DGIWG - 311

Register Markup Language (RegML)
XML Schema Encoding of ISO 19135 UML Classes

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Abstract:	This document defines the information model and respective UML classes for registers; and defines the XML encoding for storage and exchange of registers and register items.

Content

All questions regarding this document should be directed to the editor.

Person	Company	Phone	Email
Dr. René Thiele	CPA Geo-Information	+492241-2594-0	thiele@supportgis.de

1. Abstract

ISO 19135 – Procedures for Item registration – standardizes the procedures for registration of geographic items. This standard covers the definition of UML classes and their relations and associations for the information model of registers.

This document defines the XML encoding for storage and exchange of registers and register items.

This XML encoding provides a complete mapping of register UML classes to XML types and elements.

NOTE: Typical use cases for an RegML encoding of registered items is described in the DGIWG Feature Data Dictionary (DFDD) management procedures in the “Implementation Guide To The DGIWG Feature Data Dictionary, v. 1.04, 2008, DGIWG”. The RegML encoding is used in the management infrastructure to exchange register information between the architecture components, e.g.: Web Services. Register item proposals can be edited locally by an user and than uploaded to the Register Management Tool by the submitter, encoded in RegML.

2. Scope

Scope of this document is a normative XML schema definition of all defined ISO 19135 classes. The encoding of register instances is shown by example.

NOTE: Revision of ISO 19135 will be initiated shortly and will include the development of an XML encoding. This will impact RegML. ISO/CD 19145 defines an alternative encoding for ISO 19135, also based on ISO/TS 19139 encoding rules. Harmonization between these encodings is necessary and has to be considered before adoption of RegML as a DGIWG Standard.

DGIWG submits RegML as a NWIP proposal to ISO/TC211 in order to make sure that its feedback and requirements are taken into account.

3. Normative references

This document references the following standards:

- ISO 19135 – Geographic Information - Procedures for item registration. ISO TC211, 2005.
- ISO 19118 – Geographic Information – Encoding. TC211. Final CD. 2008-09-12.
- ISO 19115 – Geographic Information – Metadata.
- ISO/TS 19139 – Geographic Information – Metadata – XML schema implementation.
- W3C XMLSchema-1, XML Schema Part 1: Structures Second Edition. W3C Recommendation (28 October 2004).
- W3C XMLSchema-2, XML Schema Part 2: Datatypes Second Edition. W3C Recommendation (28 October 2004).
- W3C XML, Extensible Markup Language (XML) 1.0 (Fourth Edition), W3C Recommendation (16 August 2006).
- Implementation Guide To The DGIWG Feature Data Dictionary, v. 1.04, 2008, DGIWG.

4. Terms and definitions

- **Register**: set of files containing identifiers assigned to items with descriptions of the associated item.
- **Registry**: Information system on which a register is maintained.
- **Item Class**: set of items with common properties.
- **Registration**: assignment of a permanent, unique, and unambiguous identifier to an item.
- **RegML**: (=registerML) Register Markup Language – XML-based Exchange Format for the exchange of register information (including management information. XML profile of ISO 19135.
- **RegManTool**: DGIWG Software for the management of register procedures.

5. General Encoding Rules

The XML schema encoding of ISO 19135:2005 UML classes conforms to the encoding rules of ISO 19118 – Review final CD 2008-09-12, ISO/TS 19139: Geographic Information – Metadata – XML schema implementation and the W3C XML Schema recommendations.

RegisterML provides a complete encoding of all defined ISO 19135 classes based on the following rules:

- Abstract classes are mapped to complex types with prefix '_RE_' and postfix '_Type'.
- Non-abstract classes are mapped to complex types with prefix 'RE_' and postfix '_Type' and an element 'RE_XXX' of type 'RE_XXX_Type'.
- For each complex type a corresponing property type is defined 'RE_XXX_PropertyType'.
- Attributes of base types are mapped to elements of the corresponding 'gco' or 'gmd' type.
- Attributes of types referencing classes are mapped to elements of the corresponding type definition.
- Enumerations are mapped to simple types restricted to xs:string with values defined by xs:enumeration.
- Explicit navigable associations are mapped to elements of target type.
- Bidirectional navigable associations are mapped to two elements in both directions.

The encoding of RegisterML includes the following namespaces:

- XML-Schema: `xmlns:xs="http://www.w3.org/2001/XMLSchema".`
- Xlink: `xmlns:xlink="http://www.w3.org/1999/xlink".`
- GMD: `xmlns:gmd="http://www.isotc211.org/2005/gmd".`
- GCO: `xmlns:gco="http://www.isotc211.org/2005/gco".`

The temporary namespace for RegisterML 'tns':

```
xmlns:tns="http://www.supportgis.de/namespaces/tns"
```

6. Base Types and Elements

This chapter describes the base types uses for the ISO 19135 XML schema encoding. The types described here have no direct mapping to a corresponding UML class.

6.1 gco:AbstractObject_Type

Each instance of an ISO 19135 XML encoding shall be uniquely identifiable independent of the register, the 'itemIdentier', the current status and the version of the object. Therefore each XML schema type of the ISO 19135 encoding is derived from the complex type '*AbstractObject_Type*' defined in the gco namespace.

```
<xs:complexType name="AbstractObject_Type" abstract="true">
      <xs:sequence/>
      <xs:attributeGroup ref="gco:ObjectIdentification"/>
</xs:complexType>
```

The type '*AbstractObject_Type*' has no elements and one reference to the attribute group '*gco:ObjectIdentification*'.

6.2 gco:ObjectIdentification

The attribute group '*ObjectIdentification*' defined in the gco namespace, covers attributes for identification of XML instances within an XML document. The identification attributes are used to uniquely reference existing objects instead of redefining it – e.g.: xlink:href.

```
<xs:attributeGroup name="ObjectIdentification">
      <xs:attribute name="id" type="xs:ID"/>
      <xs:attribute name="uuid" type="xs:string"/>
</xs:attributeGroup>
```

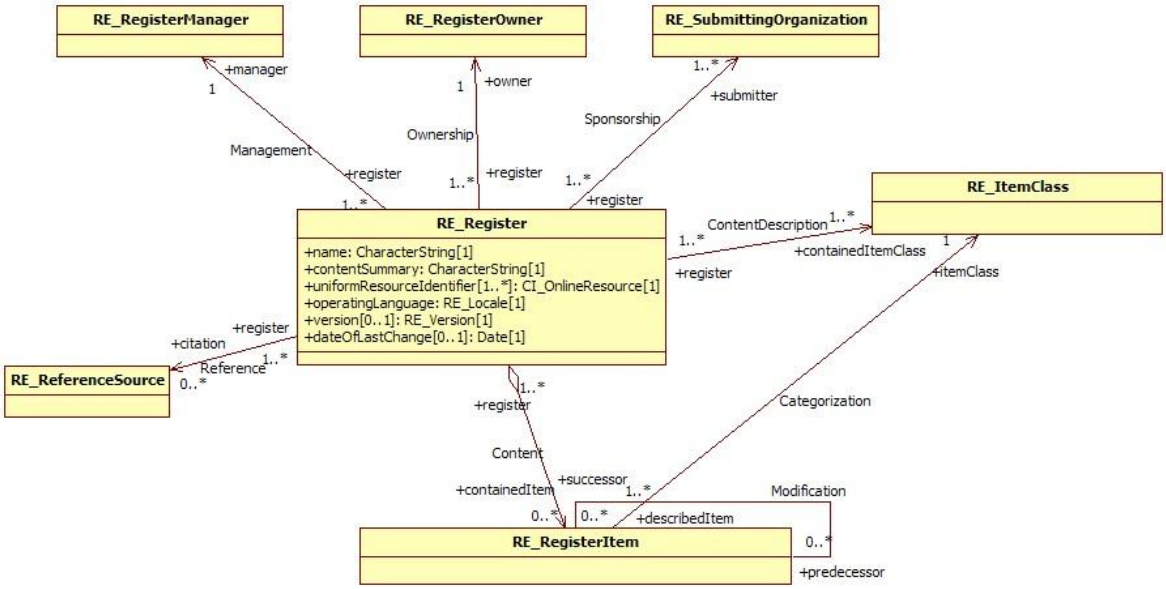
The attribute group '*ObjectIdentification*' defines two attributes:

- 'id' of type '*xs:ID*'. A system wide unique number. The 'id' identifies a single object in a database or XML document.
- 'uuid' of type '*xs:string*'. A 128 bit UUID that identifies a single object. The uuid might be provided by an external instance.

7. Register

The type '*RE_Register_Type*' is the XML schema encoding of the ISO 19135 UML class 'RE_Register'. A register is a set of files containing identifiers assigned to items with descriptions of the associated item. The class RE_Register specifies information about the register itself.

7.1 UML Class Diagram



Source: http://www.isotc211.org/hmmg/XMI/

7.2 XML Schema Encoding

The UML class 'RE_Register' is encoded by the complex type '*RE_Register_Type*'. The type '*RE_Register_Type*' inherits base properties from '*gco:AbstractObject_Type*'. It has 14 elements.

```
<xs:complexType name="RE_Register_Type">
    <xs:complexContent>
      <xs:extension base="gco:AbstractObject_Type">
          <xs:sequence>
            <xs:element name="name"
                  type="gco:CharacterString_PropertyType" />
            <xs:element name="contentSummary"
                  type="gco:CharacterString_PropertyType" />
            <xs:element name="uniformResourceIdentifier"
                  type="gmd:CI_OnlineResource_PropertyType"
                        minOccurs="1" maxOccurs="unbounded" />
            <xs:element name="operatingLanguage"
                  type="RE_Locale_PropertyType" />
            <xs:element name="alternativeLanguages"
```

```
                    type="RE_Locale_PropertyType"
                          minOccurs="0" maxOccurs="unbounded" />
                <xs:element name="version"
                          type="RE_Version_PropertyType"
                    minOccurs="0" maxOccurs="1" />
                <xs:element name="dateOfLastChange"
                    type="gco:Date_PropertyType"
                    minOccurs="0" maxOccurs="1" />

                <!--Associations-->
                <xs:element name="owner"
                    type="tns:RE_RegisterOwner_PropertyType"/>
                <xs:element name="manager"
                          type="RE_RegisterManager_PropertyType" />
                <xs:element name="containedItemClass"
                    type="tns:RE_ItemClass_PropertyType"
                          minOccurs="1" maxOccurs="unbounded" />
                <xs:element name="containedItem"
                    type="tns:RE_RegisterItem_PropertyType"
                          minOccurs="1" maxOccurs="unbounded" />
                <xs:element name="submitter"
                    type="tns:RE_SubmittingOrganization_PropertyType"
                    minOccurs="1" maxOccurs="unbounded"/>
                <xs:element name="citation"
                    type="tns:RE_ReferenceSource_PropertyType"
                          minOccurs="0"maxOccurs="unbounded" />

            </xs:sequence>
        </xs:extension>
    </xs:complexContent>
</xs:complexType>

<xs:element name="RE_Register" type="RE_Register_Type"
            abstract="false"/>

<xs:complexType name="RE_Register_PropertyType">
   <xs:sequence minOccurs="0">
       <xs:element ref="tns:RE_Register"/>
    </xs:sequence>
    <xs:attributeGroup ref="gco:ObjectReference"/>
    <xs:attribute ref="gco:nilReason"/>
</xs:complexType>
```

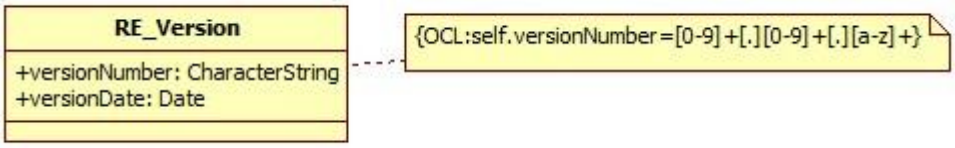
7.3 Elements

Name	Type	Card.	Description
name	*CharacterString_PropertyType*	1	Name of the register.
contentSummary	*CharacterString_PropertyType*	1	Summery of the register content.
uniformResourceIdentifier	*CI_OnlineResource_PropertyType*	1..*	Information about a referenced online resource.
operatingLanguage	*RE_Locale_PropertyType*	1	Operating language of the register.
alternativeLanguages	*RE_Locale_PropertyType*	0..*	Alternative languages if this register.
version	*RE_Version_PropertyType*	0..1	Version description of the current register.
dateOfLastChange	*Date_PropertyType*	0..1	Date of last register change.
owner	*RE_RegisterOwner_PropertyType*	1	Organization who owns the register.
manager	*RE_RegisterManager_PropertyType*	1	Oranization appointed by the owner to manage the register.
containedItemClass	*RE_ItemClass_PropertyType*	1..*	Item classes contained in this register.
containedItem	*RE_RegisterItem_PropertyType*	1..*	Items registered in this register.
submitter	*RE_SubmittingOrganization_PropertyType*	1..*	Organizations authorized to submit item proposals.
citation	*RE_ReferenceSource_PropertyType*	0..*	Description of an external source.
contentController	*RE_ControlBody_PropertyType*	1	Group of SMEs. (DGIWG Ext.)

8. Version

The type '*RE_Version_Type*' is the XML schema encoding of the ISO 19135 UML class 'RE_Version'. The version specifies the version number and date of an register.

8.1 UML Class Diagram



Source: Re-drawn from class description in ISO 19135

8.2 XML Schema Encoding

The UML class 'RE_Version' is encoded by the xml schema type '*RE_Version_Type*'. It has two elements 'versionNumber' of type '*VersionNumberType_PropertyType*' and 'versionDate' of type '*gco:Date_PropertyType*'.

```
<xs:complexType name="RE_Version_Type">
    <xs:sequence>
       <xs:element name="versionNumber"
                   type="VersionNumber_PropertyType"/>
       <xs:element name="versionDate" type="gco:Date_PropertyType"/>
    </xs:sequence>
</xs:complexType>

<xs:element name="RE_Version" type="tns:RE_Version_Type"/>

<xs:complexType name="RE_Version_PropertyType">
    <xs:sequence minOccurs="0">
       <xs:element ref="tns:RE_Version"/>
    </xs:sequence>
    <xs:attributeGroup ref="gco:ObjectReference"/>
    <xs:attribute ref="gco:nilReason"/>
</xs:complexType>
```

The xml schema type '*VersionNumber_Type*' is a 'simpleType' restricted to 'xs:string' based on regular expression '*[0-9]+[.][0-9]+[.][a-z]+*' - e.g: The version number is a string starting with a positive number, followed by a '.', followed by a positive number, followed by a '.', followed by a character.

```
<xs:simpleType name="VersionNumber_Type">
      <xs:restriction base="xs:string">
            <xs:pattern value="[0-9]+[.][0-9]+[.][a-z]+" />
      </xs:restriction>
```

```
</xs:simpleType>
<xs:element name="VersionNumber" type="tns:VersionNumber_Type"
            substitutionGroup="gco:CharacterString"/>

<xs:complexType name="VersionNumber_PropertyType">
      <xs:sequence minOccurs="0">
            <xs:element ref="tns:VersionNumber"/>
      </xs:sequence>
      <xs:attribute ref="gco:nilReason"/>
</xs:complexType>
```

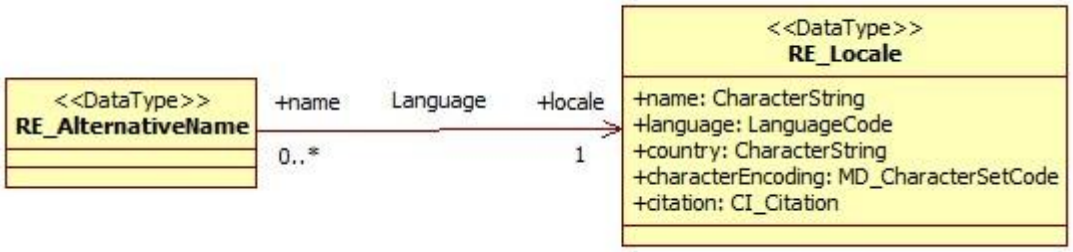
8.3 Elements

Name	Type	Card.	Description
versionNumber	*VersionNumber_PropertyType*	1	Character string specifying the version.
versionDate	*gco:Date_PropertyType*	1	Calendar date of this version.

9. Locale

The type '*RE_Locale_Type*' is the XML schema encoding of the ISO 19135 UML class 'RE_Locale'. The class 'RE_Locale' provides information about the languages used in a register.

9.1 UML Class Diagram



Source: Re-drawn from class description in ISO 19135

9.2 XML Schema Encoding

The UML DataType 'RE_Locale' is encoded by the xml schema type '*RE_Locale_Type*'. It has five elements.

```
<xs:complexType name="RE_Locale_Type">
    <xs:sequence>
      <xs:element name="name"
                  type="gco:CharacterString_PropertyType" />
       <xs:element name="language"
                  type="gmd:LanguageCode_PropertyType" />
       <xs:element name="country"
                  type="gco:CharacterString_PropertyType" />
       <xs:element name="characterEncoding"
                  type="gmd:MD_CharacterSetCode_PropertyType"/>
       <xs:element name="citation"
            type="gmd:CI_Citation_PropertyType"/>
    </xs:sequence>
</xs:complexType>

<xs:element name="RE_Locale" type="tns:RE_Locale_Type" />

<xs:complexType name="RE_Locale_PropertyType">
    <xs:sequence minOccurs="0">
       <xs:element ref="tns:RE_Locale"/>
    </xs:sequence>
    <xs:attributeGroup ref="gco:ObjectReference"/>
    <xs:attribute ref="gco:nilReason"/>
</xs:complexType>
```

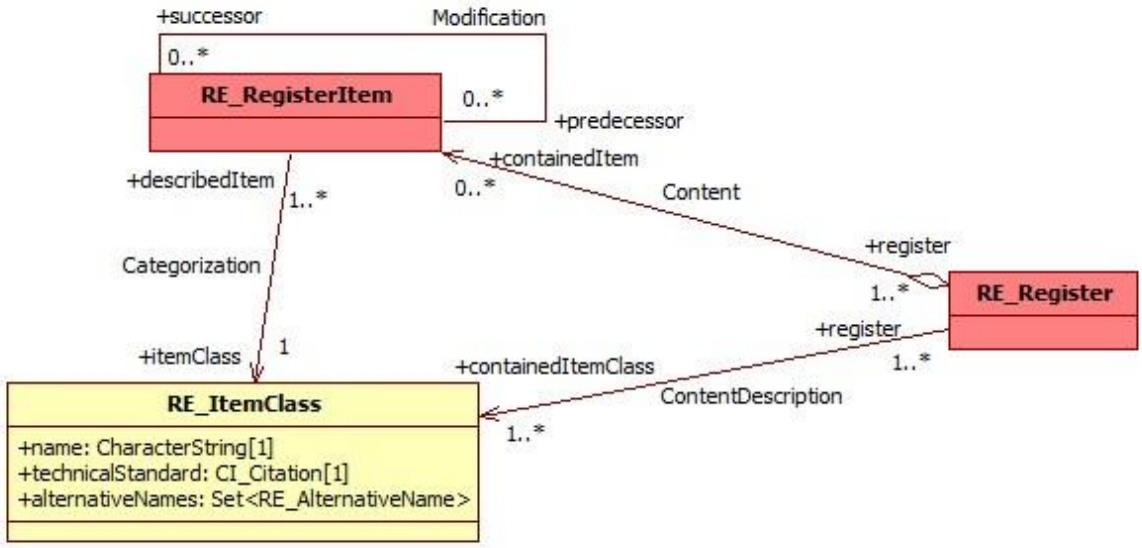
9.3 Elements

Name	Type	Card.	Description
name	*gco:CharacterString_PropertyType*	1	Name of the RE_Locale object, e.g. the language.
language	*gmd:LanguageCode_PropertyType*	1	The language code.
country	*gco:CharacterString_PropertyType*	1	3 character country code provided by ISO 3166.
characterEncoding	*gmd:MD_CharacterSetCode_PropertyType*	1	Specifies the name of the character encoding standard.
citation	*gmd:CI_Citation_PropertyType*	1	identifies a resource that provides more information about the locale

10. Item Class

The type '*RE_ItemClassType*' is the XML schema encoding of the ISO 19135 UML class 'RE_ItemClass'. The class 'RE_ItemClass' is a description of a class of registered items specified by a technical standard.

10.1 UML Class Diagram



Source: http://www.isotc211.org/hmmg/XMl/ (fixed by r.thiele)

10.2 XML Schema Encoding

The UML class 'RE_ItemClass' is encoded by the xml schema type '*RE_ItemClass_Type*'. The type '*RE_ItemClass_Type*' extents it's base type '*gco:AbstractObject_Type*' . It has three additional elements 'technicalStandard' and 'alternativeNames'.

```
<xs:complexType name="RE_ItemClassType">
    <xs:complexContent>
      <xs:extension base="gco:AbstractObject_Type">
      <xs:sequence>
            <xs:element name="name"
                 type="gco:CharacterString_PropertyType" />
            <xs:element name="technicalStandard"
                       type="gmd:CI_Citation_PropertyType" />
            <xs:element name="alternativeNames"
                       type="tns:RE_AlternativeName_PropertyType"
                  maxOccurs="unbounded" minOccurs="0" />
        </xs:sequence>
      </xs:extension>
    </xs:complexContent>
</xs:complexType>
```

```
<xs:element name="RE_ItemClass" type="tns:RE_ItemClass_Type"/>

<xs:complexType name="RE_ItemClass_PropertyType">
    <xs:sequence minOccurs="0">
       <xs:element ref="tns:RE_ItemClass"/>
    </xs:sequence>
    <xs:attributeGroup ref="gco:ObjectReference"/>
    <xs:attribute ref="gco:nilReason"/>
</xs:complexType>
```

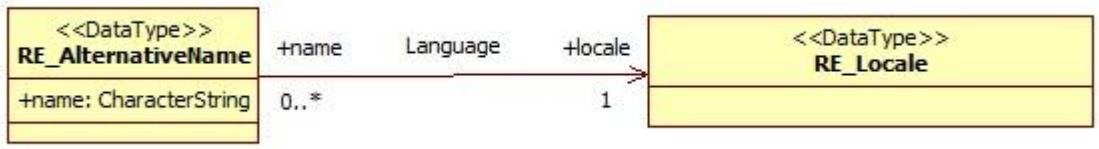
10.3 Elements

Name	Type	Card.	Description
name	*gco:CharacterString_PropertyType*	1	Name of the RE_ItemClass object.
technicalStandard	*gmd:CI_Citation_PropertyType*	1	Specifies the technical standard to which the item class shall conform.
alternativeNames	*RE_AlternativeName_PropertyType*	0..*	Set of alternative names for this item class which are translations to languages other than the operating language.

11. Alternative Names

The type '*RE_AlternativeName_Type*' is the XML schema encoding of the ISO 19135 UML class 'RE_AlternativeName'. The class 'RE_AlternativeName' describes terms and expressions in languages other that the operating language.

11.1 UML Class Diagram



Source: http://www.isotc211.org/hmmg/XMI/

11.2 XML Schema Encoding

The UML DataType 'RE_AlternativeName' is encoded by the xml schema type '*RE_AlternativeName_Type*'. The type '*RE_AlternativeName_Type*' has two elements, 'name' and 'locale' which references an instance of '*RE_Locale_PropertyType*'.

```
<xs:complexType name="RE_AlternativeName_Type">
    <xs:sequence>
       <xs:element name="name"
                   type="gco:CharacterString_PropertyType" />
       <xs:element name="locale"
                   type="tns:RE_Locale_PropertyType"/>
    </xs:sequence>
</xs:complexType>

<xs:element name="RE_AlternativeName"
            type="tns:RE_AlternativeName_Type"/>

<xs:complexType name="RE_AlternativeName_PropertyType">
    <xs:sequence minOccurs="0">
       <xs:element ref="tns:RE_AlternativeName"/>
    </xs:sequence>
    <xs:attributeGroup ref="gco:ObjectReference"/>
    <xs:attribute ref="gco:nilReason"/>
</xs:complexType>
```

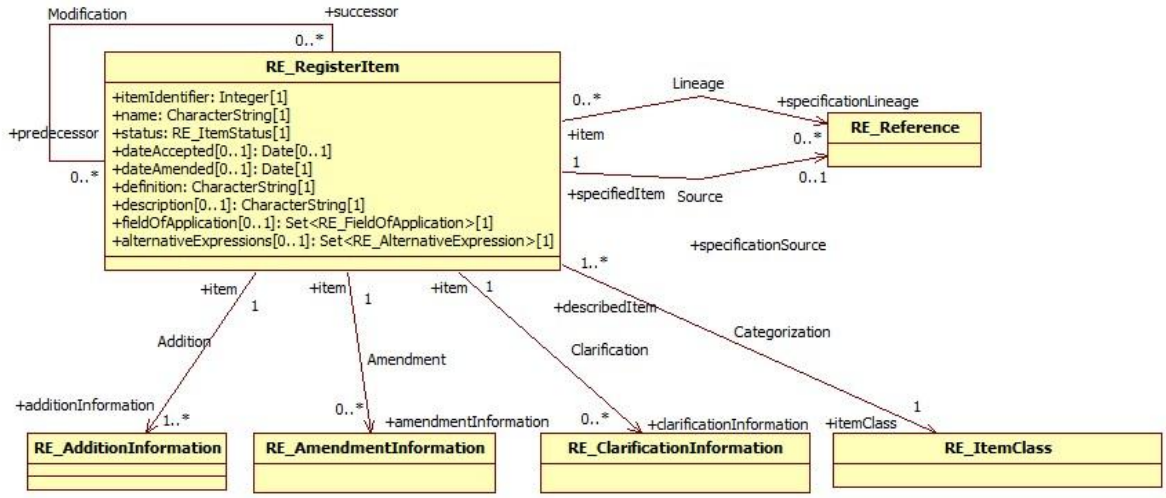
11.3 Elements

Name	Type	Card.	Description
name	*gco:CharacterString_PropertyType*	1	Name or expression.
locale	*RE_Locale_PropertyType*	1	Reference to the language description.

12. Register Item

The type '*RE_RegisterItem_Type*' is the XML schema encoding of the ISO 19135 UML class 'RE_RegisterItem'. The class 'RE_RegisterItem' specifies elements of information to be recorded for each item held in a register.

12.1 UML Class Diagram



Source: http://www.isotc211.org/hmmg/XMI/

12.2 XML Schema Encoding

The UML class 'RE_RegisterItem' is encoded by the xml schema type '*RE_RegisterItem_Type*'. The type '*RE_RegisterItem_Type*' extents the base type '*gco:AbstractObject_Type*' by inheritance. It defines 15 additional elements for encoding of attributes and associations.

```
<xs:complexType name="RE_RegisterItem_Type">
    <xs:complexContent>
      <xs:extension base="gco:AbstractObject_Type">
          <xs:sequence>
             <xs:element name="itemIdentifier"
                  type="gco:Integer_PropertyType"/>
             <xs:element name="name"
                  type="gco:CharacterString_PropertyType" />
             <xs:element name="status"
                  type="RE_ItemStatus_PropertyType">
                  <xs:annotation>
             <xs:documentation>
                  OCL:
                  {if exists
                  ->
                  (self.amendmentInformation.amendmentType =
```

```
        #retirement
        and
        self.amendmentInformation.disposition =
        #accepted
        and
        self.amendmentInformation.status = #final)
        then
        self.status = #retired
        else if exists
        ->
        (self.amendmentInformation.amendmentType =

        #supersession
        and
        self.amendmentInformation.disposition =

        #accepted
        and
        self.amendmentInformation.status = #final)
        then self.status =      #superseded
        else if exists
        ->
        (self.additionInformation.disposition =

        #accepted
        and
        self.additionInformation.status = #final)
        then self.status = #valid
        else self.status = #notValid
        end if}

         </xs:documentation>
        </xs:annotation>
</xs:element>
<xs:element name="dateAccepted"

        type="gco:Date_PropertyType"
        maxOccurs="1" minOccurs="0">
        <xs:annotation>
              <xs:documentation>
        OCL: {status &lt;> #notValid implies
              dateAccepted -> notEmpty}
        </xs:documentation>
        </xs:annotation>
</xs:element>
<xs:element name="dateAmended"

        type="gco:Date_PropertyType"
        maxOccurs="1" minOccurs="0">
        <xs:annotation>
         <xs:documentation>
        OCL: {      status = #superseded or
        status = #retired implies
            dateAmended -> notEmpty}
         </xs:documentation>
        </xs:annotation>
</xs:element>
<xs:element name="definition"

        type="gco:CharacterString_PropertyType" />
```

```
<xs:element name="description"

     type="gco:CharacterString_PropertyType"

     maxOccurs="1" minOccurs="0"/>
<xs:element name="fieldOfApplication"

     type="tns:RE_FieldOfApplication_PropertyType"
     maxOccurs="unbounded" minOccurs="0"/>
<xs:element name="alternativeExpressions"
     type="tns:RE_AlternativeExpression_PropertyType"
     maxOccurs="unbounded" minOccurs="0"/>

<!--Item Class-->
<xs:element name="itemClass"
     type="tns:RE_ItemClass_PropertyType"/>

<!--Source-->
<xs:element name="specificationSource"

     type="tns:RE_Reference_PropertyType"
     maxOccurs="1" minOccurs="0"/>

<!--Lineage-->
<xs:element name="specificationLineage"
     type="tns:RE_Reference_PropertyType"
     maxOccurs="unbounded" minOccurs="0"/>

<!--Successor - Predecessor-->
<xs:element name="successor"
     type="tns:RE_RegisterItem_PropertyType"
     minOccurs="0" maxOccurs="unbounded">

     <xs:annotation>
      <xs:documentation>
     OCL: {if exists ->
     (self.successor.predecessor not null) and
     (self in self.successor.predecessor)}
      </xs:documentation>
     </xs:annotation>
</xs:element>

<xs:element name="predecessor"
     type="tns:RE_RegisterItem_PropertyType"
     minOccurs="0" maxOccurs="unbounded">

     <xs:annotation>
      <xs:documentation>
     OCL: {if exists ->
     (self.predecessor.successor not null) and
     (self in self.predecessor.successor)}
      </xs:documentation>
     </xs:annotation>
</xs:element>

<!--Addition Information-->
<xs:element name="additionInformation"

     type="tns:RE_AdditionInformation_PropertyType"
     maxOccurs="unbounded" minOccurs="1"/>
```

```
                <!--Clarification Information-->
                <xs:element name="clarificationInformation"
                     type="tns:RE_ClarificationInformation_PropertyType"
                     maxOccurs="unbounded" minOccurs="0"/>

                <!--Amendment Information-->
                <xs:element name="amendmentInformation"
                     type="tns:RE_AmendmentInformation_PropertyType"
                     maxOccurs="unbounded" minOccurs="0"/>

            </xs:sequence>
        </xs:extension>
    </xs:complexContent>
</xs:complexType>

<xs:element name="RE_RegisterItem" type="RE_RegisterItem_Type"/>

<xs:complexType name="RE_RegisterItem_PropertyType">
    <xs:sequence minOccurs="0">
       <xs:element ref="tns:RE_RegisterItem"/>
    </xs:sequence>
    <xs:attributeGroup ref="gco:ObjectReference"/>
    <xs:attribute ref="gco:nilReason"/>
</xs:complexType>
```

12.3 Elements

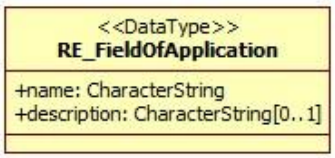
Name	Type	Card.	Description
name	*gco:CharacterString_PropertyType*	1	Name of the registered item.
ItemIdentifier	*gco:Integer_PropertyType*	1	Number identifying a item within a register.
status	*RE_ItemStatus_PropertyType*	1	Validity status of a registered item.
dateAccepted	*gco:Date_PropertyType*	0..1	Date of acceptance of a registered item.
dateAmended	*gco:Date_PropertyType*	0..1	Date of amendment of a registered item.
definition	*gco:CharacterString_PropertyType*	1	Definition of the item content.
description	*gco:CharacterString_PropertyType*	0..1	Optional describing text for an item.
fieldOfApplication	*tns:RE_FieldOfApplication_PropertyType*	0..*	Field of application for a registered item.
alternativeExpressions	*RE_AlternativeExpression_PropertyType*	0..*	Alternative name and optional additional information for a registered item in languages other than the operating language.

itemClass	*RE_ItemClass_PropertyType*	1	The item class describing the technical standard for a registered item.
specificationSource	*RE_Reference_PropertyType*	0..1	Optional reference to the external source of the registered item.
specificationLineage	*RE_Reference_PropertyType*	0..*	Optional references to descriptions of the item development.
successor	*RE_RegisterItem_PropertyType*	0..*	Reference to succeeding items of a registered item. The referencing item itself is one predecessor of the referenced item..
predecessor	*RE_RegisterItem_PropertyType*	0..*	Reference to predeceeding items of a registered item. The referencing item itself is one successor of the referenced item.
additionInformation	*RE_AdditionInformation_PropertyType*	1..*	Information about the addition of a registered item. Since each item of a register must be added once, the addition information has at least one value.
clarificationInformation	*RE_ClarificationInformation_PropertyType*	0..*	Information about clarification operations for registered items.
amendmentInformation	*RE_AmendmentInformation_PropertyType*	0..*	Information about an amendment procedure. A registered item has one amendment information for each supersession or retirement.

13. Field of Application

The type '*RE_FieldOfApplication_Type*' is the XML schema encoding of the ISO 19135 UML class 'RE_FieldOfApplication'. The class 'RE_FieldOfApplication' is used to provide information about a use for a register item.

13.1 UML Class Diagram



Source: Re-drawn by r.thiele from class description in ISO 19135

13.2 XML Schema Encoding

The UML DataType 'RE_FieldOfApplication' is encoded by the xml schema type '*RE_FieldOfApplicationType*'. The type '*RE_FieldOfApplicationType*' defines two elements, 'name' and the optional element 'description' of type '*gco:CharacterString_PropertyType*'.

```
<xs:complexType name="RE_FieldOfApplicationType">
    <xs:sequence>
       <xs:element name="name"
            type="gco:CharacterString_PropertyType" />
       <xs:element name="description"
            type="gco:CharacterString_PropertyType"
            maxOccurs="1" minOccurs="0">
       </xs:element>
    </xs:sequence>
</xs:complexType>

<xs:element name="RE_FieldOfApplication"
              type="tns:RE_FieldOfApplication_Type"/>

<xs:complexType name="RE_FieldOfApplication_PropertyType">
    <xs:sequence minOccurs="0">
       <xs:element ref="tns:RE_FieldOfApplication"/>
    </xs:sequence>
    <xs:attributeGroup ref="gco:ObjectReference"/>
    <xs:attribute ref="gco:nilReason"/>
</xs:complexType>
```

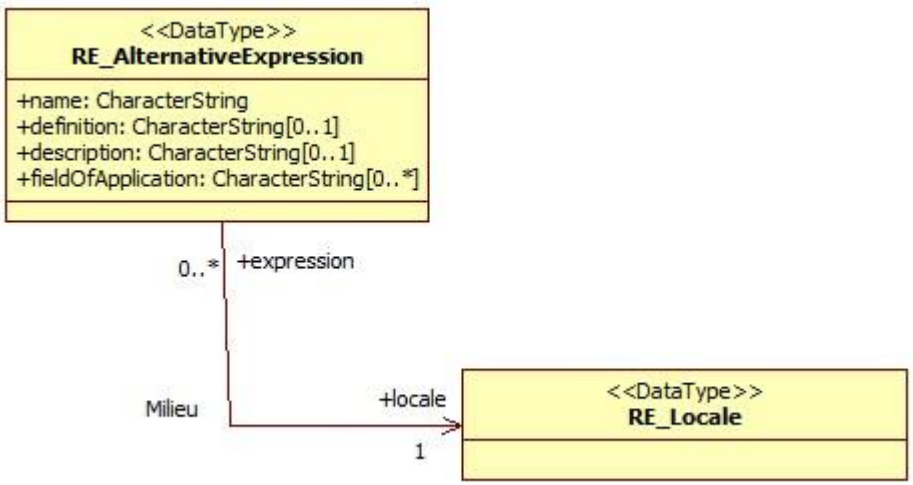
13.3 Elements

Name	Type	Card.	Description
name	*gco:CharacterString_PropertyType*	1	A character string used to identify the field of application for a registered item.
description	*gco:CharacterString_PropertyType*	0..1	Optional text describing the field of application.

14. Alternative Expressions

The type '*RE_AlternativeExpressionType*' is the XML schema encoding of the ISO 19135 UML class 'RE_AlternativeExpression'. The class 'RE_AlternativeExpression' is used as a data type to provide information about a register item in an alternative language.

14.1 UML Class Diagram



Source: http://www.isotc211.org/hmmg/XMI/

14.2 XML Schema Encoding

The UML DataType 'RE_AlternativeExpression' is encoded by the xml schema type '*RE_AlternativeExpression_Type*'. The type '*RE_AlternativeExpression_Type*' defines five elements.

```
<xs:complexType name="RE_AlternativeExpression_Type">
      <xs:sequence>
       <xs:element name="name"
            type="gco:CharacterString_PropertyType" />
       <xs:element name="definition"
                  type="gco:CharacterString_PropertyType"
            maxOccurs="1" minOccurs="0" />
       <xs:element name="description"
            type="gco:CharacterString_PropertyType"
            maxOccurs="1" minOccurs="0" />
       <xs:element name="fieldOfApplication"

            type="gco:CharacterString_PropertyType"
            maxOccurs="unbounded" minOccurs="0" />
       <xs:element name="locale"
            type="tns:RE_Locale_PropertyType"/>
      </xs:sequence>
</xs:complexType>
```

```
<xs:element name="RE_AlternativeExpression"

              type="tns:RE_AlternativeExpression_Type"/>

<xs:complexType name="RE_AlternativeExpression_PropertyType">
    <xs:sequence minOccurs="0">
       <xs:element ref="tns:RE_AlternativeExpression"/>
    </xs:sequence>
    <xs:attributeGroup ref="gco:ObjectReference"/>
    <xs:attribute ref="gco:nilReason"/>
</xs:complexType>
```

14.3 Elements

Name	Type	Card.	Description
name	*gco:CharacterString_PropertyType*	1	Character string identifying the alternative alternative expression.
definition	*gco:CharacterString_PropertyType*	0..1	Optional definition of the alternative expression.
description	*gco:CharacterString_PropertyType*	0..1	Optional description of the alternative expression.
fieldOfApplication	*gco:CharacterString_PropertyType*	0..*	Set of fields of application for the expression.
locale	*RE_Locale_PropertyType*	1	Reference to a locale object describing the used language.

15. Reference

The type '*RE_Reference_Type*' is the XML schema encoding of the ISO 19135 UML class 'RE_Reference'. The class 'RE_Reference' specifies information about the source and/or lineage of a specific registered item derived from an external document or register.

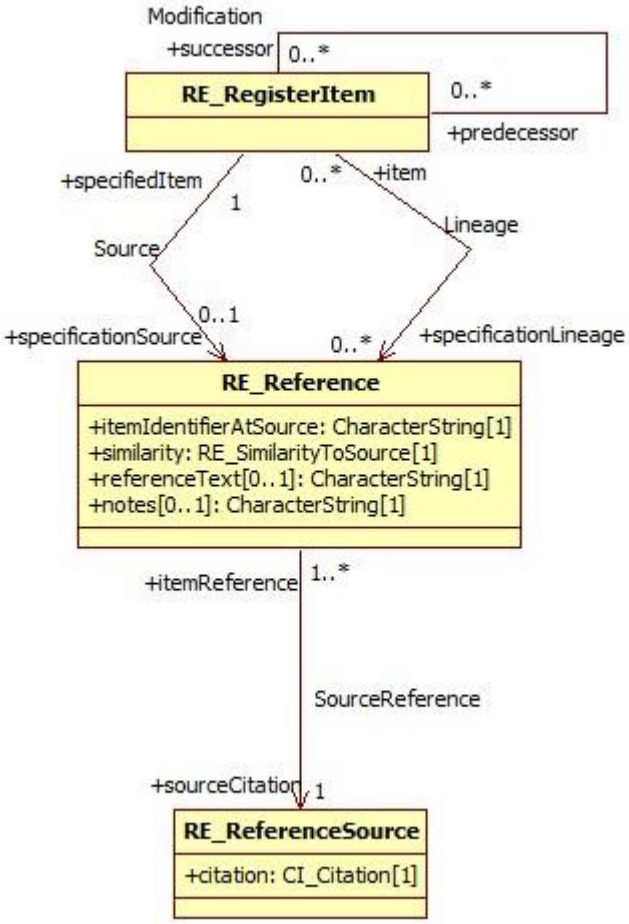
The association 'SourceReference' shall connect an 'RE_Reference' to the 'RE_ReferenceSource' that

specifies the external source from which the item specification was taken.

The type '*RE_ReferenceSource_Type*' defines the xml schema encoding of the UML class 'RE_ReferenceSource'.

The class 'RE_ReferenceSource' specifies information about the source of registered item specifications taken from an external document or register. It has one attribute 'citation' of type 'CI_Citation' (ISO 19115).

15.1 UML Class Diagram



Source: http://www.isotc211.org/hmmg/XMI/

15.2 XML Schema Encoding

The UML class 'RE_Reference' is encoded by the xml schema type '*RE_Reference_Type*'. The type '*RE_Reference_Type*' extents the base type '*gco:AbstractObject_Type*' and defines 5 additional elements.

```
<xs:complexType name="RE_Reference_Type">
    <xs:complexContent>
      <xs:extension base="gco:AbstractObject_Type">
          <xs:sequence>
             <xs:element name="itemIdentifierAtSource"
                  type="gco:CharacterString_PropertyType"/>
             <xs:element name="similarity"

                  type="tns:RE_SimilarityToSource_PropertyType" />
             <xs:element name="referenceText"
```

```
                    type="gco:CharacterString_PropertyType"

                    maxOccurs="1" minOccurs="0" />
                <xs:element name="notes"

                    type="gco:CharacterString_PropertyType"

                    maxOccurs="1" minOccurs="0" />

                <!--Associations-->
                <xs:element name="sourceCitation"

                    type="tns:RE_ReferenceSource_PropertyType" />
            </xs:sequence>
        </xs:extension>
    </xs:complexContent>
</xs:complexType>

<xs:element name="RE_Reference" type="tns:RE_Reference_Type" />

<xs:complexType name="RE_Reference_PropertyType">
    <xs:sequence minOccurs="0">
       <xs:element ref="tns:RE_Reference"/>
    </xs:sequence>
    <xs:attributeGroup ref="gco:ObjectReference"/>
    <xs:attribute ref="gco:nilReason"/>
</xs:complexType>
```

The UML class 'RE_ReferenceSource' is encoded by the xml schema type '*RE_ReferenceSource_Type*'. The type '*RE_ReferenceSource_Type*' extents the base type '*gco:AbstractObject_Type*' and defines 1 additional element.

```
<xs:complexType name="RE_ReferenceSource_Type">
    <xs:complexContent>
      <xs:extension base="gco:AbstractObject_Type">
          <xs:sequence>
            <xs:element name="citation"
                        type="gmd:CI_Citation_Type"/>
          </xs:sequence>
      </xs:extension>
    </xs:complexContent>
</xs:complexType>

<xs:element name="RE_ReferenceSource"
            type="tns:RE_ReferenceSource_Type" />

<xs:complexType name="RE_ReferenceSource_PropertyType">
    <xs:sequence minOccurs="0">
       <xs:element ref="tns:RE_ReferenceSource"/>
    </xs:sequence>
    <xs:attributeGroup ref="gco:ObjectReference"/>
    <xs:attribute ref="gco:nilReason"/>
</xs:complexType>
```

15.3 Elements

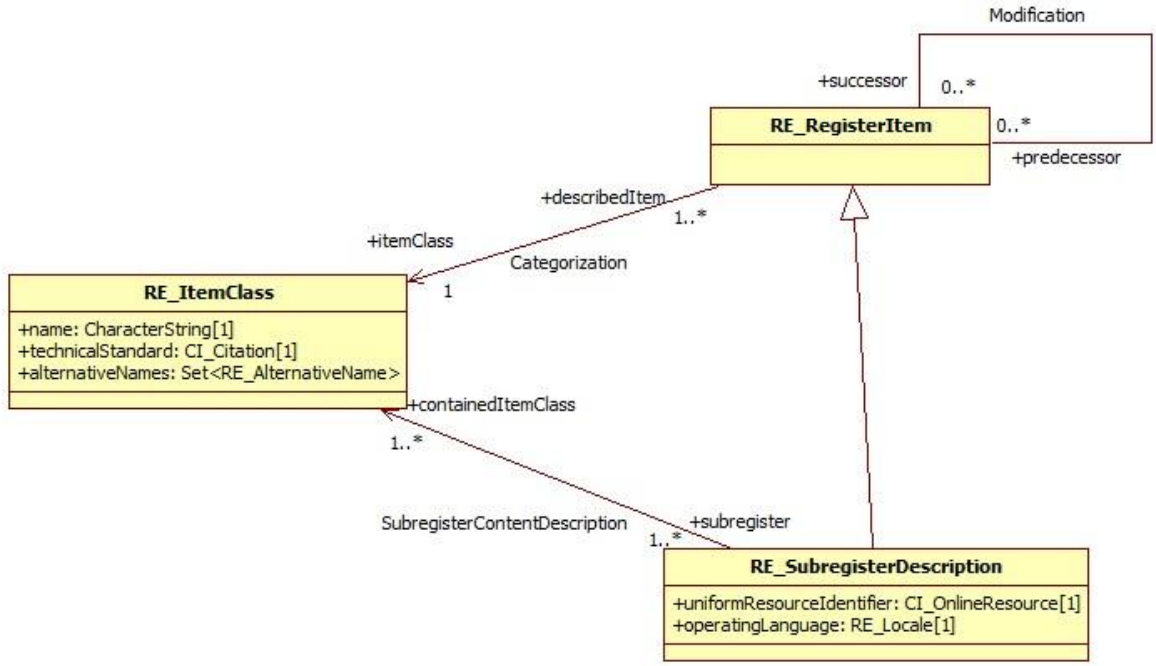
RE_ReferenceType			
Name	**Type**	**Card.**	**Description**
itemIdentifierAtSource	*gco:CharacterString_PropertyType*	1	Value of the itemIdentifier in the source document or register.
similarity	*RE_SimilarityToSource_PropertyType*	1	Type of change.
referenceText	*gco:CharacterString_PropertyType*	0..1	Copy of the documentation from the source document or register.
notes	*gco:CharacterString_PropertyType*	0..1	Additional information.
sourceCitation	*RE_ReferenceSource_PropertyType*	1	Connection to the source.

RE_ReferenceSourceType			
Name	**Type**	**Card.**	**Description**
citation	*gmd:CI_Citation_Type*	1	Description of a document or register used as an external reference source.

16. Subregister

The type '*RE_SubregisterDescription_Type*' is the XML schema encoding of the ISO 19135 UML class 'RE_SubregisterDescription'. The class 'RE_SubregisterDescription' is a subclass of RE_RegisterItem that shall be used in the principal register of a hierarchical register to describe each of the affiliated subregisters.

16.1 UML Class Diagram



Source: http://www.isotc211.org/hmmg/XMI/

16.2 XML Schema Encoding

The UML class 'RE_SubregisterDescription' is encoded by the xml schema type '*RE_SubregisterDescription_Type*'. The type '*RE_SubregisterDescription_Type*' extents the base type '*RE_RegisterItem_Type*' and defines 5 additional elements.

```
<xs:complexType name="RE_SubregisterDescription_Type">
    <xs:complexContent>
      <xs:extension base="RE_RegisterItemType">
          <xs:sequence>
             <xs:element name="uniformResourceIdentifier"

                  type="gmd:CI_OnlineResource_Type" />
             <xs:element name="operatingLanguage"
```

```
                    type="RE_Locale_PropertyType" />

                <!--Contained Item Class-->
                <xs:element name="containedItemClass"

                    type="tns:RE_ItemClass_PropertyType"

                    minOccurs="1" maxOccurs="unbounded"/>

                <!--Subregister Manager-->
                <xs:element name="subregisterManager"

                    type="tns:RE_RegisterManager_PropertyType"/>

            </xs:sequence>
        </xs:extension>
    </xs:complexContent>
</xs:complexType>

<xs:complexType name="RE_SubregisterDescription_PropertyType">
    <xs:sequence minOccurs="0">
        <xs:element ref="tns:RE_SubregisterDescription"/>
    </xs:sequence>
    <xs:attributeGroup ref="gco:ObjectReference"/>
    <xs:attribute ref="gco:nilReason"/>
</xs:complexType>
```

Element definitions for '*RE_SubregisterDescription*' which defines the constraints for subregisters:

```
<xs:element name="RE_SubregisterDescription"
    type="tns:RE_SubregisterDescription_PropertyType" >
    <xs:annotation>
        <xs:appinfo>OCL</xs:appinfo>
        <xs:documentation>
            OCL:
            {self.itemClass.name = 'Subregister'}
            {self.itemClass.technicalStandard.CI_Citation.title
                = 'ISO 19135 Geographic information -
    Procedures for registration of items of
geographic information'}
            {self.itemClass.technicalStandard.
CI_Citation.alternateTitle = ISO 19135:2004'}
            {self.itemClass.technicalStandard.
CI_Citation.date.CI_Date.date = '2004'}
            {self.itemClass.technicalStandard.
CI_Citation.otherCitationDetails = 'Clause 8.14'}
        </xs:documentation>
    </xs:annotation>
</xs:element>
```

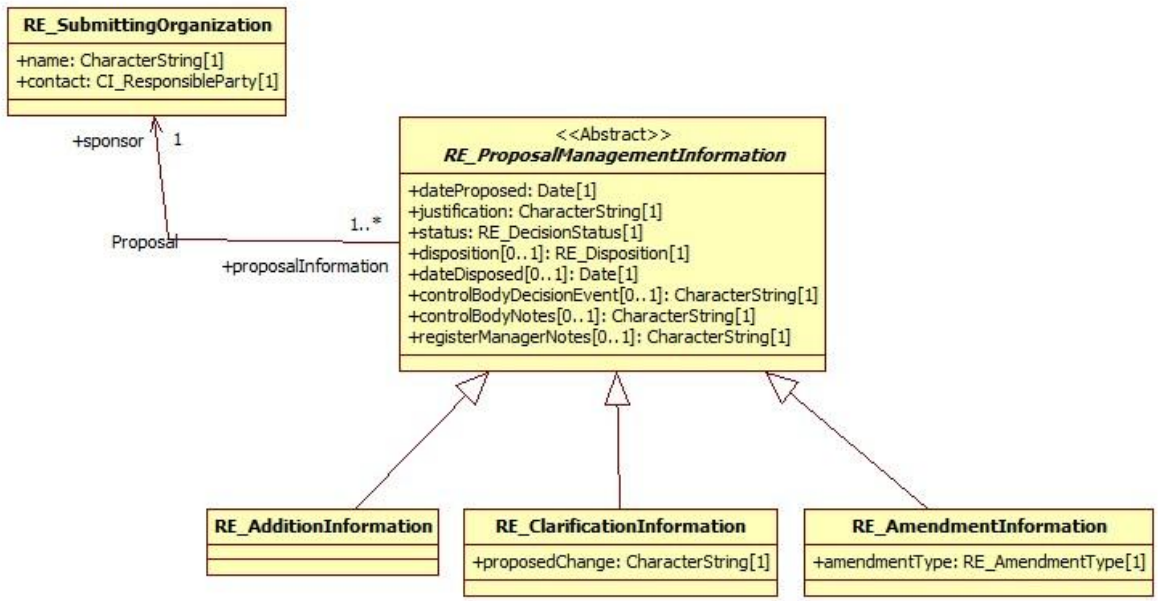
16.3 Elements

Name	Type	Card.	Description
uniformResourceIdentifier	*gmd:CI_OnlineResource_Type*	1	The corresponding value of the attribute OnLineResource.linkage specifies a resource providing access to the complete content of the subregister.
operatingLanguage	*RE_Locale_PropertyType*	1	Used language for this subregister
containedItemClass	*RE_ItemClass_PropertyType*	1..*	References to item classes describing the content of this subregister.
subregisterManager	*RE_RegisterManager_PropertyType*	1	Organization that manages the subregister.
ContainedItem (DGIWG)	*RE_RegisterItem_PropertyType*	0..*	Items contained in this subregister.

17. Proposal Management Information

The abstract type '*_RE_ProposalManagementInformation_Type*' is the XML schema encoding of the abstract ISO 19135 UML class 'RE_ProposalManagementInformation'. The class 'RE_ProposalManagementInformation' provides information about the type, content and justification of a proposal. The instances of a single proposal management information are instances of the subclasses 'RE_AdditionInformation', 'RE_AmendmentInformation' or 'RE_ClarificationInformation'.

17.1 UML Class Diagram



Source: http://www.isotc211.org/hmmg/XMI/

17.2 XML Schema Encoding

The UML class 'RE_PropsalManagementInformation' is encoded by the abstract xml schema type '*_RE_ProposalManagementInformation_Type*'.

The type '*_RE_ProposalManagementInformation_Type*' extents the base type '*gco:AbstractObject_Type*' and defines 9 additional elements.

```
<xs:complexType name="_RE_ProposalManagementInformationType"
                abstract="true">
    <xs:complexContent>
      <xs:extension base="gco:AbstractObject_Type">
          <xs:sequence>
             <xs:element name="dateProposed"

                  type="gco:Date_PropertyType"/>
             <xs:element name="justification"
```

```
                    type="gco:CharacterString_PropertyType"/>
                <xs:element name="status"
                    type="tns:RE_DecisionStatus_PropertyType"/>
                <xs:element name="disposition"
                    type="tns:RE_Disposition_PropertyType"
                    maxOccurs="1" minOccurs="0"/>
                <xs:element name="dateDisposed"
                    type="gco:Date_PropertyType"
                    maxOccurs="1" minOccurs="0"/>
                <xs:element name="controlBodyDecisionEvent"

                    type="gco:CharacterString_PropertyType"
                    maxOccurs="1" minOccurs="0"/>
                <xs:element name="controlBodyNotes"

                    type="gco:CharacterString_PropertyType"

                    maxOccurs="1" minOccurs="0"/>
                <xs:element name="registerManagerNotes"

                    type="gco:CharacterString_PropertyType"
                    maxOccurs="1" minOccurs="0"/>

                <!-- Association -->
                <xs:element name="sponsor"
                    type="RE_SubmittingOrganization_PropertyType"/>

            </xs:sequence>
        </xs:extension>
    </xs:complexContent>
</xs:complexType>

<xs:element name="RE_ProposalManagementInformation"
            type="tns:RE_ProposalManagementInformation_Type"
             abstract="true"/>

<xs:complexType name="RE_ProposalManagementInformation_PropertyType">
    <xs:sequence minOccurs="0">
       <xs:element ref="tns:RE_ProposalManagementInformation" />
    </xs:sequence>
    <xs:attributeGroup ref="gco:ObjectReference"/>
    <xs:attribute ref="gco:nilReason"/>
</xs:complexType>
```

The derived UML class 'RE_AdditionInformation' is encoded by the xml schema type '*RE_AdditionInformation_Type*'.

The type '*RE_AdditionInformation_Type*' extents the base type '*RE_ProposalManagement-InformationType*'.

```
<xs:complexType name="RE_AdditionInformation_Type">
    <xs:complexContent>
      <xs:extension base="_RE_ProposalManagementInformation_Type">
          <xs:sequence/>
      </xs:extension>
    </xs:complexContent>
</xs:complexType>
```

```
<xs:element name="RE_AdditionInformation"
            type="tns:RE_AdditionInformation_Type" />

<xs:complexType name="RE_AdditionInformation_PropertyType">
    <xs:sequence minOccurs="0">
       <xs:element ref="tns:RE_AdditionInformation"/>
    </xs:sequence>
    <xs:attributeGroup ref="gco:ObjectReference"/>
    <xs:attribute ref="gco:nilReason"/>
</xs:complexType>
```

The derived UML class 'RE_ClarificationInformation' is encoded by the xml schema type '*RE_ClarificationInformation_Type*'.

The type '*RE_ClarificationInformation_Type*' extents the base type '*_RE_ProposalManagementInformation_Type*' and defines one additional element.

```
<xs:complexType name="RE_ClarificationInformation_Type">
    <xs:complexContent>
      <xs:extension
            base="tns:_RE_ProposalManagementInformation_Type">
          <xs:sequence>
             <xs:element name="proposedChange"

            type="gco:CharacterString_PropertyType"/>
          </xs:sequence>
      </xs:extension>
    </xs:complexContent>
</xs:complexType>

<xs:element name="RE_ClarificationInformation"
            type="tns:RE_ClarificationInformation_Type" />

<xs:complexType name="RE_ClarificationInformation_PropertyType">
    <xs:sequence minOccurs="0">
       <xs:element ref="tns:RE_ClarificationInformation" />
    </xs:sequence>
    <xs:attributeGroup ref="gco:ObjectReference"/>
    <xs:attribute ref="gco:nilReason"/>
</xs:complexType>
```

The derived UML class 'RE_AmendmentInformation' is encoded by the xml schema type '*RE_AmendmentInformation_Type*'.

The type '*RE_AmendmentInformation_Type*' extents the base type '*_RE_ProposalManagementInformation_Type*' and defines one additional element.

```
<xs:complexType name="RE_AmendmentInformation_Type">
    <xs:complexContent>
      <xs:extension base="_RE_ProposalManagementInformation_Type">
          <xs:sequence>
             <xs:element name="amendmentType"
                  type="tns:RE_AmendmentType_PropertyType"/>
          </xs:sequence>
      </xs:extension>
    </xs:complexContent>
</xs:complexType>
```

```
<xs:element name="RE_AmendmentInformation"
            type="tns:RE_AmendmentInformation_Type" />

<xs:complexType name="RE_AmendmentInformation_PropertyType">
    <xs:sequence minOccurs="0">
       <xs:element ref="tns:RE_AmendmentInformation"/>
    </xs:sequence>
    <xs:attributeGroup ref="gco:ObjectReference"/>
    <xs:attribute ref="gco:nilReason"/>
</xs:complexType>
```

17.3 Elements

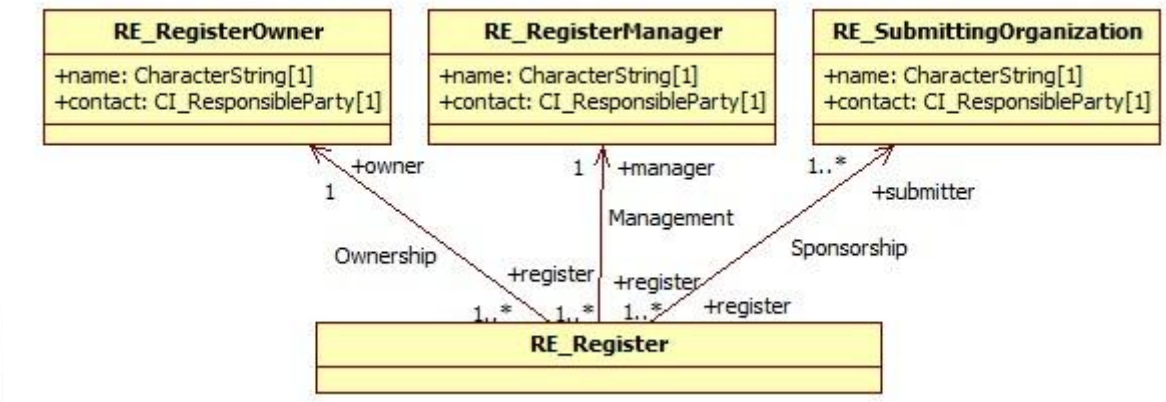
Name	Type	Card.	Description
dateProposed	*gco:Date_PropertyType*	1	Date of the proposal record.
justification	*gco:CharacterString_PropertyType*	1	Submitters justification for the proposal.
status	*RE_DecisionStatus_PropertyType*	1	Status of the decision process.
disposition	*RE_Disposition_PropertyType*	0..1	Disposition status.
dateDisposed	*gco:Date_PropertyType*	0..1	Date of disposition.
controlBodyDecisionEvent	*gco:CharacterString_PropertyType*	0..1	Identifies a meeting or other event associated with the control body's decision concerning the proposed change.
controlBodyNotes	*gco:CharacterString_PropertyType*	0..1	Notes relevant to the control body's decision.
registerManagerNotes	*gco:CharacterString_PropertyType*	0..1	Notes relevant to the register manager's handling of the proposal.
sponsor	*RE_SubmittingOrganization_PropertyType*	1	The submitters of the proposal.
RE_AmendmentInformationType			
amendmentType	*RE_AmendmentType_PropertyType*	1	Type of amendment.
RE_ClarificationInformationType			
proposedChange	*gco:CharacterString_PropertyType*	1	Description of the clarification.

18. Register Roles

The ISO 19135 UML classes 'RE_RegisterOwner', 'RE_RegisterManager', 'RE_ControlBody' and 'RE_SubmittingOrganization', describing user roles in the context of registers are encoded by the types: '*RE_RegisterOwner_Type*', '*RE_RegisterManager_Type*', '*RE_ControlBody_Type*' and '*RE_SubmittingOrganization_Type*'.

NOTE: The encoding of control body is a conceptual extensions of ISO 19135:2004 as it is needed in the DGIWG context.

18.1 UML Class Diagram



Source: http://www.isotc211.org/hmmg/XMI/

18.2 XML Schema Encoding

The UML class 'RE_RegisterOwner' is encoded by the xml schema type '*RE_RegisterOwner_Type*'. It's instances describe the ownership of a register. It is derived from the base type '*AbstractObject_Type*' as there instances shall be identifiable and define 2 additional elements.

```
<!--
      RegisterOwner: The owner of a register
-->
<xs:complexType name="RE_RegisterOwner_Type">
    <xs:complexContent>
      <xs:extension base="gco:AbstractObject_Type">
      <xs:sequence>
            <xs:element name="name"
                  type="gco:CharacterString_PropertyType" />
            <xs:element name="contact"
                  type="gmd:CI_ResponsibleParty_Type"/>
      </xs:sequence>
      </xs:extension>
    </xs:complexContent>
</xs:complexType>

<xs:element name="RE_RegisterOwner" type="RE_RegisterOwner_Type"
```

```
                abstract="false"/>

    <xs:complexType name="RE_RegisterOwner_PropertyType">
        <xs:sequence minOccurs="0">
           <xs:element ref="tns:RE_RegisterOwner"/>
        </xs:sequence>
        <xs:attributeGroup ref="gco:ObjectReference"/>
        <xs:attribute ref="gco:nilReason"/>
    </xs:complexType>
```

The UML class 'RE_RegisterManager' is encoded by the xml schema type '*RE_RegisterManager_Type*'. The register manager appointed by a register owner to manage a register.

The type '*RE_RegisterManager_Type*' is derived from the base type '*AbstractObject_Type*'.

```
    <xs:complexType name="RE_RegisterManager_Type">
        <xs:complexContent>
          <xs:extension base="gco:AbstractObject_Type">
          <xs:sequence>
                <xs:element name="name"
                      type="gco:CharacterString_PropertyType" />
                <xs:element name="contact"
                      type="gmd:CI_ResponsibleParty_Type"/>
          </xs:sequence>
          </xs:extension>
        </xs:complexContent>
    </xs:complexType>

    <xs:element name="RE_RegisterManager" type="RE_RegisterManager_Type"
                abstract="false"/>

    <xs:complexType name="RE_RegisterManager_PropertyType">
        <xs:sequence minOccurs="0">
           <xs:element ref="tns:RE_RegisterManager"/>
        </xs:sequence>
        <xs:attributeGroup ref="gco:ObjectReference"/>
        <xs:attribute ref="gco:nilReason"/>
    </xs:complexType>
```

The UML class 'RE_SubmittingOrganization' is encoded by the xml schema type '*RE_SubmittingOrganization_Type*'. An instances specifies information about a submitting organization. It is derived from the base type '*AbstractObject_Type*'.

```
    <xs:complexType name="RE_SubmittingOrganizationType">
        <xs:complexContent>
          <xs:extension base="gco:AbstractObject_Type">
          <xs:sequence>
                <xs:element name="name"
                      type="gco:CharacterString_PropertyType" />
                <xs:element name="contact"
                      type="gmd:CI_ResponsibleParty_Type"/>
          </xs:sequence>
          </xs:extension>
        </xs:complexContent>
    </xs:complexType>
```

```
<xs:element name="RE_SubmittingOrganization"
      type="tns:RE_SubmittingOrganization_Type"/>

<xs:complexType name="RE_SubmittingOrganization_PropertyType">
    <xs:sequence minOccurs="0">
       <xs:element ref="tns:RE_SubmittingOrganization"/>
    </xs:sequence>
    <xs:attributeGroup ref="gco:ObjectReference"/>
    <xs:attribute ref="gco:nilReason"/>
</xs:complexType>
```

18.3 Elements

The following table shows the common properties of all role types.

Name	Type	Card.	Description
name	*gco:CharacterString_PropertyType*	1	Name of the organization which has the defined role.
contact	*gmd:CI_ResponsibleParty_Type*	1	Contact information for the organization.

19. Enumerations and code lists

This chapter describes the used enumerations of ISO 19135 and the xml schema encodings for the enumerations.

19.1 RE_ItemStatus

'*RE_ItemStatus_Type*' describes the registration status of a 'RE_RegisterItem'.

```
    <xs:simpleType name="RE_ItemStatus_Type">
        <xs:restriction base="xs:string">

            <!--Not Valid-->
            <xs:enumeration value="notValid">
                <xs:annotation>
                    <xs:documentation xml:lang="en">
                The item has been entered into the register, but the
control body has not accepted the proposal to add it.
                    </xs:documentation>
                </xs:annotation>
            </xs:enumeration>

            <!--Valid-->
            <xs:enumeration value="valid">
                <xs:annotation>
                    <xs:documentation xml:lang="en">
                The item has been accepted, is recommended for use, and
has not been superseded or retired.
                    </xs:documentation>
                </xs:annotation>
            </xs:enumeration>

            <!--Superseded-->
            <xs:enumeration value="superseded">
                <xs:annotation>
                    <xs:documentation xml:lang="en">
                The item has been superseded by another item and is no
longer recommended for use.
                    </xs:documentation>
                </xs:annotation>
            </xs:enumeration>

            <!--Retired-->
            <xs:enumeration value="retired">
                <xs:annotation>
                    <xs:documentation xml:lang="en">
                A decision has been made that the item is no longer
recommended for use. It has not been superseded by another item.
                    </xs:documentation>
                </xs:annotation>
            </xs:enumeration>

        </xs:restriction>
    </xs:simpleType>
```

```
<xs:element name="RE_ItemStatus" type="tns:RE_ItemStatus_Type"
         substitutionGroup="gco:CharacterString"/>

<xs:complexType name="RE_ItemStatus_PropertyType">
    <xs:sequence minOccurs="0">
       <xs:element ref="tns:RE_ItemStatus"/>
    </xs:sequence>
    <xs:attribute ref="gco:nilReason"/>
</xs:complexType>
```

Value	Description
valid	The item has been accepted, is recommended for use, and has not been superseded or retired.
notValid	The item has been entered into the register, but the control body has not accepted the proposal to add it.
superseded	The item has been superseded by another item and is no longer recommended for use.
retired	A decision has been made that the item is no longer recommended for use. It has not been superseded by another item.

19.2 RE_DecisionStatus

An instance of '*RE_DecisionStatus_Type*' identifies the standing of the proposed change within the approval process.

```
<xs:simpleType name="RE_DecisionStatus_Type">
    <xs:restriction base="xs:string">
      <xs:enumeration value="pending">
          <xs:annotation>
             <xs:documentation xml:lang="en">
            No decision has been made.
             </xs:documentation>
          </xs:annotation>
      </xs:enumeration>
      <xs:enumeration value="tentative">
          <xs:annotation>
             <xs:documentation xml:lang="en">
            A decision has been made, but it is still subject to
appeal.
             </xs:documentation>
          </xs:annotation>
      </xs:enumeration>
      <xs:enumeration value="final">
          <xs:annotation>
             <xs:documentation xml:lang="en">
            A decision has been made and the time limit for appeal
has run out or an appeal has been resolved.
             </xs:documentation>
          </xs:annotation>
      </xs:enumeration>
    </xs:restriction>
</xs:simpleType>
```

```
      <xs:element name="RE_DecisionStatus"
type="tns:RE_DecisionStatus_Type"
substitutionGroup="gco:CharacterString"/>

      <xs:complexType name="RE_DecisionStatus_PropertyType">
          <xs:sequence minOccurs="0">
             <xs:element ref="tns:RE_DecisionStatus"/>
          </xs:sequence>
          <xs:attribute ref="gco:nilReason"/>
      </xs:complexType>
```

Value	Description
pending	No decision has been made.
tentative	A decision has been made, but it is still subject to appeal.
final	A decision has been made and the time limit for appeal has run out or an appeal has been resolved.

19.3 RE_Disposition

An instance of '*RE_Disposition_Type*' identifies the disposition of the proposal. The condition is specified by the constraint {status <> #pending implies disposition -> notEmpty}, which means that a value shall be provided if the value of status is 'tentative' or 'final'.

```
<xs:simpleType name="RE_Disposition_Type">
    <xs:restriction base="xs:string">
      <xs:enumeration value="withdrawn">
          <xs:annotation>
             <xs:documentation xml:lang="en">
            The submitting organization has withdrawn the proposal.
             </xs:documentation>
          </xs:annotation>
      </xs:enumeration>
      <xs:enumeration value="accepted">
          <xs:annotation>
             <xs:documentation xml:lang="en">
            The control body decided to accept the proposal.
             </xs:documentation>
          </xs:annotation>
      </xs:enumeration>
      <xs:enumeration value="notAccepted">
          <xs:annotation>
             <xs:documentation xml:lang="en">
            The control body decided not to accept the proposal.
             </xs:documentation>
          </xs:annotation>
      </xs:enumeration>
    </xs:restriction>
</xs:simpleType>

<xs:element name="RE_Disposition" type="tns:RE_Disposition_Type"
            substitutionGroup="gco:CharacterString"/>

<xs:complexType name="RE_Disposition_PropertyType">
    <xs:sequence minOccurs="0">
       <xs:element ref="tns:RE_Disposition"/>
    </xs:sequence>
    <xs:attribute ref="gco:nilReason"/>
</xs:complexType>
```

Value	Description
withdrawn	The submitting organization has withdrawn the proposal.
accepted	The control body decided to accept the proposal.
notAccepted	The proposal is not accepted.The control body decided not to accept the proposal.

19.4 RE_AmendmentType

An instance of '*RE_AmendmentType_Type*' specifies the type of a change proposal that is not an addition or a clarification – e.g.: supersession or retirement.

```
<xs:simpleType name="RE_AmendmentType_Type">
    <xs:restriction base="xs:string">
      <xs:enumeration value="supersession">
          <xs:annotation>
             <xs:documentation xml:lang="en">
            The proposal requests that an item be superseded.
             </xs:documentation>
          </xs:annotation>
      </xs:enumeration>
      <xs:enumeration value="retirement">
          <xs:annotation>
             <xs:documentation xml:lang="en">
            The proposal requests that an item be retired.
             </xs:documentation>
          </xs:annotation>
      </xs:enumeration>
    </xs:restriction>
</xs:simpleType>

<xs:element name="RE_AmendmentType" type="tns:RE_AmendmentType_Type"
          substitutionGroup="gco:CharacterString"/>

<xs:complexType name="RE_AmendmentType_PropertyType">
    <xs:sequence minOccurs="0">
       <xs:element ref="tns:RE_AmendmentType"/>
    </xs:sequence>
    <xs:attribute ref="gco:nilReason"/>
</xs:complexType>
```

Value	Description
supersession	The proposal requests that an item be superseded.
Retirement	The proposal requests that an item be retired.

19.5 RE_SimilarityToSource

An instance of '*RE_SimilarityToSource*' specifies the changes of items compared to the original item in an external source document or register. As the corresponding UML class is defined as a CodedList, it is encoded as a code list. According to ISO 19139:2007 code lists are defined as elements of type '*gco:CodeListValue_Type*'.

```
<xs:element name="RE_SimilarityToSource" type="gco:CodeListValue_Type"
        substitutionGroup="gco:CharacterString" />

<xs:complexType name="RE_SimilarityToSource_PropertyType">
   <xs:sequence minOccurs="0">
       <xs:element ref="tns:RE_SimilarityToSource"/>
   </xs:sequence>
```

```
        <xs:attribute ref="gco:nilReason"/>
    </xs:complexType>
```

The code list itself is encoded in a seperate instance file with name 'codeList.xml', containing a 'CT_CodelistCatalogue' instance:

```
<CT_CodelistCatalogue xmlns="http://www.isotc211.org/2005/gmx"
      xmlns:gmx="http://www.isotc211.org/2005/gmx"
      xmlns:gco="http://www.isotc211.org/2005/gco"
      xmlns:gml="http://www.opengis.net/gml"  >
      <!--======Catalogue description=====-->
      <name>
            <gco:CharacterString>
            ISO 19135 Register Code List Dictionary
            </gco:CharacterString>
      </name>

      <!------- Codelists =======-->
      <codelistItem>
            <CodeListDictionary gml:id="RE_SimilarityToSource">
                  <gml:description>
RE_SimilarityToSource is a CodeList that identifies the type of change that
has been made to an item specification relative to an item specification in
an external source.
                  </gml:description>
                  <gml:identifier
                        codeSpace="codeList.xml">
                  RE_SimilarityToSource_Type
                  </gml:identifier>
                  <codeEntry>
                        <CodeDefinition gml:id="1">
                              <gml:description>
No change has been made to the specification.
                              </gml:description>
                              <gml:identifier codeSpace="codeList.xml">
                              identical
                              </gml:identifier>
                        </CodeDefinition>
                  </codeEntry>
                  <codeEntry>
                        <CodeDefinition gml:id="2">
                              <gml:description>
The style of the specification has been changed to match the style and
structure of other specifications in the register that has imported the
specification.
                              </gml:description>
                              <gml:identifier codeSpace="codeList.xml">
                              restyled
                              </gml:identifier>
                        </CodeDefinition>
                  </codeEntry>
                  <codeEntry>
                        <CodeDefinition gml:id="3">
                              <gml:description>
The specification includes information about its context that is not
explicit in the specification in the external source.
                              </gml:description>
                              <gml:identifier codeSpace="codeList.xml">
                              contextAdded
                              </gml:identifier>
                        </CodeDefinition>
```

```
                    </codeEntry>
                    <codeEntry>
                          <CodeDefinition gml:id="4">
                                <gml:description>
The specification of the register item has been generalized to have a
broader meaning than the item specified in the external source.
                                </gml:description>
                                <gml:identifier codeSpace="codeList.xml">
                                generalization
                                </gml:identifier>
                          </CodeDefinition>
                    </codeEntry>
                    <codeEntry>
                          <CodeDefinition gml:id="5">
                                <gml:description>
The specification of the register item has been specialized to have a
narrower meaning than the item specified in the external source.
                                </gml:description>
                                <gml:identifier codeSpace="codeList.xml">
                                specialization
                                </gml:identifier>
                          </CodeDefinition>
                    </codeEntry>
                    <codeEntry>
                          <CodeDefinition gml:id="6">
                                <gml:description>
The nature of the differences between the register item and the similar
item in the external source is unspecified.
                                </gml:description>
                                <gml:identifier codeSpace="codeList.xml">
                                unspecified
                                </gml:identifier>
                          </CodeDefinition>
                    </codeEntry>
              </CodeListDictionary>
 </codelistItem>
</CT_CodelistCatalogue>
```

Code	Value	Description
1	identical	No change has been made to the specification.
2	restyled	The style of the specification has been changed to match the style and structure of other specifications in the register that has imported the specification.
3	contextAdded	The specification includes information about its context that is not explicit in the specification in the external source.
4	generalization	The specification of the register item has been generalized to have a broader meaning than the item specified in the external source.
5	specialization	The specification of the register item has been specialized to have a narrower meaning than the item specified in the external source.
6	unspecified	The nature of the differences between the register item and the similar item in the external source is unspecified.

20. Global Elements

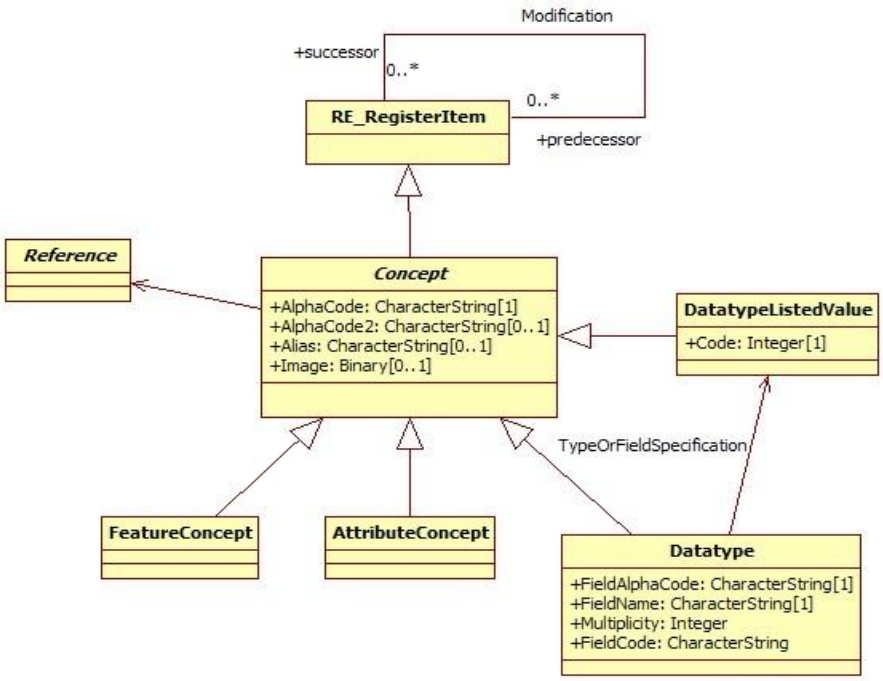
The following table shows a list of the instantiable global elements:

Element	Type
RE_Register	*tns:RE_Register_Type*
RE_RegisterItem	*tns:RE_RegisterItem_Type*
RE_ItemClass	*tns:RE_ItemClass_Type*
RE_RegisterOwner	*tns:RE_RegisterOwner_Type*
RE_RegisterManager	*tns:RE_RegisterManager_Type*
RE_SubmittingOrganization	*tns:RE_SubmittingOrganization_Type*
RE_ControlBody	*tns:RE_ControlBody_Type*
RE_AdditionInformation	*tns:RE_AdditionInformation_Type*
RE_ClarificationInformation	*tns:RE_ClarificationInformation_Type*
RE_AmendmentInformation	*tns:RE_AmendmentInformation_Type*
RE_ReferenceSource	*tns:RE_ReferenceSource_Type*
RE_Reference	*tns:RE_Reference_Type*
RE_Locale	*tns:RE_Locale_Type*
RE_SubregisterDescription	*tns:RE_SubregisterDescription_Type*

21. Annex A – DFDD Register Item Schema (informative)

This chapter shows an example of modelling and encoding of customized register item classes. This is Informative

UML Class Diagram



Schema Encoding (Feature Concept)

This section shows a listing of an XML schema encoding for 'FeatureConcepts'.

```
<xs:schema targetNamespace="http://www.supportgis.de/namespaces/dfdd"
      elementFormDefault="qualified" attributeFormDefault="unqualified"
      xmlns="http://www.w3.org/2001/XMLSchema"
      xmlns:xs="http://www.w3.org/2001/XMLSchema"
      xmlns:gmd="http://www.isotc211.org/2005/gmd"
      xmlns:gco="http://www.isotc211.org/2005/gco"
      xmlns:dfdd="http://www.supportgis.de/namespaces/dfdd"
      xmlns:tns="http://www.supportgis.de/namespaces/tns">

    <xs:import namespace="http://www.isotc211.org/2005/gmd"
      schemaLocation="http://www.isotc211.org/2005/gmd/gmd.xsd"/>

    <xs:import namespace="http://www.isotc211.org/2005/gco"
      schemaLocation="http://www.isotc211.org/2005/gco/gco.xsd"/>


    <xs:import namespace="http://www.supportgis.de/namespaces/tns"
```

```
      schemaLocation="schema19135_final/iso19135.xsd" />

<!--  Base type for all concept types. Derived from tns:RE_RegisterItemType
      The ConceptType declaration contains
      the common attributes: AplphaCode, AlphaCode2, Alias, Image and
      Reference
-->
    <xs:complexType name="Concept_Type" abstract="true">
      <xs:complexContent>
              <xs:extension base="tns:RE_RegisterItem_Type">

                <xs:sequence>

                   <xs:element name="AlphaCode"
                        type="gco:CharacterString_PropertyType">

                      <xs:annotation>
            <xs:documentation>
            In the DFDD the alphaCode is a short name, a shortened
            version written in a so called camelCase style not longer
            than 15 characters. For an "Aircraft Facility Reference
            Point" the alphaCode is "AirFacReferencePoint
      </xs:documentation>
            </xs:annotation>
                  </xs:element>


            <xs:element name="AlphaCode2"
                        type="gco:CharacterString_PropertyType"
                              maxOccurs="1" minOccurs="0">

                      <xs:annotation>
            <xs:documentation>
            In DFDD the alphaCode2 is the old FACC-based 5-3-1 Code.
            For the "Aircraft Facility Reference Point" for example
            you find the alphaCode "GB047".
            </xs:documentation>
            </xs:annotation>
                  </xs:element>

                   <xs:element name="Alias"
                        type="gco:CharacterString_PropertyType"
                        maxOccurs="1" minOccurs="0">
                      <xs:annotation>
            <xs:documentation>
            The optional Alias(s) describes functionally equivalent
            synonyms for the Concept E.g. Graveyard, Cemetery.
            </xs:documentation>
            </xs:annotation>
                  </xs:element>

                   <xs:element name="Image" type="base64Binary"
                        maxOccurs="1" minOccurs="0">

                      <xs:annotation>
            <xs:documentation>
            The DFDD can store pictures, drawings or schemas for
            Concepts. These images can help to understand what the
            Concept is about.
            </xs:documentation>
            </xs:annotation>
```

```
                    </xs:element>

                    <xs:element name="Reference"
                         type="dfdd:Reference_Type"
                         maxOccurs="1" minOccurs="0">

                    <xs:annotation>
              <xs:documentation>
              The conditional association reference connects the Concept
              to a set of sources from which the Concept has been taken.
              </xs:documentation>
              </xs:annotation>
                    </xs:element>
                </xs:sequence>
              </xs:extension>
        </xs:complexContent>
      </xs:complexType>

<!-- Type declaration for feature concepts. Derived from ConceptType -->
      <xs:complexType name="FeatureConcept_Type">
        <xs:complexContent>
              <xs:extension base="dfdd:Concept_Type"/>
        </xs:complexContent>
      </xs:complexType>

<!-- Element declaration for instantiable types -->
      <xs:element name="FeatureConcept" type="dfdd:FeatureConcept_Type"/>

        …

</xs:schema>
```

22. Annex B – DFDD RegML Example

This chapter shows an example of a Register ML document containing one item of the DFDD Feature Concept class of Annex A.

```
<?xml version="1.0" encoding="UTF-8"?>
<tns:RE_Register xmlns="http://www.supportgis.de/namespaces/tns"
    xmlns:xs="http://www.w3.org/2001/XMLSchema"
    xmlns:gmd="http://www.isotc211.org/2005/gmd"
    xmlns:gco="http://www.isotc211.org/2005/gco"
    xmlns:xlink="http://www.w3.org/1999/xlink"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xmlns:tns="http://www.supportgis.de/namespaces/tns"
    xmlns:dfdd="http://www.supportgis.de/namespaces/dfdd"
    xsi:schemaLocation="http://www.supportgis.de/namespaces/dfdd dfdd.xsd"
    id="45" uuid="78d5f0ea-8c71-4ca7-838f-907cbcebffe7">
    <tns:name>DFDD</tns:name>
    <tns:contentSummary>DGIWG Feature Data Dictionary</tns:contentSummary>

    <tns:operatingLanguage>
       <tns:RE_Locale>
           <name>English</name>
           <language>English</language>
           <country>840</country>
           <characterEncoding>
              <gmd:MD_CharacterSetCode codeList="MD_CharacterSetCode"
                 codeListValue="utf8">
                 UTF 8
              </gmd:MD_CharacterSetCode>
         </characterEncoding>
       </tns:RE_Locale>
    </tns:operatingLanguage>
    <tns:version>
       <tns:RE_Version>
           <tns:versionNumber>1.0.0</tns:versionNumber>
           <tns:versionDate>
               <gco:Date>2009-01-20</gco:Date>
           </tns:versionDate>
       </tns:RE_Version>
    </tns:version>
    <tns:containedItemClass>
       <tns:RE_ItemClass id="50"
           uuid="b20b69f3-05fe-4950-b432-e783438ee89d">
           <tns:name>
              <gco:CharacterString>
           dfdd:FeatureConcept
              </gco:CharacterString>
         </tns:name>
           <tns:technicalStandard>
             <gmd:CI_Citation gco:uuid="2d0b1057-4244-4a69-9c04-
abba0d354dfa">
                      <gmd:title>
                     <gco:CharacterString>
                     DFDD Feature Concept Dictionary
                     </gco:CharacterString>
                     </gmd:title>
```

```
                    <gmd:alternateTitle />
                    <gmd:date>
                     <gco:Date>2009-01-01</gco:Date>
                    </gmd:date>
                    <gmd:edition>
                     <gco:CharacterString>1.04</gco:CharacterString>
                    </gmd:edition>
                    <gmd:citedResponsibleParty>
                     <gmd:CI_ResponsibleParty gco:id="79">
                     <gmd:individualName>
                           <gco:CharacterString>
                                 Max Mustermann
                           </gco:CharacterString>
                     </gmd:individualName>
                     <gmd:organisationName>
                           <gco:CharacterString>
                                 BGIO
                           </gco:CharacterString>
                     </gmd:organisationName>
                     <gmd:positionName>
                           <gco:CharacterString>
                                 Register manager
                           </gco:CharacterString>
                           </gmd:positionName>
                                    <role>
                                       <CI_RoleCode
                                 codeList=
    "http://www.isotc211.org/2005/resources/CodeList/
     gmxCodelists.xml#CI_RoleCode"
                                 codeListValue=
                                 "owner">
                                 </CI_RoleCode>
                                    </role>
                     </gmd:CI_ResponsibleParty>
                    </gmd:citedResponsibleParty>

  <gmd:otherCitationDetails/>
                    <gmd:collectiveTitle></gmd:collectiveTitle>
                    <gmd:ISBN></gmd:ISBN>
                    <gmd:ISSN></gmd:ISSN>
               </gmd:CI_Citation>
          </tns:technicalStandard>
    </tns:RE_ItemClass>
  </tns:containedItemClass>

  <tns:containedItem>
    <dfdd:FeatureConcept
          id="101"
          uuid="8a02280e-58c7-4646-961b-c9ecedc00546">
          <itemIdentifier>
                100455
          </itemIdentifier>
          <name>Access Zone</name>
          <status>v</status>
          <tns:dateAccepted>
                <gco:Date>2009-01-20</gco:Date>
          </tns:dateAccepted>
          <tns:dateAmended>
                <gco:Date>2009-01-20</gco:Date>
          </tns:dateAmended>
          <definition>
```

```
                <gco:CharacterString>A terrain region
                between a contact zone and the first
                passable land transportation route
                (for example: a road).
            </gco:CharacterString>
            </definition>
            <itemClass
            xlink:href="tns:uuid:b20b69f3-05fe-4950-b432-e783438ee89d" />
            <AlphaCode>
                <gco:CharacterString>
                AccessZone
                </gco:CharacterString>
            </AlphaCode>
            <AlphaCode2>
                <gco:CharacterString>
                FA005
            </gco:CharacterString>
            </AlphaCode2>
            <tns:additionInformation>
                        <tns:RE_AdditionInformation
                              id="102"
                              uuid="5ee60b21-5b00-47ef-b591-39a42a44e594">
                              <tns:dateProposed>
                                    <gco:Date>2009-01-20</gco:Date>
                              </tns:dateProposed>
                              <tns:justification>
                                    <gco:CharacterString>
                                    just doing it
                                    </gco:CharacterString>
                              </tns:justification>
                              <tns:status>final</tns:status>

                              <tns:disposition>accepted</tns:disposition>
                              <tns:dateDisposed>
                                    <gco:Date>2009-01-20</gco:Date>
                              </tns:dateDisposed>

                              <tns:controlBodyDecisionEvent>
                              </tns:controlBodyDecisionEvent>

                              <tns:controlBodyNotes>
                                    <gco:CharacterString>
                                    checked by control body
                                    </gco:CharacterString>
                              </tns:controlBodyNotes>
                              <tns:registerManagerNotes>
                                    <gco:CharacterString>
                                    I have seen it
                                    </gco:CharacterString>
                              </tns:registerManagerNotes>
                        </tns:RE_AdditionInformation>
                  </tns:additionInformation>
    </dfdd:FeatureConcept>
</tns:containedItem>


<tns:owner>
    <tns:name>Military Intelligence 6</tns:name>
    <tns:contact xlink:href="gco:id:79" />
</tns:owner>
```

```
    <tns:manager>
      <tns:name>Military Intelligence 6</tns:name>
      <tns:contact xlink:href="gco:id:79" />
    </tns:manager>

    <tns:contentController>
            <tns:name>Military Intelligence 6</tns:name>
      <tns:contact xlink:href="gco:id:79" />
    </tns:contentController>

    <tns:submitter>
            <tns:name>Military Intelligence 6</tns:name>
      <tns:contact xlink:href="gco:id:79" />
    </tns:submitter>

</tns:RE_Register>
```