

[Direction is 'Destination -> Source'.]

</div>

ATTRIBUTES

◆ identifier : anyURI Public

<div align="right">

[Is static False. Containment is Not Specified.]

</div>

◆ label : text Public

Label by which the data object is identified in its application context

<div align="right">

[Is static False. Containment is Not Specified.]

</div>

◆ logicType : Concept Public

categorize the logical paradigm for the representation-- e.g. relational, object-oriented, graph, tabular text

<div align="right">

[Is static False. Containment is Not Specified.]

</div>

◆ expectedUses : text Public
    Multiplicity: ([0..*], Allow duplicates: 0, Is ordered: False)

an explanation of the intention for the dataType

Properties:
    source = RDA DataType Model 2015

<div align="right">

[Is static False. Containment is Not Specified.]

</div>

ASSOCIATIONS

✏ Association (direction: Source -> Destination)

Source: Public (Class) DataType   Target: Public provenance (Class) ProcessingStep
                                                                                            Cardinality: [0..*]

ASSOCIATIONS	
	use relation name from RDA data type model 2015

✎ Association (direction: Source -> Destination)

Source: Public (Class) DataType

Target: Public examples (Class) Example
Cardinality: [0..*]

✎ Association (direction: Destination -> Source)

Source: Public logicalModel (Class) DataType

Target: Public implementation (Class) ImplementationObject
Cardinality: [0..*]

✎ Association (direction: Source -> Destination)

Source: Public (Class) DataType

Target: Public metaAttribute (Class) MetaAttribute
Cardinality: [0..*]

✎ Association (direction: Source -> Destination)

Source: Public (Class) ValueDomain

Target: Public domainDataType (Class) DataType

✎ Association (direction: Destination -> Source)

Source: Public meaning (Class) ObjectClass
Cardinality: [1]

Target: Public representation (Class) DataType
Cardinality: [0..*]

1.2.13   EnumeratedValueDomain

Class in package 'Draft DataType Model'

EnumeratedValueDomain
Version 1.0 Phase 1.0 Proposed
srichard created on 8/18/2015. Last modified 1/20/2016
Extends ValueDomain

CONSTRAINTS

⚙ Invariant. type (dataType) = LogicalDataType

the values provided by an EnumeratedValueDomain are text strings, thus the dataType for the valueDomain SHALL not be an ObjectDataType

[Approved, Weight is 0.]

OUTGOING STRUCTURAL RELATIONSHIPS

⬅ Generalization from EnumeratedValueDomain to ValueDomain

[Direction is 'Source -> Destination'.]

ASSOCIATIONS

✎ Association (direction: Source -> Destination)

ASSOCIATIONS	
Source: Public (Class) EnumeratedValueDomain	Target: Public codelist (Class) ControlledVocabulary Cardinality: [0..*] role name from ISO19115 used here

1.2.14   Example

Class in package 'Draft DataType Model'

Implementation of DataType.example from RDA dataType model 2015

Example
Version 1.0 Phase 1.0 Proposed
RDA DataType model created on 8/18/2015. Last modified 1/15/2016

ATTRIBUTES
◆ exampleDataTypeInstance : text Public Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False) a text encoding of an example instance of the data type [Is static False. Containment is Not Specified.]
◆ linkToExampleDataset : Link Public Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False) Link to an example dataset that instantiates the data type [Is static False. Containment is Not Specified.]

ASSOCIATIONS	
✏ Association (direction: Source -> Destination)	
Source: Public (Class) DataType	Target: Public examples (Class) Example Cardinality: [0..*]

1.2.15   ImplementationElement

Class in package 'Draft DataType Model'

representation of the physical implementation of a DataElement. The targetEnvironment and purpose are inferred from the containing ImplementationObject

ImplementationElement
Version 1.0 Phase 1.0 Proposed
srichard created on 1/20/2016. Last modified 3/9/2016

CONSTRAINTS

CONSTRAINTS

🔩 Invariant. implemenationDataType + implementedObjectAttribute = 1

[Approved, Weight is 0.]

ATTRIBUTES

🔹 identifier : anyURI Public

[Is static False. Containment is Not Specified.]

🔹 localName : text Public

[Is static False. Containment is Not Specified.]

🔹 cardinality : text Public

[Is static False. Containment is Not Specified.]

🔹 sequence : int Public
Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

if the order of the attributes in the implementation instance is fixed, sequence numbers SHALL be provided to define the order.

[Is static False. Containment is Not Specified.]

🔹 alias : text@lang Public
Multiplicity: ([0..*], Allow duplicates: 0, Is ordered: False)

other names that may be used to identify the dataElement; should be language or context-localized.

[Is static False. Containment is Not Specified.]

ASSOCIATIONS

✏️ Association (direction: Source -> Destination)

Source: Public (Class) ImplementationElement   Target: Public units (Class) UnitOfMeasure
                                                            Cardinality: [0..1]

✏️ Association (direction: Source -> Destination)

Source: Public (Class) ImplementationElement   Target: Public implementationCodelist (Class) ControlledVocabulary
                                                            Cardinality: [0..1]

✏️ Association (direction: Source -> Destination)

Source: Public (Class) ImplementationElement   Target: Public implementationDataType (Class) SyntacticDataType
                                                            Cardinality: [0..1]

✏️ Association (direction: Source -> Destination)

Source: Public (Class) ImplementationElement   Target: Public implementedObjectAttribute (Class) ImplementationObject
                                                            Cardinality: [0..1]

                                                            If an ImplemenationElement value is specified by an object, as opposed to a simple (string, boolean,

ASSOCIATIONS

	number) value, this link specifies the object implementation

🖉 Association (direction: Source -> Destination)	
Source: Public (Class) ImplementationObject	Target: Public implementedAttribute (Class) ImplementationElement Cardinality: [1..*]

🖉 Association (direction: Destination -> Source)	
Source: Public logicalModel (Class) DataElement	Target: Public implementation (Class) ImplementationElement Cardinality: [0..*]

1.2.16   ImplementationObject

Class in package 'Draft DataType Model'

representation of a physical implementation of a DataObject.

<div align="right">

ImplementationObject
Version 1.0 Phase 1.0 Proposed
srichard created on 1/20/2016. Last modified 3/8/2016

</div>

ATTRIBUTES

🔹 identifier : anyURI Public	
	[Is static False. Containment is Not Specified.]

🔹 localName : text Public	
designation for this information object in its native environment	
	[Is static False. Containment is Not Specified.]

🔹 description : text Public Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)	
	[Is static False. Containment is Not Specified.]

🔹 targetEnvironment : Concept Public Multiplicity: ([1..*], Allow duplicates: 0, Is ordered: False)	
identification of the specific software environment for which this implementation is designed. e.g. Oracle 10 relational db, XML v1.0, GML 3.2 application schema	
	[Is static False. Containment is Not Specified.]

🔹 purpose : Concept Public Multiplicity: ([0..*], Allow duplicates: 0, Is ordered: False)	
categorize the intention of this implementation, e.g. interchange format, database table, data acquisition tool, data archive, object oriented software, semantic application	
	[Is static False. Containment is Not Specified.]

ASSOCIATIONS

Association (direction: Source -> Destination)

Source: Public (Class) ImplementationObject

Target: Public implementedAttribute (Class) ImplementationElement
Cardinality: [1..*]

Association (direction: Destination -> Source)

Source: Public logicalModel (Class) DataType

Target: Public implementation (Class) ImplementationObject
Cardinality: [0..*]

Association (direction: Source -> Destination)

Source: Public (Class) ImplementationElement

Target: Public implementedObjectAttribute (Class) ImplementationObject
Cardinality: [0..1]

If an ImplemenationElement value is specified by an object, as opposed to a simple (string, boolean, number) value, this link specifies the object implementation

---

Association (direction: Source -> Destination)

Source: Public (Class) InterchangeFormat

Target: Public encodes (Class) ImplementationObject
Cardinality: [1..*]

1.2.17   InterchangeFormat

Class in package 'Draft DataType Model'

a document type definition used to serialize information for one or more ImplementationObjects

InterchangeFormat
Version 1.0 Phase 1.0 Proposed
srichard created on 1/20/2016. Last modified 1/20/2016

ATTRIBUTES

🔹 identifier : anyURI Public

[Is static False. Containment is Not Specified.]

🔹 formatName : text Public

[Is static False. Containment is Not Specified.]

🔹 label : text Public
Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

short text version of format name. In data that is identifying this interchange format using a text string (not a URI), this string should be used (if specified).

[Is static False. Containment is Not Specified.]

ATTRIBUTES

🔷 description : text Public
Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

[Is static False. Containment is Not Specified.]

🔷 fileType : Concept Public

mime type for the file

[Is static False. Containment is Not Specified.]

🔷 source : Citation Public

should identify an accessible document that defines the interchange format.

[Is static False. Containment is Not Specified.]

🔷 schemaDocument : Link Public
Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

a link to a schema document (xsd, schematron, RuleML) that can be used to validate instance documents.

[Is static False. Containment is Not Specified.]

🔷 schemaType : Concept Public
Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

category that identifies the kind of schema document available to validate interchange document instances.

[Is static False. Containment is Not Specified.]

ASSOCIATIONS

✏️ Association (direction: Source -> Destination)

Source: Public (Class) InterchangeFormat   Target: Public encodes (Class)
                                                    ImplementationObject
                                                    Cardinality: [1..*]

1.2.18   LogicalDataType

Class in package 'Draft DataType Model'

A set of distinct values, characterized by properties of those values and by operations on those values. E.g. string, integer, real number, term, reference. Implementation independent, but restricts implementation options. Must be consistent with conceptualValueType of meaning.ConceptualDomain (if one is specified).
Does not have UnitOfMeasure property; measure is considered an object that has a numeric value and a UOM concept.

EXAMPLE 1
name: integer
description: mathematical datatype comprising the exact integral values.
scheme_reference: ISO/IEC 11404:2007
EXAMPLE 2
name: BL
description: BL stands for the values of two-valued logic. A BL value can be either true or false, or may have a nullFlavor.
scheme_reference: ISO 21090:2010

INCOMING STRUCTURAL RELATIONSHIPS

➡ Generalization from ObjectDataType to LogicalDataType

[Direction is 'Source -> Destination'.]

1.2.19   MeasureClass

Class in package 'Draft DataType Model'

a set of equivalent **units of measure** that may be shared across multiple **dimensionalities**. *Measure_Class* allows a grouping of units of measure to be specified once, and reused by multiple dimensionalities.
EXAMPLE: We could define the *Measure_Classes*: Metric Linear Distance, Imperial Linear Distance, each associated with the appropriate *Units_of_Measure*; and associate them with *Dimensionalities*: Height, Width, and Depth to model the three spatial dimensions.
Also allow dimensionless, and categorical

OUTGOING STRUCTURAL RELATIONSHIPS

⬅ Generalization from MeasureClass to Concept

[Direction is 'Source -> Destination'.]

INCOMING STRUCTURAL RELATIONSHIPS

➡ Aggregation from UnitOfMeasure to MeasureClass

[Direction is 'Destination -> Source'.]

ASSOCIATIONS

✏ Association (direction: Source -> Destination)

Source: Public (Class) ConceptualDomain   Target: Public applicableUnits (Class)
                                                 MeasureClass
                                                    Cardinality: [1..*]

1.2.20   MetaAttribute

Class in package 'Draft DataType Model'

Metadata attributes that document the data element intention and usage. NetCDF uses this to assign units to the attribute.
DataObject (data type) attributes might include geometryType, samplingBasis,
a data element might have discrete sampling scheme information, units of measure, etc.

model element based on NetCDF common data model 'attribute' concept on dataset and on variable, and properties on DataType and DataElement in ISO11179

<div align="right">
MetaAttribute
Version 1.0 Phase 1.0 Proposed
srichard created on 1/14/2016. Last modified 1/20/2016
</div>

ATTRIBUTES

🔷 key : DataElement Public

this model allows metaAttributes to themselves be DataObjects or SyntacticDataTypes, which is more general than NetCDF CDM (OGC 10-090r3).

Constraints:
    count(key.DataElement.metaAttribute)=0 :

[Is static False. Containment is Not Specified.]

🔷 values : text Public
Multiplicity: ([1..*], Allow duplicates: 0, Is ordered: False)

an array of 1 to many values assigned on this attribute. This is inherited from OGC10-090r3; needs testing to determine if necessary. text data type is assigned, non-text values must be text encoded

[Is static False. Containment is Not Specified.]

ASSOCIATIONS

✏️ Association (direction: Source -> Destination)

Source: Public (Class) DataElement   Target: Public metaAttribute (Class) MetaAttribute
                                                        Cardinality: [0..*]

✏️ Association (direction: Source -> Destination)

Source: Public (Class) DataType   Target: Public metaAttribute (Class) MetaAttribute
                                                        Cardinality: [0..*]

1.2.21   ObjectClass

Class in package 'Draft DataType Model'

object class is a **concept** (3.2.18) that represents a set of ideas, abstractions, or things in the real world that can be identified with explicit boundaries and meaning and whose properties and behavior follow the same rules.

<div align="right">
ObjectClass
Version 1.0 Phase 1.0 Proposed
srichard created on 1/6/2016. Last modified 2/6/2016
Extends Concept
</div>

OUTGOING STRUCTURAL RELATIONSHIPS

⬅ Generalization from ObjectClass to Concept

[Direction is 'Source -> Destination'.]

INCOMING STRUCTURAL RELATIONSHIPS

⇒ Aggregation from Property to ObjectClass

[Direction is 'Destination -> Source'.]

⇒ Aggregation from Property to ObjectClass

[Direction is 'Destination -> Source'.]

ASSOCIATIONS

✏ Association (direction: Destination -> Source)

Source: Public meaning (Class) ObjectClass   Target: Public representation (Class) DataType
    Cardinality: [1]   Cardinality: [0..*]

1.2.22   ObjectDataType

Class in package 'Draft DataType Model'

ObjectDataType
Version 1.0 Phase 1.0 Proposed
srichard created on 1/19/2016. Last modified 1/19/2016
Extends LogicalDataType

OUTGOING STRUCTURAL RELATIONSHIPS

⇐ Generalization from ObjectDataType to LogicalDataType

[Direction is 'Source -> Destination'.]

1.2.23   ProcessingStep

Class in package 'Draft DataType Model'

implementation of RDA DataType.provenance

ProcessingStep
Version 1.0 Phase 1.0 Proposed
RDA DataType model created on 8/17/2015. Last modified 1/15/2016

ATTRIBUTES

◆ event : Event Public

[Is static False. Containment is Not Specified.]

◆ source : Citation Private
Multiplicity: ([0..*], Allow duplicates: 0, Is ordered: False)

[Is static False. Containment is Not Specified.]

◆ contributor : QualifiedAttribution Public
Multiplicity: ([1..*], Allow duplicates: 0, Is ordered: False)

[Is static False. Containment is Not Specified.]

ASSOCIATIONS

🖉 Association (direction: Source -> Destination)

Source: Public (Class) DataType

Target: Public provenance (Class) ProcessingStep
Cardinality: [0..*]

use relation name from RDA data type model 2015

1.2.24   Property

Class in package 'Draft DataType Model'

A conceptual property. Implementation specifics included in the data type definition that uses this property ISO11179: a quality common to all members of an **object class**. A property may be any feature that humans naturally use to distinguish one individual object from another. It is the human perception of a single quality of an object class in the real world. It is conceptual and thus has no particular associated means of representation by which the property can be communicated.

A quality that inheres in an entity.

This is derived from ISO11179 **data element concept:** a **concept** that is an **association** of a **property** with an **object class**. A data element concept can be represented in the form of a **data element**, described independently of any particular representation. Since elementProperty is mandatory and single valued, there doesn't seem to be much gained by separating property and dataElementConcept

Property
Version 1.0 Phase 1.0 Proposed
srichard created on 8/18/2015. Last modified 2/6/2016
Extends Concept

OUTGOING STRUCTURAL RELATIONSHIPS

⬅ Generalization from Property to Concept

[Direction is 'Source -> Destination'.]

⬅ Aggregation from Property to ObjectClass

[Direction is 'Destination -> Source'.]

⬅ Aggregation from Property to ObjectClass

[Direction is 'Destination -> Source'.]

ATTRIBUTES

🔹 dimensionality : Concept Public
Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

An expression of measurement without units. Each dimension category groups a set equivalent units of measure, where equivalence is determined by the existence of a quantity-preserving one-to-one correspondence between values measured in one unit of measure and values measured in the other unit of measure, independent of context, and where the characterizing operations are the same. Appears to correspond (exactMatch?) to NetCDF common data model 'dimension' concept: "represents a real physical dimension, for example, time, latitude, longitude, or height. A dimension might also be used to index other quantities, for example station or model-run-number." (NetCDF User Guide, Version 4.1.3, 2011-06). ISO/IEC 11179 also permits non-physical dimensions (e.g. value dimensions such as: currency, quality indicator). See also ISO 80000 (https://en.wikipedia.org/wiki/International_System_of_Quantities) for another specification of physical dimensions (e.g. length, mass, velocity).
When a dimensionality is specified, then the Unit_of_Measure specified for any Value_Domain that is based on this Conceptual_Domain SHALL be consistent with this dimensionality.

ATTRIBUTES

EXAMPLES: inches, feet, meters, and centimeters are all units of measure whose dimensionality is length. Other common dimensionalities include: mass, time, area, volume, etc.

NOTES:

-- The units of measure "temperature in degrees Fahrenheit" and "temperature in degrees Celsius" have the same dimensionality, because given a value measured in degrees Fahrenheit there is a value measured in degrees Celsius that is the same quantity, and vice-versa. This assumes we are dealing with temperature coordinates. There is no offset when converting among temperature interval measures, e.g., the temperature difference between the coldest and hottest temperature on a day.

-- Quantities may be grouped together into categories of quantities which are mutually comparable. Lengths, diameters, distances, heights, wavelengths and so on would constitute such a category. Mutually comparable quantities have the same dimensionality if they have common characterizing operations. The requirement of common "characterizing operations" for all units of measure with the same dimensionality is a stronger requirement than that commonly adopted in conventional dimensional analysis (where comparability and transformability usually suffice). Thus with respect to temperature, absolute temperature coordinates (e.g. Kelvins) are here considered to be a different dimensionality than "offset" temperature coordinates (e.g. degrees Celsius or Fahrenheit). It is meaningful to take the ratio of absolute temperature coordinates, but not of "offset" temperature coordinates, wherein the arbitrary translation of zero renders ratios meaningless. The notion of characterizing operations used here has been adapted from the statistics literature where distinctions are commonly made among categorical, ordered, interval, and ratio measures. (ISO11179)

[Is static False. Containment is Not Specified.]

ASSOCIATIONS

✎ Association (direction: Source -> Destination)

Source: Public (Class) Property   Target: Public domain (Class) ConceptualDomain

✎ Association (direction: Source -> Destination)

Source: Public representation (Class) DataElement   Target: Public meaning (Class) Property
Cardinality: [0..*]   Cardinality: [1]

1.2.25   RangeConstraint

Class in package 'Draft DataType Model'

RangeConstraint
Version 1.0 Phase 1.0 Proposed
srichard created on 1/11/2016. Last modified 1/11/2016
Extends Constraint

OUTGOING STRUCTURAL RELATIONSHIPS

⬅ Generalization from RangeConstraint to Constraint

[Direction is 'Source -> Destination'.]

ATTRIBUTES

◆ minValue : number Public

[Is static False. Containment is Not Specified.]

◆ maxValue : number Public

[Is static False. Containment is Not Specified.]

1.2.26   SimpleType

Class in package 'Draft DataType Model'

a data type represented by a single value

<div align="right">

SimpleType
Version 1.0 Phase 1.0 Proposed
OGC10-090r3 created on 1/14/2016. Last modified 1/14/2016

</div>

1.2.27   SyntacticDataType

Class in package 'Draft DataType Model'

physical data type, specifying string length limits, specific number implementation (long integer, float, double), list syntax, symbols to use for boolean values, etc..

<div align="right">

SyntacticDataType
Version 1.0 Phase 1.0 Proposed
ISO11179 created on 1/6/2016. Last modified 1/20/2016
Extends Concept

</div>

OUTGOING STRUCTURAL RELATIONSHIPS

⬅ Generalization from SyntacticDataType to Concept

[Direction is 'Source -> Destination'.]

ATTRIBUTES

◆ format : text Public
Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

template for the structure of the presentation of the value(s)
EXAMPLE – YYYY-MM-DD for a date., limitations on character string length. Typically some sort of regular expressions specifying syntax for the alphanumeric string that specifies data values. If the data type allows lists, format text should specify list boundary and delimiter characters.

[Is static False. Containment is Not Specified.]

◆ annotation : text Public
Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

specifying information to further define the Datatype

[Is static False. Containment is Not Specified.]

ASSOCIATIONS

✎ Association (direction: Source -> Destination)

Source: Public (Class) ImplementationElement

Target: Public implementationDataType (Class) SyntacticDataType
Cardinality: [0..1]

1.2.28   Term

Class in package 'Draft DataType Model'

a representation of a concept in a particular application

Term
Version 1.0 Phase 1.0 Proposed
srichard created on 1/9/2016. Last modified 1/9/2016

OUTGOING STRUCTURAL RELATIONSHIPS
⬅ Aggregation from Term to ControlledVocabulary [Direction is 'Destination -> Source'.]

ATTRIBUTES
🔷 designation : text Public String used to represent a concept in this application [Is static False. Containment is Not Specified.]
🔷 meaning : Concept Public Concept that denotes meeting of the value in this application [Is static False. Containment is Not Specified.]

1.2.29   UnitOfMeasure

Class in package 'Draft DataType Model'

the units in which associated values are measured.
Units of measure are not limited to physical categories. Examples of physical categories are: linear measure, area, volume, mass, velocity, time duration. Examples of non-physical categories are: currency, quality indicator, color intensity.

UnitOfMeasure
Version 1.0 Phase 1.0 Proposed
ISO11179 created on 1/6/2016. Last modified 1/14/2016
Extends Concept

OUTGOING STRUCTURAL RELATIONSHIPS
⬅ Generalization from UnitOfMeasure to Concept [Direction is 'Source -> Destination'.]
⬅ Aggregation from UnitOfMeasure to MeasureClass [Direction is 'Destination -> Source'.]

ASSOCIATIONS
✏ Association (direction: Source -> Destination)

ASSOCIATIONS

Source: Public (Class) ImplementationElement	Target: Public units (Class) UnitOfMeasure
	Cardinality: [0..1]

1.2.30   ValueDomain

Class in package 'Draft DataType Model'

a set of **permissible value**s. A *Value_Domain* provides representation, but has no implication as to what *Data_Element_Concept* the values are associated with, nor what the values mean. A *Value_Domain* may be associated with multiple *Data_Elements*.
A *Value_Domain* has two possible subclasses: an *Enumerated_Value_Domain* or a *Described_Value_Domain*

<div align="right">

ValueDomain
Version 1.0 Phase 1.0 Proposed
ISO11179 created on 1/6/2016. Last modified 3/8/2016

</div>

INCOMING STRUCTURAL RELATIONSHIPS

➡ Generalization from EnumeratedValueDomain to ValueDomain

<div align="right">[Direction is 'Source -> Destination'.]</div>

ATTRIBUTES

◆ identifier : anyURI Public

<div align="right">[Is static False. Containment is Not Specified.]</div>

◆ domainName : text Public

<div align="right">[Is static False. Containment is Not Specified.]</div>

◆ description : text Public
　Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

description of intention of domain

<div align="right">[Is static False. Containment is Not Specified.]</div>

ASSOCIATIONS

✎ Association (direction: Source -> Destination)

Source: Public (Class) ValueDomain	Target: Public domainDataType (Class) DataType

✎ Association (direction: Source -> Destination)

Source: Public (Class) ValueDomain	Target: Public domainConstraint (Class) Constraint
	Cardinality: [0..*]

✎ Association (direction: Source -> Destination)

Source: Public (Class) Attribute	Target: Public domain (Class) ValueDomain
	Cardinality: [1]

✎ Association (direction: Destination -> Source)

ASSOCIATIONS

Source: Public meaning (Class) ConceptualDomain   Target: Public representation (Class) ValueDomain
   Cardinality: [0..1]   Cardinality: [0..*]

2   HelperClasses

Package in package 'DataTypeModels'

Citation, Event, Agent, Qualified attribution, address. Various metadata classes useful for other model attribute values.

<div align="right">

HelperClasses
Version 1.0 Phase 1.0 Proposed
srichard created on 1/14/2016. Last modified 1/19/2016

</div>

2.1   AgentEventLink models diagram

Class diagram in package 'HelperClasses'

<div align="right">

AgentEventLink models
Version 1.0
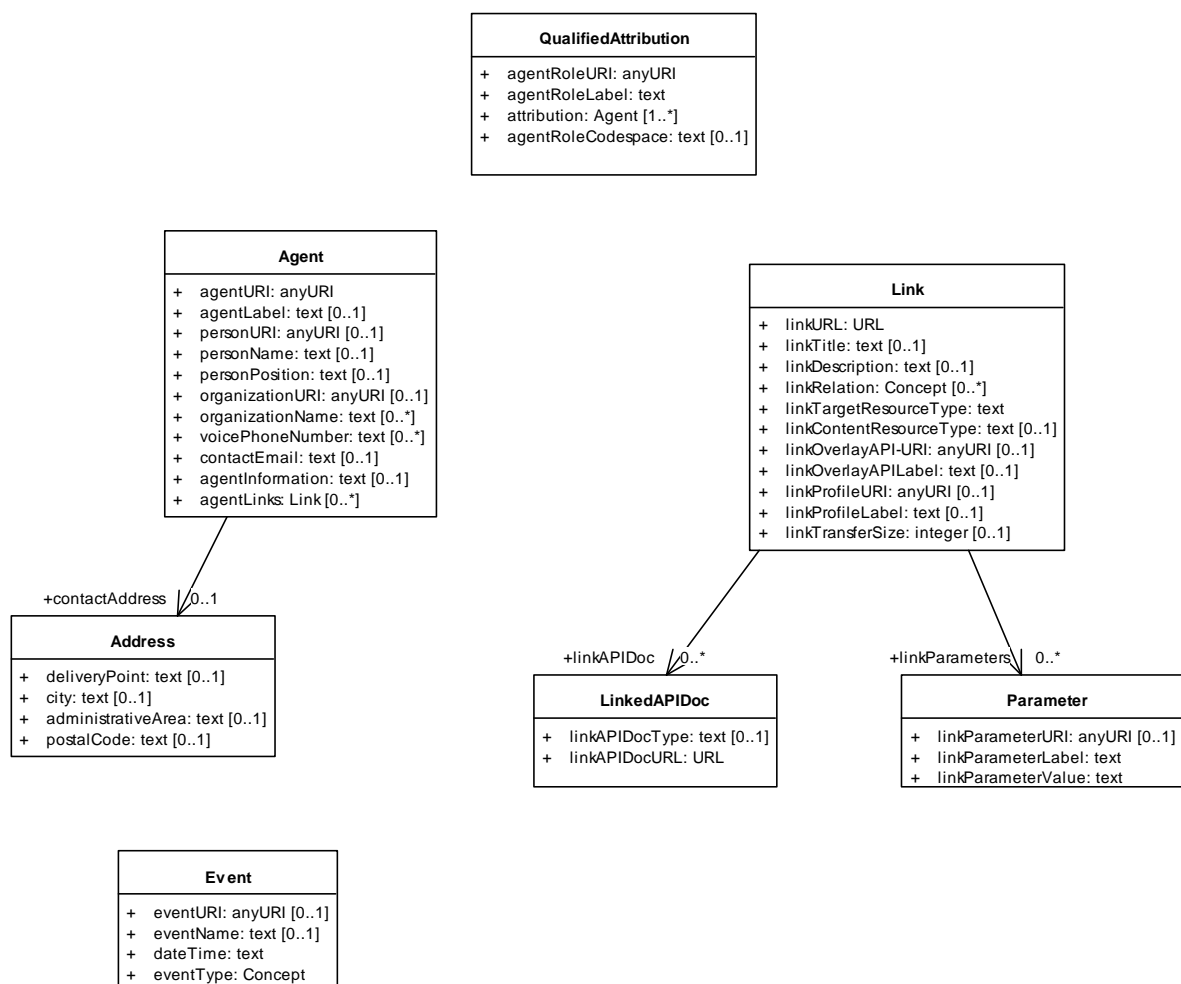srichard created on 8/18/2015. Last modified 2/5/2016

</div>

Figure 12: AgentEventLink models

2.2   Citation diagram

Class diagram in package 'HelperClasses'

Citation
Version 1.0
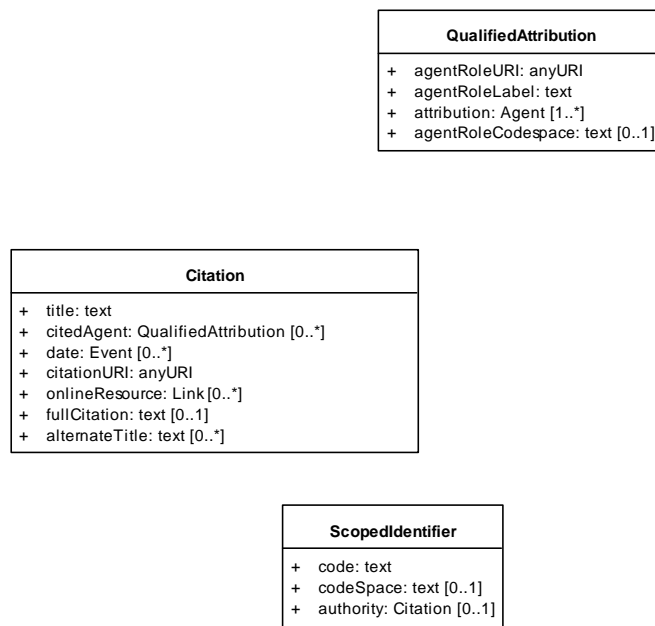srichard created on 1/19/2016. Last modified 1/19/2016

QualifiedAttribution

+ agentRoleURI: anyURI
+ agentRoleLabel: text
+ attribution: Agent [1..*]
+ agentRoleCodespace: text [0..1]

Citation

+ title: text
+ citedAgent: QualifiedAttribution [0..*]
+ date: Event [0..*]
+ citationURI: anyURI
+ onlineResource: Link [0..*]
+ fullCitation: text [0..1]
+ alternateTitle: text [0..*]

ScopedIdentifier

+ code: text
+ codeSpace: text [0..1]
+ authority: Citation [0..1]

Figure 13: Citation

2.3 Address

Class in package 'HelperClasses'

Address
Version 1.0 Phase 1.0 Proposed
srichard created on 8/18/2015. Last modified 1/14/2016

ATTRIBUTES
◆ deliveryPoint : text Public Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False) street address, PO box. Full postal address should be in this field if it is not parsed into separate fields. [Is static False. Containment is Not Specified.]
◆ city : text Public Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False) [Is static False. Containment is Not Specified.]
◆ administrativeArea : text Public Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False) [Is static False. Containment is Not Specified.]
◆ postalCode : text Public Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False) [Is static False. Containment is Not Specified.]

ASSOCIATIONS

✏ Association (direction: Source -> Destination)

Source: Public (Class) Agent   Target: Public contactAddress (Class) Address
                                                                              Cardinality: [0..1]

2.4 Agent

Class in package 'HelperClasses'

"An agent is something that bears some form of responsibility for an activity taking place, for the existence of an entity, or for another agent's activity." (W3C PROV). In this view, software can also be an agent. Responsibility does not have to be 'conscious' or intentional. An agent is an identifiable entity; could be an organization, an individual who may or may not be associated with an organization, an entity identified via a role (position) relative to an organization, or an artificial entity (software, a machine).

Agent
Version 1.0 Phase 1.0 Proposed
srichard created on 8/17/2015. Last modified 1/20/2016

CONSTRAINTS

🔗 Invariant. count(personName + personPosition+organizationName) >0

at least one text name SHALL be provided

[Approved, Weight is 0.]

🔗 Invariant. count(voicePhoneNumber + contactEmail) > 0

at least one voice phone number or e-mail SHALL be provided

[Approved, Weight is 1.]

ATTRIBUTES

🔹 agentURI : anyURI Public

Unique identifier for the agent. At least follow URI syntax (e.g. a prefix for the 'protocol'), even if they are local identifiers.

[Is static False. Containment is Not Specified.]

🔹 agentLabel : text Public
Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

text string to identify the agent for humans.

[Is static False. Containment is Not Specified.]

🔹 personURI : anyURI Public
Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

unique identifier for a person.

[Is static False. Containment is Not Specified.]

ATTRIBUTES

◆ personName : text Public
   Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

The name of an individualformat--Last Name,First name MI

[Is static False. Containment is Not Specified.]

◆ personPosition : text Public
   Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

identifies an individual who currently holds the named position in context of an organization

[Is static False. Containment is Not Specified.]

◆ organizationURI : anyURI Public
   Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

[Is static False. Containment is Not Specified.]

◆ organizationName : text Public
   Multiplicity: ([0..*], Allow duplicates: 0, Is ordered: False)

unique identifier for organization; use to link to the organization that the person is affiliated with, in the case that the AgentURI is for the person and they have an organization affiliation. In this case the organizationName is equivalent to the linkLabel property

[Is static False. Containment is Not Specified.]

◆ voicePhoneNumber : text Public
   Multiplicity: ([0..*], Allow duplicates: 0, Is ordered: False)

Number for voice contact. Use registered tel URI scheme for encoding. See http://tools.ietf.org/html/rfc3966

[Is static False. Containment is Not Specified.]

◆ contactEmail : text Public
   Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

[Is static False. Containment is Not Specified.]

◆ agentInformation : text Public
   Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

text information, providing other details useful for making contact, like hours or ordering instructions

[Is static False. Containment is Not Specified.]

◆ agentLinks : Link Public
   Multiplicity: ([0..*], Allow duplicates: 0, Is ordered: False)

[Is static False. Containment is Not Specified.]

ASSOCIATIONS

✎ Association (direction: Source -> Destination)

Source: Public (Class) Agent   Target: Public contactAddress (Class) Address
                                                         Cardinality: [0..1]

2.5 Citation

Class in package 'HelperClasses'

a resolvable reference to an information source. Not detailed here, Should include a text string providing guidance on how to cite the source, a title, bibliographic information if appropriate, a URI for the source resource, and Links to access representations of the resource online, and optionally a relation concept explaining the relationship between the source and the citing element.

<div align="right">

Citation
Version 1.0 Phase 1.0 Proposed
srichard created on 1/16/2016. Last modified 1/20/2016

</div>

ATTRIBUTES

◆ title : text Public

[Is static False. Containment is Not Specified.]

◆ citedAgent : QualifiedAttribution Public
   Multiplicity: ([0..*], Allow duplicates: 0, Is ordered: False)

implement CI_Responsibility using QualifiedAttribution based on PROV

[Is static False. Containment is Not Specified.]

◆ date : Event Public
   Multiplicity: ([0..*], Allow duplicates: 0, Is ordered: False)

[Is static False. Containment is Not Specified.]

◆ citationURI : anyURI Public

URIs, ISBN, ISSN, other alternate identifiers for the cited resource.

[Is static False. Containment is Not Specified.]

◆ onlineResource : Link Public
   Multiplicity: ([0..*], Allow duplicates: 0, Is ordered: False)

implements ISO19115 onlineResource and graphic properties of CI_Citation. Browse graphic is implemented as a link to an online graphic.

[Is static False. Containment is Not Specified.]

◆ fullCitation : text Public
   Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

suggested citation text to use in referencing or citing this resource in text. This property includes edition, editionDate, series, otherCitationDetails from ISO19115-1 CI_Citation.

[Is static False. Containment is Not Specified.]

◆ alternateTitle : text Public
   Multiplicity: ([0..*], Allow duplicates: 0, Is ordered: False)

[Is static False. Containment is Not Specified.]

ASSOCIATIONS

ASSOCIATIONS

✏ Association (direction: Source -> Destination)

Source: Public (Class) Concept   Target: Public source (Class) Citation
                                                   Cardinality: [1..*]

2.6 Event

Class in package 'HelperClasses'

Associates an event defined by an eventType and an optional event instance URI, with a date time string detailing when the event occurred. In simplest case can just provide dateTime if the event context is unambiguous in the importing object.

Event
Version 1.0 Phase 1.0 Proposed
srichard created on 8/17/2015. Last modified 1/14/2016

ATTRIBUTES

◆ eventURI : anyURI Public
Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

identifier for the event instance if this object is about a specific event

[Is static False. Containment is Not Specified.]

◆ eventName : text Public
Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

name to identify the event for people

[Is static False. Containment is Not Specified.]

◆ dateTime : text Public

Use ISO 8601: 2011-10-11T14:30

[Is static False. Containment is Not Specified.]

◆ eventType : Concept Public

[Is static False. Containment is Not Specified.]

2.7 Link

Class in package 'HelperClasses'

Link
Version 1.0 Phase 1.0 Proposed
srichard created on 8/18/2015. Last modified 1/14/2016

ATTRIBUTES

ATTRIBUTES

◆ linkURL : URL Public

a web-derferencable identifier that locates the link target; typically an HTTP URI. URI syntax specifies that the identifier string includes a prefix that specifies the base protocol for the identifier

[Is static False. Containment is Not Specified.]

◆ linkTitle : text Public
   Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

[Is static False. Containment is Not Specified.]

◆ linkDescription : text Public
   Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

free text description of the target to help UI

[Is static False. Containment is Not Specified.]

◆ linkRelation : Concept Public
   Multiplicity: ([0..*], Allow duplicates: 0, Is ordered: False)

[Is static False. Containment is Not Specified.]

◆ linkTargetResourceType : text Public

typically use MIME type string from IANA registry http : //www.iana.org/assignments/media-types/application/index.html. This is the type of the file that will be accessed directly by the link URL; if this is a container file (e.g. zip archive), the innerResourceType property is used to specify the type of file with actual resource content.

[Is static False. Containment is Not Specified.]

◆ linkContentResourceType : text Public
   Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

File type for the actual resource content. Typically use MIME type string from IANA registry http : //www.iana.org/assignments/media-types/application/index.html

[Is static False. Containment is Not Specified.]

◆ linkOverlayAPI-URI : anyURI Public
   Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

Identifier for overly API. Reference that identifies the API for messages tunneled to a component on the target server. Optional, provide if such scheme or protocol is necessary to utilize the link. The URI should be defined by the service specification for the protocol or service type; version information should be included if applicable. E.g. OGC WMS, WS-services. This property is typically used for services that encode remote procedure calls using identifiers dereferenced using standard HTTP methods (GET, POST).

[Is static False. Containment is Not Specified.]

◆ linkOverlayAPILabel : text Public
   Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

Text to identify the overlay API in a UI. Reference that identifies the API for messages tunneled to a component on the target server.

[Is static False. Containment is Not Specified.]

◆ linkProfileURI : anyURI Public
   Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

[Is static False. Containment is Not Specified.]

ATTRIBUTES

◆ linkProfileLabel : text Public
Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

Text to identify the profile in a UI. Identifier for profile of specifications identified by type, overlayAPI, and template attributes. Optional, provide if additional conventions are necessary for content contained in messages through this link. Note that the same output scheme might be encoded using different types. Profiles typically add usage conventions when the interchange scheme offers alternate approaches, restrict cardinality for elements in the interchange format, or specify usage of particular vocabularies.

[Is static False. Containment is Not Specified.]

◆ linkTransferSize : integer Public
Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

advisory length of the linked content in octets

[Is static False. Containment is Not Specified.]

ASSOCIATIONS

✏ Association (direction: Source -> Destination)

Source: Public (Class) Link   Target: Public linkAPIDoc (Class) LinkedAPIDoc
                                                Cardinality: [0..*]

✏ Association (direction: Source -> Destination)

Source: Public (Class) Link   Target: Public linkParameters (Class) Parameter
                                                Cardinality: [0..*]

2.8 LinkedAPIDoc

Class in package 'HelperClasses'

URLs that will get descriptions of the link operation; particularly targeted for RESTful type links. API doc should describe the resource architecture of the endpoint and provide some example requests, maybe even a template. Each URL is scoped to an API document type, e.g. Swagger, Hydra, Siren, HAL...

LinkedAPIDoc
Version 1.0 Phase 1.0 Proposed
srichard created on 8/18/2015. Last modified 1/14/2016

ATTRIBUTES

◆ linkAPIDocType : text Public
Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

text string that identifies the API doc type; ideally a URI defined in the API doc specification

[Is static False. Containment is Not Specified.]

◆ linkAPIDocURL : URL Public

URL that will get the API doc describing operation of the link

ATTRIBUTES
[Is static False. Containment is Not Specified.]

ASSOCIATIONS

✎ Association (direction: Source -> Destination)

Source: Public (Class) Link   Target: Public linkAPIDoc (Class) LinkedAPIDoc
                                                Cardinality: [0..*]

2.9   Parameter

Class in package 'HelperClasses'

key-value pair specifies parameters name and value, or properties that need to be associated with the link, e.g. WFS feature typeNames, WMS layer names

Parameter
Version 1.0 Phase 1.0 Proposed
srichard created on 8/18/2015. Last modified 1/14/2016

ATTRIBUTES

◆ linkParameterURI : anyURI Public
Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

identifier for the parameter from a controlled vocabulary

[Is static False. Containment is Not Specified.]

◆ linkParameterLabel : text Public

string to display, and identifier to link parameter to registry

[Is static False. Containment is Not Specified.]

◆ linkParameterValue : text Public

[Is static False. Containment is Not Specified.]

ASSOCIATIONS

✎ Association (direction: Source -> Destination)

Source: Public (Class) Link   Target: Public linkParameters (Class) Parameter
                                                Cardinality: [0..*]

2.10 QualifiedAttribution

Class in package 'HelperClasses'

CI_ResponsibleParty, CI_Responsibility in ISO19115 or 19115-1. binds an agent to a role. Name if from W3C PROV

ATTRIBUTES

🔹 agentRoleURI : anyURI Public

identifier for role concept. Use Null URI if not available. If no URI is reported, then a codespace value should be considered mandatory

[Is static False. Containment is Not Specified.]

🔹 agentRoleLabel : text Public

[Is static False. Containment is Not Specified.]

🔹 attribution : Agent Public
Multiplicity: ([1..*], Allow duplicates: 0, Is ordered: False)

[Is static False. Containment is Not Specified.]

🔹 agentRoleCodespace : text Public
Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

identifier for the vocabulary or codespace within which the role term is defined

[Is static False. Containment is Not Specified.]

2.11 ScopedIdentifier

Class in package 'HelperClasses'

Implements MD_Identifier from ISO19115-1.

ATTRIBUTES

🔹 code : text Public

the identifier string value. If a codeSpace is provided, then the concatenation of the codeSpace and code SHALL be a globally unique identifier string.

[Is static False. Containment is Not Specified.]

🔹 codeSpace : text Public
Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

[Is static False. Containment is Not Specified.]

🔹 authority : Citation Public
Multiplicity: ([0..1], Allow duplicates: 0, Is ordered: False)

[Is static False. Containment is Not Specified.]