UK Location Programme

Location Information Interoperability Board

Metadata Working Group

Schematron Error Descriptions

DOCUMENT CONTROL

Change Summary

Version	Date	Author/Editor	Change Summary
0.1	2011-12-12	James Rapaport	Initial draft
0.2	2012-01-12	James Rapaport	Review of error descriptions
0.3	2012-02-06	James Rapaport	Changes following review by UKLP
1.0	2012-02-21	James Rapaport	Final changes following further review by UKLP – for release at v1.0
1.1	2013-02-25	Peter Parslow	Amendment to match schematron version 1.3

References

Ref.	Title/Version/Publication Date/Author
[1]	UK GEMINI, Specification for discovery metadata for geospatial data resources, Version 2.2, 2012-12, AGI, http://www.agi.org.uk/uk-gemini/
[2]	UK GEMINI Encoding Guidance, Technical guidance on the encoding of UK GEMINI using XSD Schemas, version 1.4, January 2013
[3]	UK GEMINI Schematron Schema Guidance, An introduction to the UK GEMINI 2 Schematron Schema, version 1.3, January 2013
[4]	XML in a Nutshell, Second Edition, June 2002, Elliotte Rusty Harold and W. Scott Means

CONTENTS

1 INTRODUCTION

1.1 Purpose of document

1 The purpose of this document is to give 'plain English' explanations of the constraints that exist in the GEMINI 2.1 Schematron schema and how they work in the context of GEMINI 2.1 metadata instances.

2 Schematron is an XML technology described as a Document Schema Definition Language (DSDL). It provides a mechanism for applying rules based constraints to XML documents and reporting the level of conformance. A Schematron schema is encoded in XML and uses other XML technologies such as XPath to define constraints, so it might be described as human-readable and self-documenting. Knowledge of the constituent technologies is needed, however, in order to understand the meaning of a constraint.

3 This document aims to translate every constraint in the GEMINI Schematron schema in to more easily understandable language. Each section of this document explains one constraint from the Schematron schema, in plain English. A section presents the error message, the XML context within which the constraint works, the cause of the constraint failing and gives relevant examples of XML showing failure cases and success cases.

1.2 Scope

4 The scope of this document is the Schematron schema (version 1.3) used for validating XML encoded metadata conforming to the UK GEMINI 2.1 standard [1] (henceforth referred to as GEMINI).

5 Outside the scope of this document is the description of GEMINI metadata items, their content, obligation and meaning. Readers seeking this information should consult the GEMINI standard [1]. Examples of XML encoding are given but the scope of this document does not cover encoding explicitly. Readers seeking information on XML and the encoding of GEMINI should consult the UK GEMINI Encoding Guidance [2].

6 This document does not cover the concepts of the Schematron validation language. Readers seeking this information should consult the UK GEMINI Schematron Schema Guidance [3].

1.3 Assumed knowledge

7 The intended audience includes people responsible for creating and validating GEMINI metadata instances. It is hoped that in providing clear explanations of the constraints and their error messages, users will be assisted in creating valid GEMINI metadata. Readers will necessarily need some understanding of XML[1], the UK GEMINI standard [1], metadata encoding guidance [2] and the UK GEMINI Schematron schema [3].

1.4 Terminology

Assertion

8 A statement that a logical test is true.

Attribute

9 An attribute is a name-value pair attached to an element's start tag [4].

10 `<element attribute="attribute value"/>`

---

[1] See http://www.w3schools.com/xml/xml_whatis.asp

Element

11 An XML element is an item in an *XML document* consisting of a start tag and an end tag. XML elements may contain content which may ba a value or other elements (but not both in a data centric *XML document*) and may have associated *attributes*.

```
<element>value</element>

<element>
  <child>value</child>
</element>
```

GEMINI

12 The UK discovery metadata profile of ISO 19115.

GML

13 Geography Markup Language – an XML language for encoding feature types with geometry and other attributes. GML is included in ISO 19139 to encode temporal types [ISO 19136]

INSPIRE

14 Infrastructure for Spatial Information in Europe

ISO

15 International Organisation for Standardisation

Mandatory

16 The obligation on the creator of metadata to provide a metadata item. The obligation is defined at a number of levels: at the lowest level this is ISO 19115 but obligations may be redefined by subsequent standards in the hierarchy. A metadata item must be provided if its obligation is mandatory. XML elements that are used to encode metadata items inherit the obligation and that obligation might be tested by an XSD schema or some other constraining schema such as Schematron.

Metadata Instance

17 Physically instantiated metadata.

18 In the context of this document a metadata instance will be an *XML document* conforming to ISO / TS 19139 and other associated standards.

Metadata Item

19 A top level metadata concept in the UK GEMINI standard. Title, for example, is a metadata item.

20 Metadata items may comprise sub-items.

Nillable

21 This term is used to indicate whether the contents of a mandatory metadata item can be left out. The ISO 19139 schema has all elements nillable; the Schematron schema reduces this to a small number, failing others if they are empty. ISO 19139 does not use the XML nil value approach, functionally extending this by requiring a reason to be given if a mandatory item is empty in a metadata instance. See "nil reason".

Nil Reason

22   A Nil Reason is expressed in XML encoded metadata using the gco:nilReason attribute. This attribute can be added to elements in the XML to show why a value can not be provided for the element. The valid values are defined in the underlying schema:

- inapplicable – there is no value
- missing – the correct value is not readily available to the sender of this data. Furthermore, a correct value may not exist
- template – the value will be available later
- unknown – the correct value is not known to, and not computable by, the sender of this data. However, a correct value probably exists
- withheld – the value is not divulged
- other:[text] – other brief explanation, where [text] is a string of two or more characters with no included spaces
- anyURI – which should refer to a resource which describes the reason for the exception

String

23   A string is a sequence of characters. An empty string has no characters.

UML®

24   Unified Modelling Language™

UUID

25   A universally unique identifier, also known as a GUID (Globally Unique Identifier) is a unique 128-bit integer that is represented as a 36 (or 32 ignoring the dashes) character string of hexadecimal numbers. UUIDs are system generated and ideally a UUID will never be generated twice by any computer in existence.

26   Format: xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx

27   Example: 3ce4f380-b394-4e5d-b222-6914ea311156

XML

28   eXtensible Markup Language.

29   The XML specification can be found at http://www.w3.org/TR/REC-xml/

Xml Document

30   A collection of data represented in XML.

XSD

31   XML Schema Definition Language. An XSD is a document written in XML that defines the structure of an XML document.

2 ERROR DESCRIPTION STRUCTURE

2.1 Introduction

32 Each exception, which has potential to be raised during a Schematron validation, will be described under the headings: Error Message, Context, Cause, Example – fail, Example – success and Schematron pattern. The headings are described in the following sections.

2.2 Error Message

33 The error message shows the text that is presented to the user if an assertion fails, rendering the XML instance invalid.

2.3 Context

34 The context corresponds to the location in the XML instance where the assertion fires. The context will be expressed in terms of ISO 19115 classes and properties, starting at the level of the class MD_Metadata.

35 The context will be expressed in the following way: ClassName.propertyName > ClassName.propertyName

36 For example: MD_Metadata.identificationInfo > MD_DataIdentification

37 See Appendix 1 for more detail on the derivation of the context expression.

2.4 Cause

38 The cause describes the case or cases that would result in the assertion failing.

2.5 Example – fail

39 An example of invalid XML is given. The XML will be abbreviated, with missing content indicated by an ellipsis. No namespace declarations will be made.

2.6 Example – success

40 An example of valid XML is given. It will be abbreviated in the same way.

2.7 Schematron pattern

41 The Schematron pattern will be shown as below, for example. More information on Schematron patterns is given in Appendix 2.

```
<sch:pattern fpi="Gemini2-mi6">
  <sch:title>Keyword</sch:title>
  <sch:rule context="/*[1]/gmd:identificationInfo[1]/*[1]">
    <sch:assert test="count(gmd:descriptiveKeywords) &gt;= 1">
      Descriptive keywords are mandatory.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

3 TITLE NOT NILLABLE

3.1 Error message

42 The gmd:title element is not nillable and shall have a value.

3.2 Context

43 MD_Metadata.identificationInfo > MD_Identification.citation > CI_Citation.title

3.3 Cause

44 The element named gmd:title has been assigned a gco:nilReason attribute or the value of the element gmd:title is an empty string.

3.4 Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      <gmd:citation>
        <gmd:CI_Citation>
          <gmd:title gco:nilReason="unknown"/>
        </gmd:CI_Citation>
        ...
      </gmd:citation>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>


<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      <gmd:citation>
        <gmd:CI_Citation>
          <gmd:title/>
        </gmd:CI_Citation>
        ...
      </gmd:citation>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

3.5 Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      <gmd:citation>
        <gmd:CI_Citation>
          <gmd:title>
```

```
            <gco:CharacterString>A valid dataset title</gco:CharacterString>
          </gmd:title>
          ...
        </gmd:CI_Citation>
        ...
      </gmd:citation>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

3.6   Schematron rule

```
<sch:pattern is-a="TypeNotNillablePattern" id="Gemini2-mi1-NotNillable">
  <sch:param name="context"
          value="/*[1]/gmd:identificationInfo[1]/*[1]/gmd:citation/*[1]/gmd:title"/>
</sch:pattern>

<!-- Test that an element has a value - the value is not nillable -->
<sch:pattern abstract="true" id="TypeNotNillablePattern">
  <sch:rule context="$context">
    <sch:assert test="string-length(.) &gt; 0 and count(./@gco:nilReason) = 0">
      The <sch:name/> element is not nillable and shall have a value.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

4   ALTERNATIVE TITLE NILLABLE

4.1   Error message

45   The gmd:alternateTitle element shall have a value or a valid Nil Reason.

4.2   Context

46   MD_Metadata.identificationInfo > MD_Identification.citation > CI_Citation.alternateTitle

4.3   Cause

47   The element named gmd:alternateTitle has either no value or it has a gco:nilReason attribute with an invalid value. The value of the gco:nilReason attribute must be taken from a controlled list.

4.4   Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      <gmd:citation>
        <gmd:CI_Citation>
          ...
          <gmd:alternateTitle gco:nilReason="invalidvalue"/>
          ...
        </gmd:CI_Citation>
        ...
      </gmd:citation>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      <gmd:citation>
        <gmd:CI_Citation>
          ...
          <gmd:alternateTitle/>
          ...
        </gmd:CI_Citation>
        ...
      </gmd:citation>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

4.5   Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
```

```
      <gmd:citation>
        <gmd:CI_Citation>
          ...
          <gmd:alternateTitle gco:nilReason="unknown"/>
          ...
        </gmd:CI_Citation>
        ...
      </gmd:citation>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>

<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      <gmd:citation>
        <gmd:CI_Citation>
          ...
          <gmd:alternateTitle>
            <gco:CharacterString>A valid alternate title</gco:CharacterString>
          </gmd:alternateTitle>
          ...
        </gmd:CI_Citation>
        ...
      </gmd:citation>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

4.6   Schematron rule

```
<sch:pattern is-a="TypeNillablePattern" id="Gemini2-mi2-Nillable">
  <sch:param name="context"
value="/*[1]/gmd:identificationInfo[1]/*[1]/gmd:citation/*[1]/gmd:alternateTitle"/>
</sch:pattern>

<!-- Test that an element has a value or has a valid nilReason value -->
<sch:pattern abstract="true" id="TypeNillablePattern">
  <sch:rule context="$context">
    <sch:assert test="(string-length(.) &gt; 0) or
                (@gco:nilReason = 'inapplicable' or
                @gco:nilReason = 'missing' or
                @gco:nilReason = 'template' or
                @gco:nilReason = 'unknown' or
                @gco:nilReason = 'withheld' or
                starts-with(@gco:nilReason, 'other:'))">
      The <sch:name/> element shall have a value or a valid Nil Reason.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

5   DATASET LANGUAGE

5.1   Language Code

5.1.1   Error message

48   Language shall be implemented with gmd:LanguageCode.

5.1.2   Context

49   MD_Metadata.identificationInfo > MD_DataIdentification.language

5.1.3   Cause

50   The element named gmd:language may have one of two child elements: gco:CharacterString or gmd:LanguageCode. Either is valid according to the ISO 19139 XSD schemas. However, the encoding guidance [2] requires that only the gmd:LanguageCode element is used. The assertion fails if the child element of the element named gmd:language is gco:CharacterString.

5.1.4   Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:language>
        <gco:CharacterString>eng</gco:CharacterString>
      </gmd:language>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

5.1.5   Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:language>
        <gmd:LanguageCode codeList="http://www.loc.gov/standards/iso639-
2/php/code_list.php" codeListValue="eng">eng</gmd:LanguageCode>
      </gmd:language>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

5.1.6   Schematron rule

```
<sch:pattern is-a="LanguagePattern" id="Gemini2-mi3-Language">
  <sch:param name="context"
             value="/*[1]/gmd:identificationInfo[1]/*[1]/gmd:language"/>
</sch:pattern>

<!-- Test the language values (Metadata and Resource) -->
<sch:pattern abstract="true" id="LanguagePattern">
  <sch:rule context="$context">
```

```
  <sch:assert test="count(gmd:LanguageCode) = 1">
    Language shall be implemented with gmd:LanguageCode.
  </sch:assert>
</sch:rule>
<sch:rule context="$context/gmd:LanguageCode">
  <sch:assert test="string-length(@codeListValue) &gt; 0">
    The language code list value is absent.
  </sch:assert>
</sch:rule>
</sch:pattern>
```

5.2 Dataset Language Code List

5.2.1 Error message

51 The language code list value is absent.

5.2.2 Context

52 MD_Metadata.identificationInfo > MD_DataIdentification.language

5.2.3 Cause

53 The codeListValue attribute of the element gmd:LanguageCode must have a value. This assertion fails if the value of the attribute is an empty string.

5.2.4 Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:language>
        <gmd:LanguageCode codeList="http://www.loc.gov/standards/iso639-
2/php/code_list.php" codeListValue="">eng</gmd:LanguageCode>
      </gmd:language>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

5.2.5 Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:language>
        <gmd:LanguageCode codeList="http://www.loc.gov/standards/iso639-
2/php/code_list.php" codeListValue="eng">eng</gmd:LanguageCode>
      </gmd:language>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

5.2.6   Schematron rule

```
<sch:pattern is-a="LanguagePattern" id="Gemini2-mi3-Language">
  <sch:param name="context"
             value="/*[1]/gmd:identificationInfo[1]/*[1]/gmd:language"/>
</sch:pattern>

<!-- Test the language values (Metadata and Resource) -->
<sch:pattern abstract="true" id="LanguagePattern">
  <sch:rule context="$context">
    <sch:assert test="count(gmd:LanguageCode) = 1">
      Language shall be implemented with gmd:LanguageCode.
    </sch:assert>
  </sch:rule>
  <sch:rule context="$context/gmd:LanguageCode">
    <sch:assert test="string-length(@codeListValue) &gt; 0">
      The language code list value is absent.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

6   ABSTRACT NOT NILLABLE

6.1   Error message

54   The gmd:abstract element is not nillable and shall have a value.

6.2   Context

55   MD_Metadata.identificationInfo > MD_Identification.abstract

6.3   Cause

56   The element named gmd:abstract has been assigned a gco:nilReason attribute or the value of the element gmd:abstract is an empty string.

6.4   Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:abstract gco:nilReason="unknown"/>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

6.5   Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:abstract>
        <gco:CharacterString>A valid abstract</gco:CharacterString>
      </gmd:abstract>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

6.6   Schematron rule

```
<sch:pattern is-a="TypeNotNillablePattern" id="Gemini2-mi4-NotNillable">
  <sch:param name="context"
             value="/*[1]/gmd:identificationInfo[1]/*[1]/gmd:abstract"/>
</sch:pattern>

<!-- Test that an element has a value - the value is not nillable -->
<sch:pattern abstract="true" id="TypeNotNillablePattern">
  <sch:rule context="$context">
    <sch:assert test="string-length(.) &gt; 0 and count(./@gco:nilReason) = 0">
      The <sch:name/> element is not nillable and shall have a value.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

7 TOPIC CATEGORY

7.1 Topic category is mandatory

7.1.1 Error message

57 Topic category is mandatory for datasets and series. One or more shall be provided.

7.1.2 Context

58 MD_Metadata.identificationInfo > MD_DataIdentification

7.1.3 Cause

59 A metadata instance with a hierarchy level of 'dataset' or 'series' must have one or more topic category codes. This assertion fails if there are no gmd:topicCategory elements and the value of the codeListValue attribute of the gmd:hierarchyLevel element is either 'dataset' or 'series'.

7.1.4 Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <!--Dataset language-->
      <gmd:language>
        <gmd:LanguageCode codeList="http://www.loc.gov/standards/iso639-
2/php/code_list.php" codeListValue="eng">eng</gmd:LanguageCode>
      </gmd:language>
      <!--dataset-->
      <gmd:extent>
        <gmd:EX_Extent>
          ...
        </gmd:EX_Extent>
      </gmd:extent>
      <!--Additional information source-->
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

7.1.5 Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <!--Dataset language-->
      <gmd:language>
        <gmd:LanguageCode codeList="http://www.loc.gov/standards/iso639-
2/php/code_list.php" codeListValue="eng">eng</gmd:LanguageCode>
      </gmd:language>
      <!--Topic category-->
      <gmd:topicCategory>
        <gmd:MD_TopicCategoryCode>boundaries</gmd:MD_TopicCategoryCode>
      </gmd:topicCategory>
      <!--dataset-->
      <gmd:extent>
        <gmd:EX_Extent>
          ...
        </gmd:EX_Extent>
```

```
      </gmd:extent>
      <!--Additional information source-->
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

7.1.6   Schematron rule

```
<sch:pattern fpi="Gemini2-mi5">
  <sch:title>Topic Category</sch:title>
  <sch:rule context="/*[1]/gmd:identificationInfo[1]/*[1]">
    <sch:assert test="((../../gmd:hierarchyLevel[1]/*[1]/@codeListValue = 'dataset'
or ../../gmd:hierarchyLevel[1]/*[1]/@codeListValue = 'series') and
count(gmd:topicCategory) >= 1) or
 (../../gmd:hierarchyLevel[1]/*[1]/@codeListValue != 'dataset' and
../../gmd:hierarchyLevel[1]/*[1]/@codeListValue != 'series') or
count(../../gmd:hierarchyLevel) = 0">
Topic category is mandatory for datasets and series. One or more shall be provided.
    </sch:assert>
  </sch:rule>
  ...
</sch:pattern>
```

7.2   Topic Category not nillable

7.2.1   Error message

60   Topic category shall not be null.

7.2.2   Context

61   MD_Metadata.identificationInfo > MD_DataIdentification.topicCategory

7.2.3   Cause

62   The element named gmd:topicCategory has been assigned a gco:nilReason attribute or the value of the element is an empty string.

7.2.4   Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <!--Dataset language-->
      <gmd:language>
        <gmd:LanguageCode codeList="http://www.loc.gov/standards/iso639-
2/php/code_list.php" codeListValue="eng">eng</gmd:LanguageCode>
      </gmd:language>
      <!--Topic category-->
      <gmd:topicCategory gco:nilReason="missing"/>
      <!--dataset-->
      <gmd:extent>
        <gmd:EX_Extent>
          ...
        </gmd:EX_Extent>
      </gmd:extent>
      <!--Additional information source-->
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

7.2.5   Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <!--Dataset language-->
      <gmd:language>
        <gmd:LanguageCode codeList="http://www.loc.gov/standards/iso639-
2/php/code_list.php" codeListValue="eng">eng</gmd:LanguageCode>
      </gmd:language>
      <!--Topic category-->
      <gmd:topicCategory>
        <gmd:MD_TopicCategoryCode>boundaries</gmd:MD_TopicCategoryCode>
      </gmd:topicCategory>
      <!--dataset-->
      <gmd:extent>
        <gmd:EX_Extent>
          ...
        </gmd:EX_Extent>
      </gmd:extent>
      <!--Additional information source-->
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

7.2.6   Schematron rule

```
<sch:pattern fpi="Gemini2-mi5">
  <sch:title>Topic Category</sch:title>
  ...
  <sch:rule context="/*[1]/gmd:identificationInfo[1]/*[1]/gmd:topicCategory">
    <sch:assert test="((../../../gmd:hierarchyLevel[1]/*[1]/@codeListValue =
'dataset' or ../../../gmd:hierarchyLevel[1]/*[1]/@codeListValue = 'series') and
count(@gco:nilReason) = 0) or
(../../../gmd:hierarchyLevel[1]/*[1]/@codeListValue != 'dataset' and
../../../gmd:hierarchyLevel[1]/*[1]/@codeListValue != 'series') or
count(../../../gmd:hierarchyLevel) = 0">
        Topic Category shall not be null.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

8   DESCRIPTIVE KEYWORDS

8.1   Descriptive Keywords are mandatory

8.1.1   Error message

63   Descriptive keywords are mandatory.

8.1.2   Context

64   MD_Metadata.identificationInfo > MD_DataIdentification.descriptiveKeywords

65   MD_Metadata.identificationInfo > SV_ServiceIdentification.descriptiveKeywords

8.1.3   Cause

66   An MD_DataIdentification element or an SV_ServiceIdentification element must have one or more descriptiveKeywords elements in its set of child elements.

8.1.4   Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:resourceFormat>
        ...
      </gmd:resourceFormat>
      <!--Keyword-->
      <!--Limitations on public access-->
      <gmd:resourceConstraints>
        ...
      </gmd:resourceConstraints>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

8.1.5   Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:resourceFormat>
        ...
      </gmd:resourceFormat>
      <!--Keyword-->
      <gmd:descriptiveKeywords>
        <gmd:MD_Keywords>
          <gmd:keyword>
            <gco:CharacterString>Farming, agricultural land</gco:CharacterString>
          </gmd:keyword>
          <gmd:thesaurusName>
            <gmd:CI_Citation>
              <gmd:title>
                <gco:CharacterString>IPVS - Integrated Public Sector Vocabulary
version 2</gco:CharacterString>
              </gmd:title>
              <gmd:date>
```

```
                          <gmd:CI_Date>
                            <gmd:date>
                              <gco:Date>2006-04-02</gco:Date>
                            </gmd:date>
                            <gmd:dateType>
                              <gmd:CI_DateTypeCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#CI_DateTypeCode"
codeListValue="revision">revision</gmd:CI_DateTypeCode>
                            </gmd:dateType>
                          </gmd:CI_Date>
                        </gmd:date>
                    </gmd:CI_Citation>
                  </gmd:thesaurusName>
                </gmd:MD_Keywords>
            </gmd:descriptiveKeywords>
            <!--Limitations on public access-->
            <gmd:resourceConstraints>
                ...
            </gmd:resourceConstraints>
            ...
        </gmd:MD_DataIdentification>
      </gmd:identificationInfo>
      ...
</gmd:MD_Metadata>
```

8.1.6   Schematron rule

```
<sch:pattern fpi="Gemini2-mi6">
  <sch:title>Keyword</sch:title>
  <sch:rule context="/*[1]/gmd:identificationInfo[1]/*[1]">
    <sch:assert test="count(gmd:descriptiveKeywords) &gt;= 1">
      Descriptive keywords are mandatory.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

8.2   Keywords are nillable

8.2.1   Error message

67   The gmd:keyword element shall have a value or a valid Nil Reason.

8.2.2   Context

68   MD_Metadata.identificationInfo > MD_DataIdentification.descriptiveKeywords > MD_Keywords.keyword

69   MD_Metadata.identificationInfo > SV_ServiceIdentification.descriptiveKeywords > MD_Keywords.keyword

8.2.3   Cause

70   The element named gmd:keyword has either no value or it has a gco:nilReason attribute with an invalid value. The value of the gco:nilReason attribute must be taken from a controlled list.

8.2.4   Example – fail

```
<gmd:keyword>
  <gco:CharacterString></gco:CharacterString>
</gmd:keyword>
<gmd:keyword/>
```

8.2.5   Example – success

```
<gmd:keyword>
  <gco:CharacterString>Farming, agricultural land</gco:CharacterString>
</gmd:keyword>
<gmd:keyword gco:nilReason="missing"/>
```

8.2.6   Schematron rule

```
<sch:pattern is-a="TypeNillablePattern" id="Gemini2-mi6-Keyword-Nillable">
  <sch:param name="context"
value="/*[1]/gmd:identificationInfo[1]/*[1]/gmd:descriptiveKeywords/*[1]/gmd:keyword
"/>
</sch:pattern>

<sch:pattern abstract="true" id="TypeNillablePattern">
  <sch:rule context="$context">
    <sch:assert test="(string-length(.) &gt; 0) or
                (@gco:nilReason = 'inapplicable' or
                @gco:nilReason = 'missing' or
                @gco:nilReason = 'template' or
                @gco:nilReason = 'unknown' or
                @gco:nilReason = 'withheld' or
                starts-with(@gco:nilReason, 'other:'))">
      The <sch:name/> element shall have a value or a valid Nil Reason.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

8.3   Thesaurus title is not nillable

8.3.1   Error message

71   The gmd:title element is not nillable and shall have a value.

8.3.2   Context

72   MD_Metadata.identificationInfo > MD_DataIdentification.descriptiveKeywords >
MD_Keywords.thesaurusName > CI_Citation.title

73   MD_Metadata.identificationInfo > SV_ServiceIdentification.descriptiveKeywords >
MD_Keywords.thesaurusName > CI_Citation.title

8.3.3   Cause

74   The element named gmd:title has been assigned a gco:nilReason attribute or the value of the element is an
empty string. A declaration of the thesaurus is not mandatory but should be given if it is available. Therefore,
the thesaurus declaration can be omitted altogether if the title is not known.

8.3.4   Example – fail

```
<gmd:thesaurusName>
  <gmd:CI_Citation>
    <gmd:title>
      <gco:CharacterString></gco:CharacterString>
    </gmd:title>
    ...
  </gmd:CI_Citation>
</gmd:thesaurusName>
```

```
<gmd:thesaurusName>
  <gmd:CI_Citation>
    <gmd:title/>
    ...
  </gmd:CI_Citation>
</gmd:thesaurusName>
```

8.3.5   Example – success

```
<gmd:thesaurusName>
  <gmd:CI_Citation>
    <gmd:title>
      <gco:CharacterString>IPVS - Integrated Public Sector Vocabulary version
2</gco:CharacterString>
    </gmd:title>
    ...
  </gmd:CI_Citation>
</gmd:thesaurusName>
```

8.3.6   Schematron rule

```
<sch:pattern is-a="TypeNotNillablePattern" id="Gemini2-mi6-Thesaurus-Title-
NotNillable">
  <sch:param name="context"
value="/*[1]/gmd:identificationInfo[1]/*[1]/gmd:descriptiveKeywords/*[1]/gmd:thesaur
usName/*[1]/gmd:title"/>
</sch:pattern>

<sch:pattern abstract="true" id="TypeNotNillablePattern">
  <sch:rule context="$context">
    <sch:assert test="string-length(.) &gt; 0 and count(./@gco:nilReason) = 0">
      The <sch:name/> element is not nillable and shall have a value.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

8.4   Thesaurus date type code list

8.4.1   Error message

75   The codeListValue attribute does not have a value.

8.4.2   Context

76   MD_Metadata.identificationInfo > MD_DataIdentification.descriptiveKeywords >
MD_Keywords.thesaurusName > CI_Citation.date > CI_Date.dateType

77   MD_Metadata.identificationInfo > SV_ServiceIdentification.descriptiveKeywords >
MD_Keywords.thesaurusName > CI_Citation.date > CI_Date.dateType

8.4.3   Cause

78   This assertion fails if the attribute codeListValue of the element gmd:CI_DateTypeCode does not have a value.

8.4.4   Example – fail

```
<gmd:thesaurusName>
  <gmd:CI_Citation>
    ...
    <gmd:date>
      <gmd:CI_Date>
        ...
        <gmd:dateType>
```

```
            <gmd:CI_DateTypeCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#CI_DateTypeCode"
codeListValue="">revision</gmd:CI_DateTypeCode>
         </gmd:dateType>
       </gmd:CI_Date>
     </gmd:date>
   </gmd:CI_Citation>
</gmd:thesaurusName>
```

8.4.5   Example – success

```
<gmd:thesaurusName>
  <gmd:CI_Citation>
     ...
     <gmd:date>
       <gmd:CI_Date>
          ...
         <gmd:dateType>
            <gmd:CI_DateTypeCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#CI_DateTypeCode"
codeListValue="revision">revision</gmd:CI_DateTypeCode>
         </gmd:dateType>
       </gmd:CI_Date>
     </gmd:date>
   </gmd:CI_Citation>
</gmd:thesaurusName>
```

8.4.6   Schematron rule

```
<sch:pattern is-a="IsoCodeListPattern" id="Gemini2-mi6-Thesaurus-DateType-CodeList">
  <sch:param name="context"
value="/*[1]/gmd:identificationInfo[1]/*[1]/gmd:descriptiveKeywords/*[1]/gmd:thesaur
usName/*[1]/gmd:date/*[1]/gmd:dateType/*[1]"/>
</sch:pattern>

<sch:pattern abstract="true" id="IsoCodeListPattern">
  <sch:rule context="$context">
    <sch:assert test="string-length(@codeListValue) &gt; 0">
      The codeListValue attribute does not have a value.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

9 TEMPORAL EXTENT

9.1 Error message

79 Temporal extent shall be implemented using gml:TimePeriod or gml:TimeInstant.

9.2 Context

80 MD_Metadata.identificationInfo > MD_DataIdentification.extent > EX_Extent.temporalElement > EX_TemporalExtent.extent

81 MD_Metadata.identificationInfo > SV_ServiceIdentification.extent > EX_Extent.temporalElement > EX_TemporalExtent.extent

9.3 Cause

82 Temporal types are encoded using GML. The GML schema provides a wide range of temporal data types which can be used within metadata to express the temporal extent. The Schematron rule limits the choice of data types that can be used to TimePeriod and TimeInstant.

9.4 Example – fail

```
<gmd:extent>
  <gmd:EX_Extent>
    ...
    <gmd:temporalElement>
      <gmd:EX_TemporalExtent>
        <gmd:extent>
          <gml:TimeNode gml:id="_id1">
              ...
          </gml:TimeNode>
        </gmd:extent>
      </gmd:EX_TemporalExtent>
    </gmd:temporalElement>
    ...
  </gmd:EX_Extent>
</gmd:extent>
```

9.5 Example – success

```
<gmd:extent>
  <gmd:EX_Extent>
    ...
    <gmd:temporalElement>
      <gmd:EX_TemporalExtent>
        <gmd:extent>
          <gml:TimePeriod gml:id="_884CEEC4-7DF9-4BCB-9A19-4F60C070DE6B">
            <gml:beginPosition>2012-01-10</gml:beginPosition>
            <gml:endPosition>2012-01-05</gml:endPosition>
          </gml:TimePeriod>
        </gmd:extent>
      </gmd:EX_TemporalExtent>
    </gmd:temporalElement>
    ...
  </gmd:EX_Extent>
</gmd:extent>
```

9.6   Schematron rule

```
<sch:pattern fpi="Gemini2-mi7">
  <sch:title>Temporal extent</sch:title>
  <sch:rule
context="/*[1]/gmd:identificationInfo[1]/*[1]/gmd:extent/*[1]/gmd:temporalElement/gm
d:EX_TemporalExtent/gmd:extent |
/*[1]/gmd:identificationInfo[1]/*[1]/gmd:extent/*[1]/gmd:temporalElement/*[@gco:isoT
ype='gmd:EX_TemporalExtent'][1]/gmd:extent |
/*[1]/gmd:identificationInfo[1]/*[1]/srv:extent/*[1]/gmd:temporalElement/gmd:EX_Temp
oralExtent/gmd:extent |
/*[1]/gmd:identificationInfo[1]/*[1]/srv:extent/*[1]/gmd:temporalElement/*[@gco:isoT
ype='gmd:EX_TemporalExtent'][1]/gmd:extent">
    <sch:assert test="count(gml:TimePeriod) = 1 or count(gml:TimeInstant) = 1">
      Temporal extent shall be implemented using gml:TimePeriod or gml:TimeInstant.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

10 DATASET REFERENCE DATE

10.1 Error message

83 The codeListValue attribute does not have a value.

10.2 Context

84 MD_Metadata.identificationInfo > MD_DataIdentification.citation > CI_Citation.date > CI_Date.dateType

85 MD_Metadata.identificationInfo > SV_ServiceIdentification.citation > CI_Citation.date > CI_Date.dateType

10.3 Cause

86 This assertion fails if the attribute codeListValue of the element gmd:CI_DateTypeCode does not have a value.

10.4 Example – fail

```
<gmd:citation>
  <gmd:CI_Citation>
    ...
    <gmd:date>
      <gmd:CI_Date>
        ...
        <gmd:dateType>
          <gmd:CI_DateTypeCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#CI_DateTypeCode"
codeListValue="">revision</gmd:CI_DateTypeCode>
        </gmd:dateType>
      </gmd:CI_Date>
    </gmd:date>
  </gmd:CI_Citation>
</gmd:citation>
```

10.5 Example – success

```
<gmd:citation>
  <gmd:CI_Citation>
    ...
    <gmd:date>
      <gmd:CI_Date>
        ...
        <gmd:dateType>
          <gmd:CI_DateTypeCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#CI_DateTypeCode"
codeListValue="revision">revision</gmd:CI_DateTypeCode>
        </gmd:dateType>
      </gmd:CI_Date>
    </gmd:date>
  </gmd:CI_Citation>
</gmd:citation>
```

10.6 Schematron rule

```
<sch:pattern is-a="IsoCodeListPattern" id="Gemini2-mi8-ReferenceDate-DateType-
CodeList">
  <sch:param name="context"
value="/*[1]/gmd:identificationInfo[1]/*[1]/gmd:citation/*[1]/gmd:date/*[1]/gmd:date
Type/*[1]"/>
</sch:pattern>

<sch:pattern abstract="true" id="IsoCodeListPattern">
  <sch:rule context="$context">
    <sch:assert test="string-length(@codeListValue) &gt; 0">
      The codeListValue attribute does not have a value.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

11   LINEAGE

11.1   Mandatory for dataset and series

11.1.1   Error message

87   Lineage is mandatory for datasets and series. One shall be provided.

11.1.2   Context

88   MD_Metadata.dataQualityInfo > DQ_DataQuality.lineage > LI_Lineage.statement

11.1.3   Cause

89   The lineage statement must be provided for metadata describing a dataset or a series. This assertion fails if it is not provided.

11.1.4   Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:hierarchyLevel>
    <gmd:MD_ScopeCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#MD_ScopeCode"
codeListValue="dataset">dataset</gmd:MD_ScopeCode>
  </gmd:hierarchyLevel>
  ...
  <gmd:dataQualityInfo>
    <gmd:DQ_DataQuality>
      ...
      <!--Lineage-->
      ...
    </gmd:DQ_DataQuality>
  </gmd:dataQualityInfo>
</gmd:MD_Metadata>
```

11.1.5   Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:hierarchyLevel>
    <gmd:MD_ScopeCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#MD_ScopeCode"
codeListValue="dataset">dataset</gmd:MD_ScopeCode>
  </gmd:hierarchyLevel>
  ...
  <gmd:dataQualityInfo>
    <gmd:DQ_DataQuality>
      ...
      <!--Lineage-->
      <gmd:lineage>
        <gmd:LI_Lineage>
          <gmd:statement>
            <gco:CharacterString>The lineage statement</gco:CharacterString>
          </gmd:statement>
        </gmd:LI_Lineage>
      </gmd:lineage>
    </gmd:DQ_DataQuality>
  </gmd:dataQualityInfo>
</gmd:MD_Metadata>
```

11.1.6   Schematron rule

```
<sch:pattern fpi="Gemini2-mi10">
  <sch:title>Lineage</sch:title>
  <sch:rule context="/*[1]">
    <sch:assert test="((gmd:hierarchyLevel[1]/*[1]/@codeListValue = 'dataset' or
          gmd:hierarchyLevel[1]/*[1]/@codeListValue = 'series') and
          count(gmd:dataQualityInfo[1]/*[1]/gmd:lineage/*[1]/gmd:statement) = 1) or
          (gmd:hierarchyLevel[1]/*[1]/@codeListValue != 'dataset' and
          gmd:hierarchyLevel[1]/*[1]/@codeListValue != 'series') or
          count(gmd:hierarchyLevel) = 0">
      Lineage is mandatory for datasets and series. One shall be provided.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

11.2   Statement is nillable

11.2.1   Error message

90   The gmd:statement element shall have a value or a valid Nil Reason.

11.2.2   Context

91   MD_Metadata.dataQualityInfo > DQ_DataQuality.lineage > LI_Lineage.statement

11.2.3   Cause

92   The element named gmd:statement has either no value or it has a gco:nilReason attribute with an invalid value. The value of the gco:nilReason attribute must be taken from a controlled list.

11.2.4   Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:hierarchyLevel>
    <gmd:MD_ScopeCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#MD_ScopeCode"
codeListValue="dataset">dataset</gmd:MD_ScopeCode>
  </gmd:hierarchyLevel>
  ...
  <gmd:dataQualityInfo>
    <gmd:DQ_DataQuality>
      ...
      <!--Lineage-->
      <gmd:lineage>
        <gmd:LI_Lineage>
          <gmd:statement/>
        </gmd:LI_Lineage>
      </gmd:lineage>
    </gmd:DQ_DataQuality>
  </gmd:dataQualityInfo>
</gmd:MD_Metadata>
```

11.2.5   Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:hierarchyLevel>
    <gmd:MD_ScopeCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#MD_ScopeCode"
codeListValue="dataset">dataset</gmd:MD_ScopeCode>
```

```
    </gmd:hierarchyLevel>
    ...
    <gmd:dataQualityInfo>
      <gmd:DQ_DataQuality>
        ...
        <!--Lineage-->
        <gmd:lineage>
          <gmd:LI_Lineage>
            <gmd:statement gco:nilReason="missing"/>
          </gmd:LI_Lineage>
        </gmd:lineage>
      </gmd:DQ_DataQuality>
    </gmd:dataQualityInfo>
</gmd:MD_Metadata>
```

11.2.6   Schematron rule

```
<sch:pattern is-a="TypeNillablePattern" id="Gemini2-mi10-Statement-Nillable">
  <sch:param name="context"
value="/*[1]/gmd:dataQualityInfo[1]/*[1]/gmd:lineage/*[1]/gmd:statement"/>
</sch:pattern>

<sch:pattern abstract="true" id="TypeNillablePattern">
  <sch:rule context="$context">
    <sch:assert test="(string-length(.) &gt; 0) or
                  (@gco:nilReason = 'inapplicable' or
                  @gco:nilReason = 'missing' or
                  @gco:nilReason = 'template' or
                  @gco:nilReason = 'unknown' or
                  @gco:nilReason = 'withheld' or
                  starts-with(@gco:nilReason, 'other:'))">
      The <sch:name/> element shall have a value or a valid Nil Reason.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

12 GEOGRAPHIC BOUNDING BOX

12.1 Geographic bounding box is mandatory

12.1.1 Error message

93 Geographic bounding box is mandatory for datasets and series. One or more shall be provided.

12.1.2 Context

94 MD_Metadata.identificationInfo > MD_DataIdentification.extent > EX_Extent.geographicElement > EX_GeographicBoundingBox

95 MD_Metadata.identificationInfo > SV_ServiceIdentification.extent > EX_Extent.geographicElement > EX_GeographicBoundingBox

12.1.3 Cause

96 This assertion fails if no bounding box is provided.

12.1.4 Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:hierarchyLevel>
    <gmd:MD_ScopeCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#MD_ScopeCode"
codeListValue="dataset">dataset</gmd:MD_ScopeCode>
  </gmd:hierarchyLevel>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:extent>
        <gmd:EX_Extent>
          ...
        </gmd:EX_Extent>
      </gmd:extent>
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

12.1.5 Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:hierarchyLevel>
    <gmd:MD_ScopeCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#MD_ScopeCode"
codeListValue="dataset">dataset</gmd:MD_ScopeCode>
  </gmd:hierarchyLevel>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:extent>
        <gmd:EX_Extent>
          ...
          <gmd:geographicElement>
            <gmd:EX_GeographicBoundingBox>
```

```
            <gmd:westBoundLongitude>
              <gco:Decimal>-9.226253</gco:Decimal>
            </gmd:westBoundLongitude>
            <gmd:eastBoundLongitude>
              <gco:Decimal>-0.707798</gco:Decimal>
            </gmd:eastBoundLongitude>
            <gmd:southBoundLatitude>
              <gco:Decimal>54.513061</gco:Decimal>
            </gmd:southBoundLatitude>
            <gmd:northBoundLatitude>
              <gco:Decimal>60.866752</gco:Decimal>
            </gmd:northBoundLatitude>
          </gmd:EX_GeographicBoundingBox>
        </gmd:geographicElement>
          ...
      </gmd:EX_Extent>
    </gmd:extent>
  </gmd:MD_DataIdentification>
</gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

12.1.6   Schematron rule

```
<sch:pattern fpi="Gemini2-mi11">
  <sch:title>West and east longitude, north and south latitude</sch:title>
  <sch:rule context="/*[1]/gmd:identificationInfo[1]/*[1]">
    <sch:assert test="((../../gmd:hierarchyLevel[1]/*[1]/@codeListValue =
'dataset' or ../../gmd:hierarchyLevel[1]/*[1]/@codeListValue = 'series') and
 (count(gmd:extent/*[1]/gmd:geographicElement/gmd:EX_GeographicBoundingBox) &gt;= 1)
or
count(gmd:extent/*[1]/gmd:geographicElement/*[@gco:isoType='gmd:EX_GeographicBoundin
gBox'][1]) &gt;= 1) or
 (../../gmd:hierarchyLevel[1]/*[1]/@codeListValue != 'dataset' and
../../gmd:hierarchyLevel[1]/*[1]/@codeListValue != 'series') or
count(../../gmd:hierarchyLevel) = 0">
      Geographic bounding box is mandatory for datasets and series. One or more
shall be provided.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

12.2   Coordinate values

12.2.1   Error message

97 West bounding longitude has a value of <X> which is outside bounds.

98 East bounding longitude as a value of <X> which is outside bounds.

99 South bounding latitude has a value of <Y> which is outside bounds.

100 North bounding latitude has a value of <Y> which is outside bounds.

12.2.2   Context

101 MD_Metadata.identificationInfo > MD_DataIdentification.extent > EX_Extent.geographicElement >
    EX_GeographicBoundingBox

102 MD_Metadata.identificationInfo > SV_ServiceIdentification.extent > EX_Extent.geographicElement >
    EX_GeographicBoundingBox

12.2.3 Cause

103 The bounding box coordinates are referenced to a WGS 84 coordinate reference system, with coordinate units of degrees and the Greenwich prime meridian. This means that, in general, longitude values must be between -180 and +180 and latitude values must be between -90 and +90.

104 Specifically, the following tests are applied:

105 -180 <= east bounding longitude <= +180

106 -180 <= west bounding longitude <= +180

107 -90 <= south bounding latitude <= north bounding latitude

108 South bounding latitude <= north bounding latitude <= +90

109 The east and west bounding longitude values are not compared against each other because the west value can be greater than the east value where bounding boxes cross the +/-180 degree meridian.

12.2.4 Example – fail

```
...
<gmd:geographicElement>
  <gmd:EX_GeographicBoundingBox>
    <gmd:westBoundLongitude>
      <gco:Decimal>-190.0</gco:Decimal>
    </gmd:westBoundLongitude>
    <gmd:eastBoundLongitude>
      <gco:Decimal>190.0</gco:Decimal>
    </gmd:eastBoundLongitude>
    <gmd:southBoundLatitude>
      <gco:Decimal>-100.0</gco:Decimal>
    </gmd:southBoundLatitude>
    <gmd:northBoundLatitude>
      <gco:Decimal>100.0</gco:Decimal>
    </gmd:northBoundLatitude>
  </gmd:EX_GeographicBoundingBox>
</gmd:geographicElement>
...
```

12.2.5 Example – success

```
...
<gmd:geographicElement>
  <gmd:EX_GeographicBoundingBox>
    <gmd:westBoundLongitude>
      <gco:Decimal>-9.226253</gco:Decimal>
    </gmd:westBoundLongitude>
    <gmd:eastBoundLongitude>
      <gco:Decimal>-0.707798</gco:Decimal>
    </gmd:eastBoundLongitude>
    <gmd:southBoundLatitude>
      <gco:Decimal>54.513061</gco:Decimal>
    </gmd:southBoundLatitude>
    <gmd:northBoundLatitude>
      <gco:Decimal>60.866752</gco:Decimal>
    </gmd:northBoundLatitude>
  </gmd:EX_GeographicBoundingBox>
</gmd:geographicElement>
...
```

12.2.6   Schematron rule

```
<sch:pattern is-a="GeographicBoundingBoxPattern" id="Gemini2-mi11-BoundingBox">
  <sch:param name="context"
value="/*[1]/gmd:identificationInfo[1]/*[1]/gmd:extent/*[1]/gmd:geographicElement/gm
d:EX_GeographicBoundingBox |
/*[1]/gmd:identificationInfo[1]/*[1]/gmd:extent/*[1]/gmd:geographicElement/*[@gco:is
oType='gmd:EX_GeographicBoundingBox'] [1]|
/*[1]/gmd:identificationInfo[1]/*[1]/srv:extent/*[1]/gmd:geographicElement/gmd:EX_Ge
ographicBoundingBox |
/*[1]/gmd:identificationInfo[1]/*[1]/srv:extent/*[1]/gmd:geographicElement/*[@gco:is
oType='gmd:EX_GeographicBoundingBox'][1]"/>
</sch:pattern>

<sch:pattern abstract="true" id="GeographicBoundingBoxPattern">
  <sch:rule context="$context">
    <!-- West Bound Longitude -->
    <sch:assert test="string-length(gmd:westBoundLongitude) = 0 or
(gmd:westBoundLongitude &gt;= -180.0 and gmd:westBoundLongitude &lt;= 180.0)">
      West bound longitude has a value of <sch:value-of
select="gmd:westBoundLongitude"/> which is outside bounds.
    </sch:assert>
    <!-- East Bound Longitude -->
    <sch:assert test="string-length(gmd:eastBoundLongitude) = 0 or
gmd:eastBoundLongitude &gt;= -180.0 and gmd:eastBoundLongitude &lt;= 180.0)">
      East bound longitude has a value of <sch:value-of
select="gmd:eastBoundLongitude"/> which is outside bounds.
    </sch:assert>
    <!-- South Bound Latitude -->
    <sch:assert test="string-length(gmd:southBoundLatitude) = 0 or
(gmd:southBoundLatitude &gt;= -90.0 and gmd:southBoundLatitude &lt;=
gmd:northBoundLatitude)">
      South bound latitude has a value of <sch:value-of
select="gmd:southBoundLatitude"/> which is outside bounds.
    </sch:assert>
    <!-- North Bound Latitude -->
    <sch:assert test="string-length(gmd:northBoundLatitude) = 0 or
(gmd:northBoundLatitude &lt;= 90.0 and gmd:northBoundLatitude &gt;=
gmd:southBoundLatitude)">
      North bound latitude has a value of <sch:value-of
select="gmd:northBoundLatitude"/> which is outside bounds.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

12.3   West bound longitude not nillable

12.3.1   Error message

110   The gmd:westBoundLongitude element is not nillable and shall have a value.

12.3.2   Context

111   MD_Metadata.identificationInfo > MD_DataIdentification.extent > EX_Extent.geographicElement >
EX_GeographicBoundingBox.westBoundLongitude

112   MD_Metadata.identificationInfo > SV_ServiceIdentification.extent > EX_Extent.geographicElement >
EX_GeographicBoundingBox.westBoundLongitude

12.3.3   Cause

113   The element named gmd:westBoundLongitude has been assigned a gco:nilReason attribute or the value of the
element is an empty string.

12.3.4 Example – fail

```
<gmd:westBoundLongitude/>
```

```
<gmd:westBoundLongitude gco:nilReason="missing"/>
```

12.3.5 Example – success

```
<gmd:westBoundLongitude>
  <gco:Decimal>-9.226253</gco:Decimal>
</gmd:westBoundLongitude>
```

12.3.6 Schematron rule

```
<sch:pattern is-a="TypeNotNillablePattern" id="Gemini2-mi11-West-NotNillable">
  <sch:param name="context"
value="/*[1]/gmd:identificationInfo[1]/*[1]/gmd:extent/*[1]/gmd:geographicElement/*[
1]/gmd:westBoundLongitude |
/*[1]/gmd:identificationInfo[1]/*[1]/srv:extent/*[1]/gmd:geographicElement/*[1]/gmd:
westBoundLongitude"/>
</sch:pattern>

<sch:pattern abstract="true" id="TypeNotNillablePattern">
  <sch:rule context="$context">
    <sch:assert test="string-length(.) &gt; 0 and count(./@gco:nilReason) = 0">
      The <sch:name/> element is not nillable and shall have a value.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

12.4 East bound longitude not nillable

12.4.1 Error message

114 The gmd:eastBoundLongitude element is not nillable and shall have a value.

12.4.2 Context

115 MD_Metadata.identificationInfo > MD_DataIdentification.extent > EX_Extent.geographicElement > EX_GeographicBoundingBox.eastBoundLongitude

116 MD_Metadata.identificationInfo > SV_ServiceIdentification.extent > EX_Extent.geographicElement > EX_GeographicBoundingBox.eastBoundLongitude

12.4.3 Cause

117 The element named gmd:eastBoundLongitude has been assigned a gco:nilReason attribute or the value of the element is an empty string.

12.4.4 Example – fail

```
<gmd:eastBoundLongitude/>
```

```
<gmd:eastBoundLongitude gco:nilReason="missing"/>
```

12.4.5   Example – success

```
<gmd:eastBoundLongitude>
  <gco:Decimal>-0.707798</gco:Decimal>
</gmd:eastBoundLongitude>
```

12.4.6   Schematron rule

```
<sch:pattern is-a="TypeNotNillablePattern" id="Gemini2-mi11-East-NotNillable">
  <sch:param name="context"
value="/*[1]/gmd:identificationInfo[1]/*[1]/gmd:extent/*[1]/gmd:geographicElement/*[
1]/gmd:eastBoundLongitude |
/*[1]/gmd:identificationInfo[1]/*[1]/srv:extent/*[1]/gmd:geographicElement/*[1]/gmd:
eastBoundLongitude"/>
</sch:pattern>

<sch:pattern abstract="true" id="TypeNotNillablePattern">
  <sch:rule context="$context">
    <sch:assert test="string-length(.) &gt; 0 and count(./@gco:nilReason) = 0">
      The <sch:name/> element is not nillable and shall have a value.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

12.5   South bound latitude not nillable

12.5.1   Error message

118 The gmd:southBoundLatitude element is not nillable and shall have a value.

12.5.2   Context

119 MD_Metadata.identificationInfo > MD_DataIdentification.extent > EX_Extent.geographicElement > EX_GeographicBoundingBox.southBoundLatitude

120 MD_Metadata.identificationInfo > SV_ServiceIdentification.extent > EX_Extent.geographicElement > EX_GeographicBoundingBox.southBoundLatitude

12.5.3   Cause

121 The element named gmd:southBoundLatitude has been assigned a gco:nilReason attribute or the value of the element is an empty string.

12.5.4   Example – fail

```
<gmd:southBoundLatitude/>
```

```
<gmd:southBoundLatitude gco:nilReason="missing"/>
```

12.5.5   Example – success

```
<gmd:southBoundLatitude>
  <gco:Decimal>54.513061</gco:Decimal>
</gmd:southBoundLatitude>
```

12.5.6   Schematron rule

```
<sch:pattern is-a="TypeNotNillablePattern" id="Gemini2-mi11-South-NotNillable">
  <sch:param name="context"
value="/*[1]/gmd:identificationInfo[1]/*[1]/gmd:extent/*[1]/gmd:geographicElement/*[
```

```
1]/gmd:southBoundLatitude |
/*[1]/gmd:identificationInfo[1]/*[1]/srv:extent/*[1]/gmd:geographicElement/*[1]/gmd:
southBoundLatitude"/>
</sch:pattern>

<sch:pattern abstract="true" id="TypeNotNillablePattern">
  <sch:rule context="$context">
    <sch:assert test="string-length(.) &gt; 0 and count(./@gco:nilReason) = 0">
      The <sch:name/> element is not nillable and shall have a value.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

12.6 North bound latitude not nillable

12.6.1 Error message

122 The gmd:northBoundLatitude element is not nillable and shall have a value.

12.6.2 Context

123 MD_Metadata.identificationInfo > MD_DataIdentification.extent > EX_Extent.geographicElement > EX_GeographicBoundingBox.northBoundLatitude

124 MD_Metadata.identificationInfo > SV_ServiceIdentification.extent > EX_Extent.geographicElement > EX_GeographicBoundingBox.northBoundLatitude

12.6.3 Cause

125 The element named gmd:northBoundLatitude has been assigned a gco:nilReason attribute or the value of the element is an empty string.

12.6.4 Example – fail

```
<gmd:northBoundLatitude/>

<gmd:northBoundLatitude gco:nilReason="missing"/>
```

12.6.5 Example – success

```
<gmd:northBoundLatitude>
  <gco:Decimal>54.513061</gco:Decimal>
</gmd:northBoundLatitude>
```

12.6.6 Schematron rule

```
<sch:pattern is-a="TypeNotNillablePattern" id="Gemini2-mill-North-NotNillable">
  <sch:param name="context"
value="/*[1]/gmd:identificationInfo[1]/*[1]/gmd:extent/*[1]/gmd:geographicElement/*[
1]/gmd:northBoundLatitude |
/*[1]/gmd:identificationInfo[1]/*[1]/srv:extent/*[1]/gmd:geographicElement/*[1]/gmd:
northBoundLatitude"/>
</sch:pattern>

<sch:pattern abstract="true" id="TypeNotNillablePattern">
  <sch:rule context="$context">
    <sch:assert test="string-length(.) &gt; 0 and count(./@gco:nilReason) = 0">
      The <sch:name/> element is not nillable and shall have a value.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

13   EXTENT

13.1   Error message

126 The gmd:code element shall have a value or a valid Nil Reason.

13.2   Context

127 MD_Metadata.identificationInfo > MD_DataIdentification.extent > EX_Extent.geographicElement > EX_GeographicDescription.geographicIdentifier > MD_Identifier.code

128 MD_Metadata.identificationInfo > SV_ServiceIdentification.extent > EX_Extent.geographicElement > EX_GeographicDescription.geographicIdentifier > MD_Identifier.code

13.3   Cause

129 The element named gmd:code, in the context of EX_GeographicDescription, has no value or has a gco:nilReason attribute with an invalid value.

13.4   Example – fail

```xml
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:extent>
        <gmd:EX_Extent>
          <gmd:geographicElement>
            <gmd:EX_GeographicDescription>
              <gmd:geographicIdentifier>
                <gmd:MD_Identifier>
                  <gmd:code>
                    <gco:CharacterString></gco:CharacterString>
                  </gmd:code>
                </gmd:MD_Identifier>
              </gmd:geographicIdentifier>
            </gmd:EX_GeographicDescription>
          </gmd:geographicElement>
          ...
        </gmd:EX_Extent>
      </gmd:extent>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>


<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:extent>
        <gmd:EX_Extent>
          <gmd:geographicElement>
            <gmd:EX_GeographicDescription>
              <gmd:geographicIdentifier>
                <gmd:MD_Identifier>
                  <gmd:code gco:nilReason="invalidvalue"/>
```

```
          </gmd:MD_Identifier>
        </gmd:geographicIdentifier>
      </gmd:EX_GeographicDescription>
    </gmd:geographicElement>
    ...
  </gmd:EX_Extent>
</gmd:extent>
    ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

13.5   Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:extent>
        <gmd:EX_Extent>
          <gmd:geographicElement>
            <gmd:EX_GeographicDescription>
              <gmd:geographicIdentifier>
                <gmd:MD_Identifier>
                  <gmd:code>
                    <gco:CharacterString>
http://data.ordnancesurvey.co.uk/doc/7000000000041546</gco:CharacterString>
                  </gmd:code>
                </gmd:MD_Identifier>
              </gmd:geographicIdentifier>
            </gmd:EX_GeographicDescription>
          </gmd:geographicElement>
          ...
        </gmd:EX_Extent>
      </gmd:extent>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>


<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:extent>
        <gmd:EX_Extent>
          <gmd:geographicElement>
            <gmd:EX_GeographicDescription>
              <gmd:geographicIdentifier>
                <gmd:MD_Identifier>
                  <gmd:code gco:nilReason="inapplicable"/>
                </gmd:MD_Identifier>
              </gmd:geographicIdentifier>
            </gmd:EX_GeographicDescription>
          </gmd:geographicElement>
          ...
```

```
        </gmd:EX_Extent>
      </gmd:extent>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

13.6 Schematron rule

```
<sch:pattern fpi="Gemini2-mi15">
  <sch:title>Extent</sch:title>
</sch:pattern>

<sch:pattern is-a="TypeNillablePattern" id="Gemini2-mi15-Nillable">
  <sch:param name="context"
value="/*[1]/gmd:identificationInfo[1]/*[1]/gmd:extent/*[1]/gmd:geographicElement/gm
d:EX_GeographicDescription/gmd:geographicIdentifier/*[1]/gmd:code |

/*[1]/gmd:identificationInfo[1]/*[1]/gmd:extent/*[1]/gmd:geographicElement/*[@gco:is
oType='gmd:EX_GeographicDescription'][1]/gmd:geographicIdentifier/*[1]/gmd:code |

/*[1]/gmd:identificationInfo[1]/*[1]/srv:extent/*[1]/gmd:geographicElement/gmd:EX_Ge
ographicDescription/gmd:geographicIdentifier/*[1]/gmd:code |

/*[1]/gmd:identificationInfo[1]/*[1]/srv:extent/*[1]/gmd:geographicElement/*[@gco:is
oType='gmd:EX_GeographicDescription'][1]/gmd:geographicIdentifier/*[1]/gmd:code"/>
</sch:pattern>

<sch:pattern abstract="true" id="TypeNillablePattern">
  <sch:rule context="$context">
    <sch:assert test="(string-length(.) &gt; 0) or
                  (@gco:nilReason = 'inapplicable' or
                  @gco:nilReason = 'missing' or
                  @gco:nilReason = 'template' or
                  @gco:nilReason = 'unknown' or
                  @gco:nilReason = 'withheld' or
                  starts-with(@gco:nilReason, 'other:'))">
      The <sch:name/> element shall have a value or a valid Nil Reason.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

14 VERTICAL EXTENT INFORMATION

14.1 Error message

130 The gmd:minimumValue element shall have a value or a valid Nil Reason.

131 The gmd:maximumValue element shall have a value or a valid Nil Reason.

14.2 Context

132 MD_Metadata.identificationInfo > MD_DataIdentification.extent > EX_Extent.verticalElement > EX_VerticalExtent.minimumValue

133 MD_Metadata.identificationInfo > MD_DataIdentification.extent > EX_Extent.verticalElement > EX_VerticalExtent.maximumValue

14.3 Cause

134 The element named gmd:minimumValue has either no value or it has a gco:nilReason attribute with an invalid value, and / or, the element named gmd:maximumValue has either no value of it has a gco:nilReason attribute with an invalid value. The value of the gco:nilReason attribute must be taken from a controlled list.

14.4 Example – fail

```
<MD_Metadata>
  ...
  <identificationInfo>
    <MD_DataIdentification>
      ...
      <extent>
        <EX_Extent>
          ...
          <verticalElement>
            <EX_VerticalExtent>
              <minimumValue>
                <gco:Real></gco:Real>
              </minimumValue>
              <maximumValue/>
              <verticalCRS xlink:href="urn:ogc:def:crs:ESPG::5101" />
            </EX_VerticalExtent>
          </verticalElement>
        </EX_Extent>
      </extent>
    </MD_DataIdentification>
  </identificationInfo>
  ...
</MD_Metadata>
```

14.5   Example – success

```
<MD_Metadata>
  ...
  <identificationInfo>
    <MD_DataIdentification>
      ...
      <extent>
        <EX_Extent>
          ...
          <verticalElement>
            <EX_VerticalExtent>
              <minimumValue>
                <gco:Real>10</gco:Real>
              </minimumValue gco:nilReason="unknown" />
              <maximumValue>
              <verticalCRS xlink:href="urn:ogc:def:crs:ESPG::5101" />
            </EX_VerticalExtent>
          </verticalElement>
        </EX_Extent>
      </extent>
    </MD_DataIdentification>
  </identificationInfo>
  ...
</MD_Metadata>
```

14.6   Schematron rule

```
<sch:pattern is-a="TypeNillablePattern" id="Gemini2-mi16-Nillable">
  <sch:param name="context"
value="/*[1]/gmd:identificationInfo[1]/*[1]/gmd:extent/*[1]/gmd:verticalElement/*[1]
/gmd:minimumValue |
/*[1]/gmd:identificationInfo[1]/*[1]/gmd:extent/*[1]/gmd:verticalElement/*[1]/gmd:ma
ximumValue"/>
</sch:pattern>

<sch:pattern abstract="true" id="TypeNillablePattern">
  <sch:rule context="$context">
    <sch:assert test="(string-length(.) &gt; 0) or
                (@gco:nilReason = 'inapplicable' or
                @gco:nilReason = 'missing' or
                @gco:nilReason = 'template' or
                @gco:nilReason = 'unknown' or
                @gco:nilReason = 'withheld' or
                starts-with(@gco:nilReason, 'other:'))">
      The <sch:name/> element shall have a value or a valid Nil Reason.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

15 SPATIAL REFERENCE SYSTEM

15.1 Error message

135 The gmd:code element shall have a value or a valid Nil Reason.

15.2 Context

136 MD_Metadata.referenceSystemInfo > MD_ReferenceSystem.referenceSystemIdentifier > RS_Identifier.code

15.3 Cause

137 The element named gmd:code has either no value or it has a gco:nilReason attribute with an invalid value. The value of the gco:nilReason attribute must be taken from a controlled list.

15.4 Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:referenceSystemInfo>
    <gmd:MD_ReferenceSystem>
      <gmd:referenceSystemIdentifier>
        <gmd:RS_Identifier>
          <gmd:code/>
        </gmd:RS_Identifier>
      </gmd:referenceSystemIdentifier>
    </gmd:MD_ReferenceSystem>
  </gmd:referenceSystemInfo>
  ...
</gmd:MD_Metadata>
```

15.5 Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:referenceSystemInfo>
    <gmd:MD_ReferenceSystem>
      <gmd:referenceSystemIdentifier>
        <gmd:RS_Identifier>
          <gmd:code>
            <gco:CharacterString>urn:ogc:def:crs:EPSG::27700</gco:CharacterString>
          </gmd:code>
        </gmd:RS_Identifier>
      </gmd:referenceSystemIdentifier>
    </gmd:MD_ReferenceSystem>
  </gmd:referenceSystemInfo>
  ...
</gmd:MD_Metadata>


<gmd:MD_Metadata>
  ...
  <gmd:referenceSystemInfo>
    <gmd:MD_ReferenceSystem>
      <gmd:referenceSystemIdentifier>
        <gmd:RS_Identifier>
          <gmd:code gco:nilReason="unknown"/>
        </gmd:RS_Identifier>
      </gmd:referenceSystemIdentifier>
    </gmd:MD_ReferenceSystem>
```

```
    </gmd:referenceSystemInfo>
    ...
</gmd:MD_Metadata>
```

15.6 Schematron rule

```
<sch:pattern is-a="TypeNillablePattern" id="Gemini2-mi17-Nillable">
  <sch:param name="context"
value="/*[1]/gmd:referenceSystemInfo/*[1]/gmd:referenceSystemIdentifier/*[1]/gmd:cod
e"/>
</sch:pattern>

<sch:pattern abstract="true" id="TypeNillablePattern">
  <sch:rule context="$context">
    <sch:assert test="(string-length(.) &gt; 0) or
                (@gco:nilReason = 'inapplicable' or
                @gco:nilReason = 'missing' or
                @gco:nilReason = 'template' or
                @gco:nilReason = 'unknown' or
                @gco:nilReason = 'withheld' or
                starts-with(@gco:nilReason, 'other:'))">
      The <sch:name/> element shall have a value or a valid Nil Reason.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

16 SPATIAL RESOLUTION

16.1 Error message

138 The gmd:distance element shall have a value or a valid Nil Reason.

16.2 Context

139 MD_Metadata.identificationInfo > MD_DataIdentification.spatialResolution > MD_Resolution.distance

16.3 Cause

140 The element named gmd:distance has either no value or it has a gco:nilReason attribute with an invalid value. The value of the gco:nilReason attribute must be taken from a controlled list.

16.4 Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:spatialResolution>
        <gmd:MD_Resolution>
          <gmd:distance/>
      </gmd:spatialResolution>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

16.5 Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:spatialResolution>
        <gmd:MD_Resolution>
          <gmd:distance>
            <gco:Distance uom="urn:ogc:def:uom:EPSG::9001">29.2</gco:Distance>
          </gmd:distance>
        </gmd:MD_Resolution>
      </gmd:spatialResolution>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>


<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:spatialResolution>
```

```
        <gmd:MD_Resolution>
          <gmd:distance gco:nilReason="missing"/>
        </gmd:MD_Resolution>
      </gmd:spatialResolution>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

16.6   Schematron rule

```
<sch:pattern is-a="TypeNillablePattern" id="Gemini2-mi18-Nillable">
  <sch:param name="context"
value="/*[1]/gmd:identificationInfo[1]/*[1]/gmd:spatialResolution/*[1]/gmd:distance"
/>
</sch:pattern>

<sch:pattern abstract="true" id="TypeNillablePattern">
  <sch:rule context="$context">
    <sch:assert test="(string-length(.) &gt; 0) or
                (@gco:nilReason = 'inapplicable' or
                @gco:nilReason = 'missing' or
                @gco:nilReason = 'template' or
                @gco:nilReason = 'unknown' or
                @gco:nilReason = 'withheld' or
                starts-with(@gco:nilReason, 'other:'))">
      The <sch:name/> element shall have a value or a valid Nil Reason.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

17 RESOURCE LOCATOR

17.1 Valid URI

17.1.1 Error message

141 The value of resource locator does not appear to be a valid URL. It has a value of '[VALUE]'. The URL must start with either http://, https:// or ftp://.

17.1.2 Context

142 MD_Metadata.distributionInfo > MD_Distribution.transferOptions > MD_DigitalTransferOptions.onLine > CI_OnlineResource.linkage

17.1.3 Cause

143 The value of the gmd:linkage element must be a valid URL. The assertion test looks for the strings 'http://', 'https://' or 'ftp://' at the start of the element value string.

17.1.4 Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:distributionInfo>
    <gmd:MD_Distribution>
      ...
      <gmd:transferOptions>
        <gmd:MD_DigitalTransferOptions>
          <gmd:onLine>
            <gmd:CI_OnlineResource>
              <gmd:linkage>
                <gmd:URL>www.anyuri.com</gmd:URL>
              </gmd:linkage>
            </gmd:CI_OnlineResource>
          </gmd:onLine>
        </gmd:MD_DigitalTransferOptions>
      </gmd:transferOptions>
    </gmd:MD_Distribution>
  </gmd:distributionInfo>
  ...
</gmd:MD_Metadata>
```

17.1.5 Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:distributionInfo>
    <gmd:MD_Distribution>
      ...
      <gmd:transferOptions>
        <gmd:MD_DigitalTransferOptions>
          <gmd:onLine>
            <gmd:CI_OnlineResource>
              <gmd:linkage>
                <gmd:URL>http://www.anyuri.com</gmd:URL>
              </gmd:linkage>
            </gmd:CI_OnlineResource>
          </gmd:onLine>
        </gmd:MD_DigitalTransferOptions>
      </gmd:transferOptions>
    </gmd:MD_Distribution>
  </gmd:distributionInfo>
```

```
    ...
</gmd:MD_Metadata>
```

17.1.6   Schematron rule

```
<sch:pattern fpi="Gemini2-mi19">
  <sch:title>Resource locator</sch:title>
  <sch:rule
context="/*[1]/gmd:distributionInfo/*[1]/gmd:transferOptions/*[1]/gmd:onLine/*[1]">
    <sch:assert test="count(gmd:linkage) = 0 or
                (starts-with(normalize-space(gmd:linkage/*[1]), 'http://')  or
                starts-with(normalize-space(gmd:linkage/*[1]), 'https://') or
                starts-with(normalize-space(gmd:linkage/*[1]), 'ftp://'))">
      The value of resource locator does not appear to be a valid URL. It has a
value of '<sch:value-of select="gmd:linkage/*[1]"/>'. The URL must start with either
http://, https:// or ftp://.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

17.2   Online resource is nillable

17.2.1   Error message

144 The gmd:linkage element shall have a value or a valid Nil Reason.

17.2.2   Context

145 MD_Metadata.distributionInfo > MD_Distribution.transferOptions > MD_DigitalTransferOptions.onLine >
CI_OnlineResource.linkage

17.2.3   Cause

146 The element named gmd:linkage has either no value or it has a gco:nilReason attribute with an invalid value.
The value of the gco:nilReason attribute must be taken from a controlled list.

17.2.4   Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:distributionInfo>
    <gmd:MD_Distribution>
      ...
      <gmd:transferOptions>
        <gmd:MD_DigitalTransferOptions>
          <gmd:onLine>
            <gmd:CI_OnlineResource>
              <gmd:linkage/>
            </gmd:CI_OnlineResource>
          </gmd:onLine>
        </gmd:MD_DigitalTransferOptions>
      </gmd:transferOptions>
    </gmd:MD_Distribution>
  </gmd:distributionInfo>
  ...
</gmd:MD_Metadata>
```

17.2.5   Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:distributionInfo>
    <gmd:MD_Distribution>
```

```
    ...
    <gmd:transferOptions>
      <gmd:MD_DigitalTransferOptions>
        <gmd:onLine>
          <gmd:CI_OnlineResource>
            <gmd:linkage gco:nilReason="missing"/>
          </gmd:CI_OnlineResource>
        </gmd:onLine>
      </gmd:MD_DigitalTransferOptions>
    </gmd:transferOptions>
  </gmd:MD_Distribution>
</gmd:distributionInfo>
  ...
</gmd:MD_Metadata>
```

17.2.6   Schematron rule

```
<sch:pattern is-a="TypeNillablePattern" id="Gemini2-mi19-Nillable">
  <sch:param name="context"
value="/*[1]/gmd:distributionInfo/*[1]/gmd:transferOptions/*[1]/gmd:onLine/*[1]/gmd:
linkage"/>
</sch:pattern>

<sch:pattern abstract="true" id="TypeNillablePattern">
  <sch:rule context="$context">
    <sch:assert test="(string-length(.) &gt; 0) or
                (@gco:nilReason = 'inapplicable' or
                @gco:nilReason = 'missing' or
                @gco:nilReason = 'template' or
                @gco:nilReason = 'unknown' or
                @gco:nilReason = 'withheld' or
                starts-with(@gco:nilReason, 'other:'))">
      The <sch:name/> element shall have a value or a valid Nil Reason.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

18 DATA FORMAT

18.1 Error message

147 The gmd:name element shall have a value or a valid Nil Reason.

148 The gmd:version element shall have a value or a valid Nil Reason.

18.2 Context

149 MD_Metadata.distributionInfo > MD_Distribution.distributionFormat > MD_Format.name

150 MD_Metadata.distributionInfo > MD_Distribution.distributionFormat > MD_Format.version

18.3 Cause

151 The element named gmd:name has either no value or it has a gco:nilReason attribute with an invalid value, and / or, the element named gmd:version has either no value of it has a gco:nilReason attribute with an invalid value. The value of the gco:nilReason attribute must be taken from a controlled list.

18.4 Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:distributionInfo>
    <gmd:MD_Distribution>
      <gmd:distributionFormat>
        <gmd:MD_Format>
          <gmd:name/>
          <gmd:version>
            <gco:CharacterString></gco:CharacterString>
          </gmd:version>
        </gmd:MD_Format>
      </gmd:distributionFormat>
      ...
    </gmd:MD_Distribution>
  </gmd:distributionInfo>
  ...
</gmd:MD_Metadata>
```

18.5 Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:distributionInfo>
    <gmd:MD_Distribution>
      <gmd:distributionFormat>
        <gmd:MD_Format>
          <gmd:name>
            <gco:CharacterString>GML</gco:CharacterString>
          </gmd:name>
          <gmd:version>
            <gco:CharacterString>3.2</gco:CharacterString>
          </gmd:version>
        </gmd:MD_Format>
      </gmd:distributionFormat>
      ...
    </gmd:MD_Distribution>
  </gmd:distributionInfo>
  ...
</gmd:MD_Metadata>
```

18.6   Schematron rule

```
<sch:pattern is-a="TypeNillablePattern" id="Gemini2-mi21-Name-Nillable">
  <sch:param name="context"
value="/*[1]/gmd:distributionInfo/*[1]/gmd:distributionFormat/*[1]/gmd:name"/>
</sch:pattern>

<sch:pattern is-a="TypeNillablePattern" id="Gemini2-mi21-Version-Nillable">
    <sch:param name="context"
value="/*[1]/gmd:distributionInfo/*[1]/gmd:distributionFormat/*[1]/gmd:version"/>
</sch:pattern>

<sch:pattern abstract="true" id="TypeNillablePattern">
  <sch:rule context="$context">
    <sch:assert test="(string-length(.) &gt; 0) or
                 (@gco:nilReason = 'inapplicable' or
                 @gco:nilReason = 'missing' or
                 @gco:nilReason = 'template' or
                 @gco:nilReason = 'unknown' or
                 @gco:nilReason = 'withheld' or
                 starts-with(@gco:nilReason, 'other:'))">
      The <sch:name/> element shall have a value or a valid Nil Reason.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

19 RESPONSIBLE ORGANISATION

19.1 Mandatory

19.1.1 Error message

152 Responsible organisation is mandatory. At least one shall be provided.

19.1.2 Context

153 MD_Metadata.identificationInfo > MD_DataIdentification.pointOfContact

154 MD_Metadata.identificationInfo > SV_ServiceIdentification.pointOfContact

19.1.3 Cause

155 The assertion will fail if no responsible party information is provided. Specifically, there must be at least one pointOfContact element in the context of MD_DataIdentification or SV_ServiceIdentification.

19.1.4 Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

19.1.5 Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
    <gmd:pointOfContact>
      <gmd:CI_ResponsibleParty>
        <gmd:organisationName>
          <gco:CharacterString>SeaZone Solutions Limited</gco:CharacterString>
        </gmd:organisationName>
        <gmd:contactInfo>
          <gmd:CI_Contact>
            <gmd:address>
              <gmd:CI_Address>
                <gmd:electronicMailAddress>
                  <gco:CharacterString>info@seazone.com</gco:CharacterString>
                </gmd:electronicMailAddress>
              </gmd:CI_Address>
            </gmd:address>
          </gmd:CI_Contact>
        </gmd:contactInfo>
        <gmd:role>
          <gmd:CI_RoleCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#CI_RoleCode"
codeListValue="owner">owner</gmd:CI_RoleCode>
        </gmd:role>
      </gmd:CI_ResponsibleParty>
    </gmd:pointOfContact>
      ...
```

```
      </gmd:MD_DataIdentification>
    </gmd:identificationInfo>
    ...
</gmd:MD_Metadata>
```

19.1.6   Schematron rule

```
<sch:pattern fpi="Gemini2-23">
  <sch:title>Responsible organisation</sch:title>
  <sch:rule context="/*[1]/gmd:identificationInfo[1]/*[1]">
    <sch:assert test="count(gmd:pointOfContact) &gt;= 1">
      Responsible organisation is mandatory. At least one shall be provided.
    </sch:assert>
  </sch:rule>
  ...
</sch:pattern>
```

19.2   Responsible organisation not null

19.2.1   Error message

156 The value of responsible organisation shall not be null.

19.2.2   Context

157 MD_Metadata.identificationInfo > MD_DataIdentification.pointOfContact

158 MD_Metadata.identificationInfo > SV_ServiceIdentification.pointOfContact

19.2.3   Cause

159 The assertion fails if the pointOfContact element has a nilReason attribute. The responsible party information must be provided in all cases and a nil reason is not acceptable.

19.2.4   Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:pointOfContact>
        <gmd:CI_ResponsibleParty>
          <gmd:organisationName gco:nilReason="missing"/>
          ...
          <gmd:role>
            <gmd:CI_RoleCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#CI_RoleCode"
codeListValue="owner">owner</gmd:CI_RoleCode>
          </gmd:role>
        </gmd:CI_ResponsibleParty>
      </gmd:pointOfContact>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

19.2.5   Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
```

```
      <gmd:MD_DataIdentification>
        ...
      <gmd:pointOfContact>
        <gmd:CI_ResponsibleParty>
          <gmd:organisationName>
            <gco:CharacterString>SeaZone Solutions Limited</gco:CharacterString>
          </gmd:organisationName>
          ...
          <gmd:role>
            <gmd:CI_RoleCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#CI_RoleCode"
codeListValue="owner">owner</gmd:CI_RoleCode>
          </gmd:role>
        </gmd:CI_ResponsibleParty>
      </gmd:pointOfContact>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

19.2.6   Schematron rule

```
<sch:pattern fpi="Gemini2-23">
  <sch:title>Responsible organisation</sch:title>
  ...
  <sch:rule context="/*[1]/gmd:identificationInfo[1]/*[1]/gmd:pointOfContact">
    <sch:assert test="count(@gco:nilReason) = 0">
      The value of responsible organisation shall not be null.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

19.3   Organisation name

19.3.1   Error message

160 One organisation name shall be provided.

19.3.2   Context

161 MD_Metadata.identificationInfo > MD_DataIdentification.pointOfContact >
CI_ResponsibleParty.organisationName

162 MD_Metadata.identificationInfo > SV_ServiceIdentification.pointOfContact >
CI_ResponsibleParty.organisationName

19.3.3   Cause

163 The organisation name has an obligation of conditional in the base ISO 19115 standard. However, it must be
provided in GEMINI metadata. It must occur once only within the context of a CI_ResponsibleParty element.

19.3.4   Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
    <gmd:pointOfContact>
      <gmd:CI_ResponsibleParty>
        <gmd:individualName>
          <gco:CharacterString>A N Other</gco:CharacterString>
```

```
        </gmd:individualName>
        <gmd:positionName>
          <gco:CharacterString>Metadata Manager</gco:CharacterString>
        </gmd:positionName>
        <gmd:role>
          <gmd:CI_RoleCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#CI_RoleCode"
codeListValue="owner">owner</gmd:CI_RoleCode>
        </gmd:role>
      </gmd:CI_ResponsibleParty>
    </gmd:pointOfContact>
    ...
  </gmd:MD_DataIdentification>
</gmd:identificationInfo>
...
</gmd:MD_Metadata>
```

19.3.5 Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:pointOfContact>
        <gmd:CI_ResponsibleParty>
          <gmd:organisationName>
            <gco:CharacterString>SeaZone Solutions Limited</gco:CharacterString>
          </gmd:organisationName>
          ...
          <gmd:role>
            <gmd:CI_RoleCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#CI_RoleCode"
codeListValue="owner">owner</gmd:CI_RoleCode>
          </gmd:role>
        </gmd:CI_ResponsibleParty>
      </gmd:pointOfContact>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

19.3.6 Schematron rule

```
<sch:pattern is-a="ResponsiblePartyPattern" id="Gemini2-mi23-ResponsibleParty">
  <sch:param name="context"
value="/*[1]/gmd:identificationInfo[1]/*[1]/gmd:pointOfContact"/>
</sch:pattern>

<sch:pattern abstract="true" id="ResponsiblePartyPattern">
  <!-- Count of Organisation Name and Individual Name >= 1 -->
  <sch:rule context="$context">
    <sch:assert test="count(*/gmd:organisationName) = 1">
      One organisation name shall be provided.
    </sch:assert>
    ...
  </sch:rule>
</sch:pattern>
```

19.4   Email address

19.4.1   Error message

164 One email address shall be provided.

19.4.2   Context

165 MD_Metadata.identificationInfo > MD_DataIdentification.pointOfContact > CI_ResponsibleParty.contactInfo > CI_Contact.address > CI_Address.electronicMailAddress

166 MD_Metadata.identificationInfo > SV_ServiceIdentification.pointOfContact > CI_ResponsibleParty.contactInfo > CI_Contact.address > CI_Address.electronicMailAddress

19.4.3   Cause

167 The element electronicMail Address is mandatory in GEMINI metadata. One shall be provided within the context of a CI_ResponsibleParty element.

19.4.4   Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:pointOfContact>
        <gmd:CI_ResponsibleParty>
          ...
          <gmd:contactInfo>
            <gmd:CI_Contact>
              <gmd:address>
                <gmd:CI_Address>
                  ...
                </gmd:CI_Address>
              </gmd:address>
            </gmd:CI_Contact>
          </gmd:contactInfo>
          ...
        </gmd:CI_ResponsibleParty>
      </gmd:pointOfContact>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

19.4.5   Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:pointOfContact>
        <gmd:CI_ResponsibleParty>
          ...
          <gmd:contactInfo>
            <gmd:CI_Contact>
              <gmd:address>
                <gmd:CI_Address>
                  <gmd:electronicMailAddress>
                    <gco:CharacterString>info@seazone.com</gco:CharacterString>
                  </gmd:electronicMailAddress>
```

```
            </gmd:CI_Address>
          </gmd:address>
        </gmd:CI_Contact>
      </gmd:contactInfo>
      ...
    </gmd:CI_ResponsibleParty>
  </gmd:pointOfContact>
  ...
</gmd:MD_DataIdentification>
</gmd:identificationInfo>
...
</gmd:MD_Metadata>
```

19.4.6   Schematron rule

```
<sch:pattern is-a="ResponsiblePartyPattern" id="Gemini2-mi23-ResponsibleParty">
  <sch:param name="context"
value="/*[1]/gmd:identificationInfo[1]/*[1]/gmd:pointOfContact"/>
</sch:pattern>

<sch:pattern abstract="true" id="ResponsiblePartyPattern">
  <!-- Count of Organisation Name and Individual Name >= 1 -->
  <sch:rule context="$context">
    ...
    <sch:assert
test="count(*/gmd:contactInfo/*[1]/gmd:address/*[1]/gmd:electronicMailAddress) = 1">
      One email address shall be provided
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

19.5   Elements not nillable

19.5.1   Error message

168 The gmd:organisationName element is not nillable and shall have a value.

169 The gmd:electronicMailAddress element is not nillable and shall have a value.

19.5.2   Context

170 MD_Metadata.identificationInfo > MD_DataIdentification.pointOfContact > CI_ResponsibleParty.organisationName

171 MD_Metadata.identificationInfo > SV_ServiceIdentification.pointOfContact > CI_ResponsibleParty.organisationName

172 MD_Metadata.identificationInfo > MD_DataIdentification.pointOfContact > CI_ResponsibleParty.contactInfo > CI_Contact.address > CI_Address.electronicMailAddress

173 MD_Metadata.identificationInfo > SV_ServiceIdentification.pointOfContact > CI_ResponsibleParty.contactInfo > CI_Contact.address > CI_Address.electronicMailAddress

19.5.3   Cause

174 The element gmd:organisationName has been assigned a gco:nilReason attribute or the value of the element is an empty string, and / or the element named gmd:electronicMailAddress has been assigned a gco:nilReason attribute or the value of the element is an empty string.

19.5.4   Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
```

```xml
  <gmd:MD_DataIdentification>
    ...
    <gmd:pointOfContact>
      <gmd:CI_ResponsibleParty>
        <gmd:organisationName gco:nilReason="unknown"/>
        <gmd:contactInfo>
          <gmd:CI_Contact>
            <gmd:address>
              <gmd:CI_Address>
                <gmd:electronicMailAddress gco:nilReason="missing"/>
              </gmd:CI_Address>
            </gmd:address>
          </gmd:CI_Contact>
        </gmd:contactInfo>
        ...
      </gmd:CI_ResponsibleParty>
    </gmd:pointOfContact>
    ...
  </gmd:MD_DataIdentification>
</gmd:identificationInfo>
...
</gmd:MD_Metadata>
```

19.5.5   Example – success

```xml
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:pointOfContact>
        <gmd:CI_ResponsibleParty>
          <gmd:organisationName>
            <gco:CharacterString>SeaZone Solutions Limited</gco:CharacterString>
          </gmd:organisationName>
          <gmd:contactInfo>
            <gmd:CI_Contact>
              <gmd:address>
                <gmd:CI_Address>
                  <gmd:electronicMailAddress>
                    <gco:CharacterString>info@seazone.com</gco:CharacterString>
                  </gmd:electronicMailAddress>
                </gmd:CI_Address>
              </gmd:address>
            </gmd:CI_Contact>
          </gmd:contactInfo>
          ...
        </gmd:CI_ResponsibleParty>
      </gmd:pointOfContact>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

19.5.6   Schematron rule

```xml
<sch:pattern is-a="TypeNotNillablePattern" id="Gemini2-mi23-OrganisationName-
NotNillable">
  <sch:param name="context"
value="/*[1]/gmd:identificationInfo[1]/*[1]/gmd:pointOfContact/*[1]/gmd:organisation
Name |
/*[1]/gmd:identificationInfo[1]/*[1]/gmd:pointOfContact/*[1]/gmd:contactInfo/*[1]/gm
```

```
d:address/*[1]/gmd:electronicMailAddress"/>
</sch:pattern>

<sch:pattern abstract="true" id="TypeNotNillablePattern">
  <sch:rule context="$context">
    <sch:assert test="string-length(.) &gt; 0 and count(./@gco:nilReason) = 0">
      The <sch:name/> element is not nillable and shall have a value.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

19.6   Role code list value

19.6.1   Error message

175 The codeListValue attribute does not have a value.

19.6.2   Context

176 MD_Metadata.identificationInfo > MD_DataIdentification.pointOfContact > CI_ResponsibleParty.role

177 MD_Metadata.identificationInfo > SV_ServiceIdentification.pointOfContact > CI_ResponsibleParty.role

19.6.3   Cause

178 This assertion fails if the attribute codeListValue of the element gmd:CI_RoleCode does not have a value.

19.6.4   Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:pointOfContact>
        <gmd:CI_ResponsibleParty>
          ...
          <gmd:role>
            <gmd:CI_RoleCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#CI_RoleCode"
codeListValue="">owner</gmd:CI_RoleCode>
          </gmd:role>
        </gmd:CI_ResponsibleParty>
      </gmd:pointOfContact>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

19.6.5   Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:pointOfContact>
        <gmd:CI_ResponsibleParty>
          ...
          <gmd:role>
            <gmd:CI_RoleCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#CI_RoleCode"
```

```
codeListValue="owner">owner</gmd:CI_RoleCode>
          </gmd:role>
        </gmd:CI_ResponsibleParty>
      </gmd:pointOfContact>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

19.6.6 Schematron rule

```
<sch:pattern is-a="IsoCodeListPattern" id="Gemini2-mi23-Role-CodeList">
  <sch:param name="context"
value="/*[1]/gmd:identificationInfo[1]/*[1]/gmd:pointOfContact/*[1]/gmd:role/*[1]"/>
</sch:pattern>

<sch:pattern abstract="true" id="IsoCodeListPattern">
  <sch:rule context="$context">
    <sch:assert test="string-length(@codeListValue) &gt; 0">
      The codeListValue attribute does not have a value.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

20 FREQUENCY OF UPDATE

20.1   Error message

179 The codeListValue attribute does not have a value.

20.2   Context

180 MD_Metadata.identificationInfo > MD_DataIdentification.resourceMaintenance >
MD_MaintenanceInformation.maintenanceAndUpdateFrequency

181 MD_Metadata.identificationInfo > SV_ServiceIdentification.resourceMaintenance >
MD_MaintenanceInformation.maintenanceAndUpdateFrequency

20.3   Cause

182 This assertion fails if the attribute codeListValue of the element gmd:MD_MaintenanceFrequencyCode does
not have a value.

20.4   Example – fail

```
<gmd:MD_Metadata>
   ...
   <gmd:identificationInfo>
     <gmd:MD_DataIdentification>
       ...
       <gmd:resourceMaintenance>
         <gmd:MD_MaintenanceInformation>
           <gmd:maintenanceAndUpdateFrequency>
             <gmd:MD_MaintenanceFrequencyCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#MD_MaintenanceFrequencyCode"
codeListValue="">notPlanned</gmd:MD_MaintenanceFrequencyCode>
           </gmd:maintenanceAndUpdateFrequency>
         </gmd:MD_MaintenanceInformation>
       </gmd:resourceMaintenance>
       ...
     </gmd:MD_DataIdentification>
   </gmd:identificationInfo>
   ...
</gmd:MD_Metadata>
```

20.5   Example – success

```
<gmd:MD_Metadata>
   ...
   <gmd:identificationInfo>
     <gmd:MD_DataIdentification>
       ...
       <gmd:resourceMaintenance>
         <gmd:MD_MaintenanceInformation>
           <gmd:maintenanceAndUpdateFrequency>
             <gmd:MD_MaintenanceFrequencyCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#MD_MaintenanceFrequencyCode"
codeListValue="notPlanned">notPlanned</gmd:MD_MaintenanceFrequencyCode>
           </gmd:maintenanceAndUpdateFrequency>
         </gmd:MD_MaintenanceInformation>
       </gmd:resourceMaintenance>
       ...
     </gmd:MD_DataIdentification>
```

```
    </gmd:identificationInfo>
    ...
</gmd:MD_Metadata>
```

20.6   Schematron rule

```
<sch:pattern is-a="IsoCodeListPattern" id="Gemini2-mi24-CodeList">
  <sch:param name="context"
value="/*[1]/gmd:identificationInfo[1]/*[1]/gmd:resourceMaintenance/*[1]/gmd:mainten
anceAndUpdateFrequency/*[1]"/>
</sch:pattern>

<sch:pattern abstract="true" id="IsoCodeListPattern">
  <sch:rule context="$context">
    <sch:assert test="string-length(@codeListValue) &gt; 0">
      The codeListValue attribute does not have a value.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

21 LIMITATIONS ON PUBLIC ACCESS

21.1 Other restrictions

21.1.1 Error message

183 Limitations on public access code list value shall be 'otherRestrictions'.

21.1.2 Context

184 MD_Metadata.identificationInfo > MD_DataIdentification.resourceConstraints >
MD_LegalConstraints.accessConstraints

185 MD_Metadata.identificationInfo > SV_ServiceIdentification.resourceConstraints >
MD_LegalConstraints.accessConstraints

21.1.3 Cause

186 The value of the access constraints is taken from a code list. The encoding guidance [2] requires that the value
that is selected is 'otherConstraints'. The assertion fails if a different value is chosen.

21.1.4 Example – fail

```xml
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:resourceConstraints>
        <gmd:MD_LegalConstraints>
          ...
          <gmd:accessConstraints>
            <gmd:MD_RestrictionCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#MD_RestrictionCode"
codeListValue="copyright">copyright</gmd:MD_RestrictionCode>
          </gmd:accessConstraints>
          ...
          <gmd:otherConstraints>
            <gco:CharacterString>Standard licensing terms
apply</gco:CharacterString>
          </gmd:otherConstraints>
        </gmd:MD_LegalConstraints>
      </gmd:resourceConstraints>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

21.1.5 Example – success

```xml
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:resourceConstraints>
        <gmd:MD_LegalConstraints>
          ...
          <gmd:accessConstraints>
            <gmd:MD_RestrictionCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
```

```
/resources/Codelist/gmxCodelists.xml#MD_RestrictionCode"
codeListValue="otherRestrictions">otherRestrictions</gmd:MD_RestrictionCode>
          </gmd:accessConstraints>
          ...
          <gmd:otherConstraints>
            <gco:CharacterString>Standard licensing terms
apply</gco:CharacterString>
          </gmd:otherConstraints>
        </gmd:MD_LegalConstraints>
      </gmd:resourceConstraints>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

21.1.6   Schematron rule

```
<sch:pattern fpi="Gemini2-mi25">
  <sch:title>Limitations on public access</sch:title>
  <sch:rule
context="/*[1]/gmd:identificationInfo[1]/*[1]/gmd:resourceConstraints/gmd:MD_LegalCo
nstraints |
/*[1]/gmd:identificationInfo[1]/*[1]/gmd:resourceConstraints/*[1][gco:isoType='gmd:M
D_LegalConstraints']">
    <sch:assert
test="count(gmd:accessConstraints[*/@codeListValue='otherRestrictions']) = 1">
      Limitations on public access code list value shall be 'otherRestrictions'.
    </sch:assert>
    ...
  </sch:rule>
</sch:pattern>
```

21.2   Other constraints

21.2.1   Error message

187 Limitations on public access shall be expressed using gmd:otherConstraints.

21.2.2   Context

188 MD_Metadata.identificationInfo > MD_DataIdentification.resourceConstraints > MD_LegalConstraints.otherConstraints

189 MD_Metadata.identificationInfo > SV_ServiceIdentification.resourceConstraints > MD_LegalConstraints.otherConstraints

21.2.3   Cause

190 The encoding guidance [2] requires that limitations on public access are expressed in natural language and encoded using the gmd:otherConstraints element. This assertion fails if the gmd:otherConstraints element is missing.

21.2.4   Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:resourceConstraints>
        <gmd:MD_LegalConstraints>
          ...
          <gmd:accessConstraints>
```

```
              <gmd:MD_RestrictionCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#MD_RestrictionCode"
codeListValue="otherRestrictions">otherRestrictions</gmd:MD_RestrictionCode>
            </gmd:accessConstraints>
              ...
          </gmd:MD_LegalConstraints>
        </gmd:resourceConstraints>
        ...
      </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

21.2.5   Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:resourceConstraints>
        <gmd:MD_LegalConstraints>
          ...
          <gmd:accessConstraints>
            <gmd:MD_RestrictionCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#MD_RestrictionCode"
codeListValue="otherRestrictions">otherRestrictions</gmd:MD_RestrictionCode>
          </gmd:accessConstraints>
          ...
          <gmd:otherConstraints>
            <gco:CharacterString>Standard licensing terms
apply</gco:CharacterString>
          </gmd:otherConstraints>
        </gmd:MD_LegalConstraints>
      </gmd:resourceConstraints>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

21.2.6   Schematron rule

```
<sch:pattern fpi="Gemini2-mi25">
  <sch:title>Limitations on public access</sch:title>
  <sch:rule
context="/*[1]/gmd:identificationInfo[1]/*[1]/gmd:resourceConstraints/gmd:MD_LegalCo
nstraints |
/*[1]/gmd:identificationInfo[1]/*[1]/gmd:resourceConstraints/*[1][gco:isoType='gmd:M
D_LegalConstraints']">
      ...
    <sch:assert test="count(gmd:otherConstraints) &gt;= 1">
      Limitations on public access shall be expressed using gmd:otherConstraints.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

21.3   Other constraints nillable

21.3.1   Error message

191 The gmd:otherConstraints element shall have a value or a valid nil reason.

21.3.2   Context

192 MD_Metadata.identificationInfo > MD_DataIdentification.resourceConstraints > MD_LegalConstraints.otherConstraints

193 MD_Metadata.identificationInfo > SV_ServiceIdentification.resourceConstraints > MD_LegalConstraints.otherConstraints

21.3.3   Cause

194 The element named gmd:otherConstraints has either no value or it has a gco:nilReason attribute with an invalid value. The value of the gco:nilReason attribute must be taken from a controlled list.

21.3.4   Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:resourceConstraints>
        <gmd:MD_LegalConstraints>
          ...
          <gmd:accessConstraints>
            <gmd:MD_RestrictionCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#MD_RestrictionCode"
codeListValue="otherRestrictions">otherRestrictions</gmd:MD_RestrictionCode>
          </gmd:accessConstraints>
          ...
          <gmd:otherConstraints/>
        </gmd:MD_LegalConstraints>
      </gmd:resourceConstraints>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

21.3.5   Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:resourceConstraints>
        <gmd:MD_LegalConstraints>
          ...
          <gmd:accessConstraints>
            <gmd:MD_RestrictionCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#MD_RestrictionCode"
codeListValue="otherRestrictions">otherRestrictions</gmd:MD_RestrictionCode>
          </gmd:accessConstraints>
          ...
```

```
        <gmd:otherConstraints gco:nilReason="unknown"/>
      </gmd:MD_LegalConstraints>
    </gmd:resourceConstraints>
    ...
  </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

21.3.6   Schematron rule

```
<sch:pattern is-a="TypeNillablePattern" id="Gemini2-mi25-OtherConstraints-Nillable">
  <sch:param name="context"
value="/*[1]/gmd:identificationInfo[1]/*[1]/gmd:resourceConstraints/*[1]/gmd:otherCo
nstraints"/>
</sch:pattern>

<sch:pattern abstract="true" id="TypeNillablePattern">
  <sch:rule context="$context">
    <sch:assert test="(string-length(.) &gt; 0) or
                (@gco:nilReason = 'inapplicable' or
                @gco:nilReason = 'missing' or
                @gco:nilReason = 'template' or
                @gco:nilReason = 'unknown' or
                @gco:nilReason = 'withheld' or
                starts-with(@gco:nilReason, 'other:'))">
      The <sch:name/> element shall have a value or a valid Nil Reason.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

21.4   Code list value

21.4.1   Error message

195   The codeListValue attribute does not have a value.

21.4.2   Context

196   MD_Metadata.identificationInfo > MD_DataIdentification.resourceConstraints > MD_LegalConstraints.accessConstraints

197   MD_Metadata.identificationInfo > SV_ServiceIdentification.resourceConstraints > MD_LegalConstraints.accessConstraints

21.4.3   Cause

198   This assertion fails if the attribute codeListValue of the element gmd:MD_RestrictionCode does not have a value.

21.4.4   Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:resourceConstraints>
        <gmd:MD_LegalConstraints>
          ...
          <gmd:accessConstraints>
            <gmd:MD_RestrictionCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#MD_RestrictionCode"
```

```
codeListValue="">otherRestrictions</gmd:MD_RestrictionCode>
          </gmd:accessConstraints>
          ...
        </gmd:MD_LegalConstraints>
      </gmd:resourceConstraints>
    ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

21.4.5   Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:resourceConstraints>
        <gmd:MD_LegalConstraints>
          ...
          <gmd:accessConstraints>
            <gmd:MD_RestrictionCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#MD_RestrictionCode"
codeListValue="otherRestrictions">otherRestrictions</gmd:MD_RestrictionCode>
          </gmd:accessConstraints>
          ...
        </gmd:MD_LegalConstraints>
      </gmd:resourceConstraints>
    ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

21.4.6   Schematron rule

```
<sch:pattern is-a="IsoCodeListPattern" id="Gemini2-mi25-AccessConstraints-CodeList">
  <sch:param name="context"
value="/*[1]/gmd:identificationInfo[1]/*[1]/gmd:resourceConstraints/*[1]/gmd:accessC
onstraints/*[1]"/>
</sch:pattern>

<sch:pattern abstract="true" id="IsoCodeListPattern">
  <sch:rule context="$context">
    <sch:assert test="string-length(@codeListValue) &gt; 0">
      The codeListValue attribute does not have a value.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

22   USE CONSTRAINTS

22.1   Use constraints are mandatory

22.1.1   Error message

199   Use constraints shall be provided.

22.1.2   Context

200   MD_Metadata.identificationInfo > MD_DataIdentification.resourceConstraints >
MD_LegalConstraints.useLimitation

201   MD_Metadata.identificationInfo > SV_ServiceIdentification.resourceConstraints >
MD_LegalConstraints.useLimitation

22.1.3   Cause

202   The metadata item 'use constraints' is mandatory. The item is encoded using the useLimitation element. This
assertion fails if the element is omitted from metadata.

22.1.4   Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:resourceConstraints>
        <gmd:MD_LegalConstraints>
          ...
        </gmd:MD_LegalConstraints>
      </gmd:resourceConstraints>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

22.1.5   Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:resourceConstraints>
        <gmd:MD_LegalConstraints>
          <gmd:useLimitation>
            <gco:CharacterString>Not to be used for navigation</gco:CharacterString>
          </gmd:useLimitation>
          ...
        </gmd:MD_LegalConstraints>
      </gmd:resourceConstraints>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

22.1.6   Schematron rule

```
<sch:pattern fpi="Gemini2-mi26">
  <sch:title>Use constraints</sch:title>
  <sch:rule context="/*[1]/gmd:identificationInfo[1]/*[1]">
   <sch:assert test="count(gmd:resourceConstraints/*[1]/gmd:useLimitation) &gt;= 1">
     Use constraints shall be provided.
   </sch:assert>
  </sch:rule>
</sch:pattern>
```

22.2   Use limitation is nillable

22.2.1   Error message

203 The gmd:useLimitation element shall have a value or a valid Nil Reason.

22.2.2   Context

204 MD_Metadata.identificationInfo > MD_DataIdentification.resourceConstraints >
MD_LegalConstraints.useLimitation

205 MD_Metadata.identificationInfo > SV_ServiceIdentification.resourceConstraints >
MD_LegalConstraints.useLimitation

22.2.3   Cause

206 The element named gmd:useLimitation either has no value or it has a gco:nilReason attribute with an invalid
value. The value of the gco:nilReason attribute must be taken from a controlled list.

22.2.4   Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:resourceConstraints>
        <gmd:MD_LegalConstraints>
          <gmd:useLimitation/>
          ...
        </gmd:MD_LegalConstraints>
      </gmd:resourceConstraints>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

22.2.5   Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:resourceConstraints>
        <gmd:MD_LegalConstraints>
          <gmd:useLimitation gco:nilReason="missing"/>
          ...
        </gmd:MD_LegalConstraints>
      </gmd:resourceConstraints>
      ...
```

```
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

22.2.6   Schematron rule

```
<sch:pattern is-a="TypeNillablePattern" id="Gemini2-mi26-UseLimitation-Nillable">
  <sch:param name="context"
value="/*[1]/gmd:identificationInfo[1]/*[1]/gmd:resourceConstraints/*[1]/gmd:useLimi
tation"/>
</sch:pattern>

<sch:pattern abstract="true" id="TypeNillablePattern">
  <sch:rule context="$context">
    <sch:assert test="(string-length(.) &gt; 0) or
                (@gco:nilReason = 'inapplicable' or
                @gco:nilReason = 'missing' or
                @gco:nilReason = 'template' or
                @gco:nilReason = 'unknown' or
                @gco:nilReason = 'withheld' or
                starts-with(@gco:nilReason, 'other:'))">
      The <sch:name/> element shall have a value or a valid Nil Reason.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

23   ADDITIONAL INFORMATION SOURCE

23.1   Error message

207   The gmd:supplementalInformation element shall have a value or a valid Nil Reason.

23.2   Context

208   MD_Metadata.identificationInfo > MD_Identification.supplementalInformation

23.3   Cause

209   The metadata item 'additional information source' must have a value or a valid nil reason attribute. However, the item is optional so it can be omitted altogether.

23.4   Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:supplementalInformation/>
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

23.5   Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:supplementalInformation>
        <gco:CharacterString>The additional information</gco:CharacterString>
      </gmd:supplementalInformation>
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```


```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:supplementalInformation gco:nilReason="missing"/>
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

23.6   Schematron rule

```
<sch:pattern is-a="TypeNillablePattern" id="Gemini2-mi27-Nillable">
  <sch:param name="context"
```

```
value="/*[1]/gmd:identificationInfo[1]/*[1]/gmd:supplementalInformation"/>
</sch:pattern>

<sch:pattern abstract="true" id="TypeNillablePattern">
  <sch:rule context="$context">
    <sch:assert test="(string-length(.) &gt; 0) or
                (@gco:nilReason = 'inapplicable' or
                @gco:nilReason = 'missing' or
                @gco:nilReason = 'template' or
                @gco:nilReason = 'unknown' or
                @gco:nilReason = 'withheld' or
                starts-with(@gco:nilReason, 'other:'))">
      The <sch:name/> element shall have a value or a valid Nil Reason.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

24 UNIQUE RESOURCE IDENTIFIER

24.1 Mandatory

24.1.1 Error message

210 Unique resource identifier is mandatory for datasets and series. One or more shall be provided.

24.1.2 Context

211 MD_Metadata.identificationInfo > MD_DataIdentification.citation > CI_Citation.identifier

24.1.3 Cause

212 A metadata instance for a dataset or a series must contain the 'unique resource identifier' of the dataset or series. This assertion fails if the identifier element of CI_Citation is omitted.

24.1.4 Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:hierarchyLevel>
    <gmd:MD_ScopeCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#MD_ScopeCode"
codeListValue="dataset">dataset</gmd:MD_ScopeCode>
  </gmd:hierarchyLevel>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      <gmd:citation>
        <gmd:CI_Citation>
          ...
        </gmd:CI_Citation>
      </gmd:citation>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

24.1.5 Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:hierarchyLevel>
    <gmd:MD_ScopeCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#MD_ScopeCode"
codeListValue="dataset">dataset</gmd:MD_ScopeCode>
  </gmd:hierarchyLevel>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      <gmd:citation>
        <gmd:CI_Citation>
          ...
          <gmd:identifier>
            <gmd:RS_Identifier>
              <gmd:code>
                <gco:CharacterString>42</gco:CharacterString>
              </gmd:code>
            </gmd:RS_Identifier>
```

```
        </gmd:identifier>
      </gmd:CI_Citation>
    </gmd:citation>
      ...
  </gmd:MD_DataIdentification>
</gmd:identificationInfo>
...
</gmd:MD_Metadata>
```

24.1.6   Schematron rule

```
<sch:pattern fpi="Gemini2-mi36">
  <sch:title>Unique resource identifier</sch:title>
  <sch:rule context="/*[1]/gmd:identificationInfo[1]/*[1]/gmd:citation/*[1]">
    <sch:assert test="((../../../../gmd:hierarchyLevel[1]/*[1]/@codeListValue =
'dataset' or
../../../../gmd:hierarchyLevel[1]/*[1]/@codeListValue = 'series') and
count(gmd:identifier) &gt;= 1) or
(../../../../gmd:hierarchyLevel[1]/*[1]/@codeListValue != 'dataset' and
../../../../gmd:hierarchyLevel[1]/*[1]/@codeListValue != 'series') or
count(../../../../gmd:hierarchyLevel) = 0">
      Unique resource identifier is mandatory for datasets and series. One or more
shall be provided.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

24.2   Unique resource identifier is not nillable

24.2.1   Error message

213 The gmd:code element is not nillable and shall have a value.

24.2.2   Context

214 MD_Metadata.identificationInfo > MD_DataIdentification.citation > CI_Citation.identifier > RS_Identifier.code

24.2.3   Cause

215 The element gmd:code has been assigned a gco:nilReason attribute or the value of the element is an empty string.

24.2.4   Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      <gmd:citation>
        <gmd:CI_Citation>
          ...
          <gmd:identifier>
            <gmd:RS_Identifier>
              <gmd:code gco:nilReason="missing"/>
            </gmd:RS_Identifier>
          </gmd:identifier>
        </gmd:CI_Citation>
      </gmd:citation>
        ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

24.2.5   Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      <gmd:citation>
        <gmd:CI_Citation>
          ...
          <gmd:identifier>
            <gmd:RS_Identifier>
              <gmd:code>
                <gco:CharacterString>42</gco:CharacterString>
              </gmd:code>
            </gmd:RS_Identifier>
          </gmd:identifier>
        </gmd:CI_Citation>
      </gmd:citation>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

24.2.6   Schematron rule

```
<sch:pattern is-a="TypeNotNillablePattern" id="Gemini2-mi36-Code-NotNillable">
  <sch:param name="context"
value="/*[1]/gmd:identificationInfo[1]/*[1]/gmd:citation/*[1]/gmd:identifier/*[1]/gm
d:code"/>
</sch:pattern>

<sch:pattern abstract="true" id="TypeNotNillablePattern">
  <sch:rule context="$context">
    <sch:assert test="string-length(.) &gt; 0 and count(./@gco:nilReason) = 0">
      The <sch:name/> element is not nillable and shall have a value.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

24.3   Codespace is nillable

24.3.1   Error message

216 The gmd:codeSpace element shall have a value or a valid Nil Reason.

24.3.2   Context

217 MD_Metadata.identificationInfo > MD_DataIdentification.citation > CI_Citation.identifier >
RS_Identifier.codeSpace

24.3.3   Cause

218 The element named gmd:codeSpace either has no value or it has a gco:nilReason attribute with an invalid
value. The value of the gco:nilReason attribute must be taken from a controlled list.

24.3.4   Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      <gmd:citation>
```

```
    <gmd:CI_Citation>
      ...
      <gmd:identifier>
        <gmd:RS_Identifier>
          <gmd:code>
            <gco:CharacterString>42</gco:CharacterString>
          </gmd:code>
          <gmd:codeSpace/>
        </gmd:RS_Identifier>
      </gmd:identifier>
    </gmd:CI_Citation>
  </gmd:citation>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

24.3.5   Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      <gmd:citation>
        <gmd:CI_Citation>
          ...
          <gmd:identifier>
            <gmd:RS_Identifier>
              <gmd:code>
                <gco:CharacterString>42</gco:CharacterString>
              </gmd:code>
              <gmd:codeSpace>
                <gco:CharacterString>http://www.anyuri.com</gco:CharacterString>
              </gmd:codeSpace>
            </gmd:RS_Identifier>
          </gmd:identifier>
        </gmd:CI_Citation>
      </gmd:citation>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

24.3.6   Schematron rule

```
<sch:pattern is-a="TypeNillablePattern" id="Gemini2-mi36-CodeSpace-Nillable">
  <sch:param name="context"
value="/*[1]/gmd:identificationInfo[1]/*[1]/gmd:citation/*[1]/gmd:identifier/*[1]/gm
d:codeSpace"/>
</sch:pattern>

<sch:pattern abstract="true" id="TypeNillablePattern">
  <sch:rule context="$context">
    <sch:assert test="(string-length(.) &gt; 0) or
                (@gco:nilReason = 'inapplicable' or
                @gco:nilReason = 'missing' or
                @gco:nilReason = 'template' or
                @gco:nilReason = 'unknown' or
                @gco:nilReason = 'withheld' or
                starts-with(@gco:nilReason, 'other:'))">
      The <sch:name/> element shall have a value or a valid Nil Reason.
```

```
        </sch:assert>
    </sch:rule>
</sch:pattern>
```

```
        </sch:assert>
```

25 RESOURCE TYPE

25.1 Mandatory

25.1.1 Error message

219 Resource type is mandatory. One shall be provided.

25.1.2 Context

220 MD_Metadata.hierarchyLevel

25.1.3 Cause

221 The metadata item 'resource type' is encoded in metadata using the hierarchyLevel element. This assertion fails if the hierarchyLevel element is omitted from a metadata instance.

25.1.4 Example – fail

```
<gmd:MD_Metadata>
  ...
</gmd:MD_Metadata>
```

25.1.5 Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:hierarchyLevel>
    <gmd:MD_ScopeCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#MD_ScopeCode"
codeListValue="dataset">dataset</gmd:MD_ScopeCode>
  </gmd:hierarchyLevel>
  ...
</gmd:MD_Metadata>
```

25.1.6 Schematron rule

```
<sch:pattern fpi="Gemini2-mi39">
  <sch:title>Resource type</sch:title>
  <sch:rule context="/*[1]">
    <sch:assert test="count(gmd:hierarchyLevel) = 1">
      Resource type is mandatory. One shall be provided.
    </sch:assert>
    ...
  </sch:rule>
</sch:pattern>
```

25.2 Specific value

25.2.1 Error message

222 Value of resource type shall be 'dataset', 'series' or 'service'.

25.2.2 Context

223 MD_Metadata.hierarchyLevel

25.2.3 Cause

224 The value of the element hierarchyLevel is taken from a code list. The encoding guidance [2] and Schematron schema limits this list to 'dataset', 'series' or 'service'. This assertion will fail if any other value is used.

25.2.4   Example – fail

```
<gmd:MD_Metadata>
   ...
   <gmd:hierarchyLevel>
     <gmd:MD_ScopeCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#MD_ScopeCode"
codeListValue="attribute">attribute</gmd:MD_ScopeCode>
   </gmd:hierarchyLevel>
   ...
</gmd:MD_Metadata>
```

25.2.5   Example – success

```
<gmd:MD_Metadata>
   ...
   <gmd:hierarchyLevel>
     <gmd:MD_ScopeCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#MD_ScopeCode"
codeListValue="dataset">dataset</gmd:MD_ScopeCode>
   </gmd:hierarchyLevel>
   ...
</gmd:MD_Metadata>
```

25.2.6   Schematron rule

```
<sch:pattern fpi="Gemini2-mi39">
  <sch:title>Resource type</sch:title>
  <sch:rule context="/*[1]">
    ...
    <sch:assert test="gmd:hierarchyLevel[1]/*[1]/@codeListValue = 'dataset' or
                gmd:hierarchyLevel[1]/*[1]/@codeListValue = 'series' or
                gmd:hierarchyLevel[1]/*[1]/@codeListValue = 'service'">
     Value of resource type shall be 'dataset', 'series' or 'service'.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

25.3   Code list

25.3.1   Error message

225 The codeListValue attribute does not have a value.

25.3.2   Context

226 MD_Metadata.hierarchyLevel

25.3.3   Cause

227 This assertion fails if the attribute codeListValue of the element gmd:MD_ScopeCode does not have a value.

25.3.4   Example – fail

```
<gmd:MD_Metadata>
   ...
   <gmd:hierarchyLevel>
     <gmd:MD_ScopeCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#MD_ScopeCode"
codeListValue="">dataset</gmd:MD_ScopeCode>
```

```
  </gmd:hierarchyLevel>
  ...
</gmd:MD_Metadata>
```

25.3.5   Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:hierarchyLevel>
    <gmd:MD_ScopeCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#MD_ScopeCode"
codeListValue="dataset">dataset</gmd:MD_ScopeCode>
  </gmd:hierarchyLevel>
  ...
</gmd:MD_Metadata>
```

25.3.6   Schematron rule

```
<sch:pattern is-a="IsoCodeListPattern" id="Gemini2-mi39-CodeList">
  <sch:param name="context" value="/*[1]/gmd:hierarchyLevel/*[1]"/>
</sch:pattern>

<sch:pattern abstract="true" id="IsoCodeListPattern">
  <sch:rule context="$context">
    <sch:assert test="string-length(@codeListValue) &gt; 0">
      The codeListValue attribute does not have a value.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

26 CONFORMITY

26.1   Result is not nillable

26.1.1   Error message

228 The gmd:pass element is not nillable and shall have a value.

26.1.2   Context

229 MD_Metadata.dataQualityInfo > DQ_DataQuality.report > DQ_DomainConsistency.result > DQ_ConformanceResult.pass

26.1.3   Cause

230 The gmd:pass element has been assigned a gco:nilReason attribute or the value of the element is an empty string.

26.1.4   Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:dataQualityInfo>
    <gmd:DQ_DataQuality>
      ...
      <gmd:report>
        <gmd:DQ_DomainConsistency>
          ...
          <gmd:result>
            <gmd:DQ_ConformanceResult>
              ...
              <gmd:pass gco:nilReason="unknown"/>
            </gmd:DQ_ConformanceResult>
          </gmd:result>
        </gmd:DQ_DomainConsistency>
      </gmd:report>
      ...
    </gmd:DQ_DataQuality>
  </gmd:dataQualityInfo>
</gmd:MD_Metadata>
```

26.1.5   Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:dataQualityInfo>
    <gmd:DQ_DataQuality>
      ...
      <gmd:report>
        <gmd:DQ_DomainConsistency>
          ...
          <gmd:result>
            <gmd:DQ_ConformanceResult>
              ...
              <gmd:pass>
                <gco:Boolean>true</gco:Boolean>
              </gmd:pass>
            </gmd:DQ_ConformanceResult>
          </gmd:result>
        </gmd:DQ_DomainConsistency>
      </gmd:report>
      ...
    </gmd:DQ_DataQuality>
```

```
    </gmd:dataQualityInfo>
</gmd:MD_Metadata>
```

26.1.6   Schematron rule

```
<sch:pattern is-a="TypeNotNillablePattern" id="Gemini2-mi41-Pass-NotNillable">
  <sch:param name="context"
value="/*[1]/gmd:dataQualityInfo/*[1]/gmd:report/*[1]/gmd:result/*[1]/gmd:pass"/>
</sch:pattern>

<sch:pattern abstract="true" id="TypeNotNillablePattern">
  <sch:rule context="$context">
    <sch:assert test="string-length(.) &gt; 0 and count(./@gco:nilReason) = 0">
      The <sch:name/> element is not nillable and shall have a value.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

26.2   Explanation is nillable

26.2.1   Error message

231 The gmd:explanation element shall have a value or a valid Nil Reason.

26.2.2   Context

232 MD_Metadata.dataQualityInfo > DQ_DataQuality.report > DQ_DomainConsistency.result > DQ_ConformanceResult.explanation

26.2.3   Cause

233 An 'explanation' of the conformity is not required in GEMINI metadata. However, the element gmd:explanation is mandatory in the XML encoding. It must have either a value or a valid nil reason. This assertion fails if the element named gmd:explanation has no value or it has a gco:nilReason attribute with an invalid value.

26.2.4   Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:dataQualityInfo>
    <gmd:DQ_DataQuality>
      ...
      <gmd:report>
        <gmd:DQ_DomainConsistency>
          ...
          <gmd:result>
            <gmd:DQ_ConformanceResult>
              ...
              <gmd:explanation/>
              ...
            </gmd:DQ_ConformanceResult>
          </gmd:result>
        </gmd:DQ_DomainConsistency>
      </gmd:report>
      ...
    </gmd:DQ_DataQuality>
  </gmd:dataQualityInfo>
</gmd:MD_Metadata>
```

26.2.5   Example – success

```
<gmd:MD_Metadata>
  ...
```

```
  <gmd:dataQualityInfo>
    <gmd:DQ_DataQuality>
      ...
      <gmd:report>
        <gmd:DQ_DomainConsistency>
          ...
          <gmd:result>
            <gmd:DQ_ConformanceResult>
              ...
              <gmd:explanation gco:nilReason="missing"/>
              ...
            </gmd:DQ_ConformanceResult>
          </gmd:result>
        </gmd:DQ_DomainConsistency>
      </gmd:report>
      ...
    </gmd:DQ_DataQuality>
  </gmd:dataQualityInfo>
</gmd:MD_Metadata>
```

26.2.6   Schematron rule

```
<sch:pattern is-a="TypeNillablePattern" id="Gemini2-mi41-Explanation-Nillable">
  <sch:param name="context"
value="/*[1]/gmd:dataQualityInfo/*[1]/gmd:report/*[1]/gmd:result/*[1]/gmd:explanatio
n"/>
</sch:pattern>

<sch:pattern abstract="true" id="TypeNillablePattern">
  <sch:rule context="$context">
    <sch:assert test="(string-length(.) &gt; 0) or
                (@gco:nilReason = 'inapplicable' or
                @gco:nilReason = 'missing' or
                @gco:nilReason = 'template' or
                @gco:nilReason = 'unknown' or
                @gco:nilReason = 'withheld' or
                starts-with(@gco:nilReason, 'other:'))">
      The <sch:name/> element shall have a value or a valid Nil Reason.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

27 SPECIFICATION

27.1 Title not nillable

27.1.1 Error message

234 The gmd:title element is not nillable and shall have a value.

27.1.2 Context

235 MD_Metadata.dataQualityInfo > DQ_DataQuality.report > DQ_DomainConsistency.result > DQ_ConformanceResult.specification > CI_Citation.title

27.1.3 Cause

236 The element named gmd:title has been assigned a gco:nilReason attribute or the value of the element is an empty string.

27.1.4 Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:dataQualityInfo>
    <gmd:DQ_DataQuality>
      ...
      <gmd:report>
        <gmd:DQ_DomainConsistency>
          ...
          <gmd:result>
            <gmd:DQ_ConformanceResult>
              <gmd:specification>
                <gmd:CI_Citation>
                  <gmd:title gco:nilReason="missing"/>
                  ...
                </gmd:CI_Citation>
              </gmd:specification>
              ...
            </gmd:DQ_ConformanceResult>
          </gmd:result>
        </gmd:DQ_DomainConsistency>
      </gmd:report>
      ...
    </gmd:DQ_DataQuality>
  </gmd:dataQualityInfo>
</gmd:MD_Metadata>
```

27.1.5 Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:dataQualityInfo>
    <gmd:DQ_DataQuality>
      ...
      <gmd:report>
        <gmd:DQ_DomainConsistency>
          ...
          <gmd:result>
            <gmd:DQ_ConformanceResult>
              <gmd:specification>
                <gmd:CI_Citation>
                  <gmd:title>
                    <gco:CharacterString>Conformity</gco:CharacterString>
                  </gmd:title>
```

```
                        ...
                      </gmd:CI_Citation>
                  </gmd:specification>
                  ...
              </gmd:DQ_ConformanceResult>
            </gmd:result>
          </gmd:DQ_DomainConsistency>
        </gmd:report>
        ...
      </gmd:DQ_DataQuality>
    </gmd:dataQualityInfo>
</gmd:MD_Metadata>
```

27.1.6   Schematron rule

```
<sch:pattern is-a="TypeNotNillablePattern" id="Gemini2-mi42-Title-NotNillable">
  <sch:param name="context"
value="/*[1]/gmd:dataQualityInfo/*[1]/gmd:report/*[1]/gmd:result/*[1]/gmd:specificat
ion/*[1]/gmd:title"/>
</sch:pattern>

<sch:pattern abstract="true" id="TypeNotNillablePattern">
  <sch:rule context="$context">
    <sch:assert test="string-length(.) &gt; 0 and count(./@gco:nilReason) = 0">
      The <sch:name/> element is not nillable and shall have a value.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

27.2   Date is nillable

27.2.1   Error message

237 The gmd:date element shall have a value or a valid nil reason.

27.2.2   Context

238 MD_Metadata.dataQualityInfo > DQ_DataQuality.report > DQ_DomainConsistency.result >
DQ_ConformanceResult.specification > CI_Citation.date > CI_Date.date

27.2.3   Cause

239 The element named gmd:date has either no value or it has a gco:nilReason attribute with an invalid value. The
value of the gco:nilReason attribute must be taken from a controlled list.

27.2.4   Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:dataQualityInfo>
    <gmd:DQ_DataQuality>
      ...
      <gmd:report>
        <gmd:DQ_DomainConsistency>
          ...
          <gmd:result>
            <gmd:DQ_ConformanceResult>
              <gmd:specification>
                <gmd:CI_Citation>
                  ...
                  <gmd:date>
                    <gmd:CI_Date>
                      <gmd:date/>
                      ...
```

```
            </gmd:CI_Date>
          </gmd:date>
        </gmd:CI_Citation>
      </gmd:specification>
      ...
    </gmd:DQ_ConformanceResult>
  </gmd:result>
</gmd:DQ_DomainConsistency>
</gmd:report>
...
</gmd:DQ_DataQuality>
</gmd:dataQualityInfo>
</gmd:MD_Metadata>
```

27.2.5   Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:dataQualityInfo>
    <gmd:DQ_DataQuality>
      ...
      <gmd:report>
        <gmd:DQ_DomainConsistency>
          ...
          <gmd:result>
            <gmd:DQ_ConformanceResult>
              <gmd:specification>
                <gmd:CI_Citation>
                  ...
                  <gmd:date>
                    <gmd:CI_Date>
                      <gmd:date gco:nilReason="unknown"/>
                      ...
                    </gmd:CI_Date>
                  </gmd:date>
                </gmd:CI_Citation>
              </gmd:specification>
              ...
            </gmd:DQ_ConformanceResult>
          </gmd:result>
        </gmd:DQ_DomainConsistency>
      </gmd:report>
      ...
    </gmd:DQ_DataQuality>
  </gmd:dataQualityInfo>
</gmd:MD_Metadata>
```

27.2.6   Schematron rule

```
<sch:pattern is-a="TypeNillablePattern" id="Gemini2-mi42-Date-Nillable">
  <sch:param name="context"
value="/*[1]/gmd:dataQualityInfo/*[1]/gmd:report/*[1]/gmd:result/*[1]/gmd:specificat
ion/*[1]/gmd:date/*[1]/gmd:date"/>
</sch:pattern>

<sch:pattern abstract="true" id="TypeNillablePattern">
  <sch:rule context="$context">
    <sch:assert test="(string-length(.) &gt; 0) or
                (@gco:nilReason = 'inapplicable' or
                @gco:nilReason = 'missing' or
                @gco:nilReason = 'template' or
                @gco:nilReason = 'unknown' or
                @gco:nilReason = 'withheld' or
```

```
                    starts-with(@gco:nilReason, 'other:'))">
      The <sch:name/> element shall have a value or a valid Nil Reason.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

27.3   Date type code list

27.3.1   Error message

240 The codeListValue attribute does not have a value.

27.3.2   Context

241 MD_Metadata.dataQualityInfo > DQ_DataQuality.report > DQ_DomainConsistency.result >
DQ_ConformanceResult.specification > CI_Citation.date > CI_Date.dateType

27.3.3   Cause

242 This assertion fails if the attribute codeListValue of the element gmd:CI_DateTypeCode does not have a value.

27.3.4   Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:dataQualityInfo>
    <gmd:DQ_DataQuality>
      ...
      <gmd:report>
        <gmd:DQ_DomainConsistency>
          ...
          <gmd:result>
            <gmd:DQ_ConformanceResult>
              <gmd:specification>
                <gmd:CI_Citation>
                  ...
                  <gmd:date>
                    <gmd:CI_Date>
                      ...
                      <gmd:dateType>
                       <gmd:CI_DateTypeCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#CI_DateTypeCode"
codeListValue="">creation</gmd:CI_DateTypeCode>
                      </gmd:dateType>
                    </gmd:CI_Date>
                  </gmd:date>
                </gmd:CI_Citation>
              </gmd:specification>
              ...
            </gmd:DQ_ConformanceResult>
          </gmd:result>
        </gmd:DQ_DomainConsistency>
      </gmd:report>
      ...
    </gmd:DQ_DataQuality>
  </gmd:dataQualityInfo>
</gmd:MD_Metadata>
```

27.3.5   Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:dataQualityInfo>
```

```
    <gmd:DQ_DataQuality>
      ...
     <gmd:report>
       <gmd:DQ_DomainConsistency>
          ...
        <gmd:result>
          <gmd:DQ_ConformanceResult>
            <gmd:specification>
              <gmd:CI_Citation>
                 ...
                <gmd:date>
                  <gmd:CI_Date>
                    ...
                   <gmd:dateType>
                     <gmd:CI_DateTypeCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#CI_DateTypeCode"
codeListValue="creation">creation</gmd:CI_DateTypeCode>
                   </gmd:dateType>
                  </gmd:CI_Date>
                </gmd:date>
              </gmd:CI_Citation>
            </gmd:specification>
             ...
          </gmd:DQ_ConformanceResult>
        </gmd:result>
       </gmd:DQ_DomainConsistency>
     </gmd:report>
      ...
    </gmd:DQ_DataQuality>
  </gmd:dataQualityInfo>
</gmd:MD_Metadata>
```

27.3.6   Schematron rule

```
<sch:pattern is-a="IsoCodeListPattern" id="Gemini2-mi42-DateType-CodeList">
  <sch:param name="context"
value="/*[1]/gmd:dataQualityInfo/*[1]/gmd:report/*[1]/gmd:result/*[1]/gmd:specificat
ion/*[1]/gmd:date/*[1]/gmd:date/*[1]/gmd:dateType/*[1]"/>
</sch:pattern>

<sch:pattern abstract="true" id="IsoCodeListPattern">
  <sch:rule context="$context">
    <sch:assert test="string-length(@codeListValue) &gt; 0">
      The codeListValue attribute does not have a value.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

28 EQUIVALENT SCALE

28.1 Error message

243 The gmd:denominator element shall have a value or a valid Nil Reason.

28.2 Context

244 MD_Metadata.identificationInfo > MD_DataIdentification.spatialResolution > MD_Resolution.equivalentScale > MD_RepresentativeFraction.denominator

28.3 Cause

245 The denominator element must have a value of a valid nil reason. However, the 'equivalent scale' metadata item is optional and does not need to be included in metadata.

28.4 Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:spatialResolution>
        <gmd:MD_Resolution>
          <gmd:equivalentScale>
            <gmd:MD_RepresentativeFraction>
              <gmd:denominator/>
            </gmd:MD_RepresentativeFraction>
          </gmd:equivalentScale>
        </gmd:MD_Resolution>
      </gmd:spatialResolution>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

28.5 Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:spatialResolution>
        <gmd:MD_Resolution>
          <gmd:equivalentScale>
            <gmd:MD_RepresentativeFraction>
              <gmd:denominator>
                <gco:Integer>660000</gco:Integer>
              </gmd:denominator>
            </gmd:MD_RepresentativeFraction>
          </gmd:equivalentScale>
        </gmd:MD_Resolution>
      </gmd:spatialResolution>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
```

```
</gmd:MD_Metadata>


<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:spatialResolution>
        <gmd:MD_Resolution>
          <gmd:equivalentScale>
            <gmd:MD_RepresentativeFraction>
              <gmd:denominator gco:nilReason="missing"/>
            </gmd:MD_RepresentativeFraction>
          </gmd:equivalentScale>
        </gmd:MD_Resolution>
      </gmd:spatialResolution>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

28.6   Schematron rule

```
<sch:pattern is-a="TypeNillablePattern" id="Gemini2-mi43-Nillable">
  <sch:param name="context"
value="/*[1]/gmd:identificationInfo[1]/*[1]/gmd:spatialResolution/*[1]/gmd:equivalen
tScale/*[1]/gmd:denominator"/>
</sch:pattern>

<sch:pattern abstract="true" id="TypeNillablePattern">
  <sch:rule context="$context">
    <sch:assert test="(string-length(.) &gt; 0) or
                (@gco:nilReason = 'inapplicable' or
                @gco:nilReason = 'missing' or
                @gco:nilReason = 'template' or
                @gco:nilReason = 'unknown' or
                @gco:nilReason = 'withheld' or
                starts-with(@gco:nilReason, 'other:'))">
      The <sch:name/> element shall have a value or a valid Nil Reason.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

29 METADATA LANGUAGE

29.1 Metadata language is mandatory

29.1.1 Error message

246 Metadata language is mandatory. One shall be provided.

29.1.2 Context

247 MD_Metadata.language

29.1.3 Cause

248 MD_Metadata.language is optional in ISO 19115, 19139 and GEMINI, but is mandatory in the INSPIRE metadata regulation and the UK Location profile of GEMINI.

29.1.4 Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:fileIdentifier>
    ...
  </gmd:fileIdentifier>
  <gmd:hierarchyLevel>
    ...
  </gmd:hierarchyLevel>
  ...
</gmd:MD_Metadata>
```

29.1.5 Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:language>
    <gmd:LanguageCode codeList="http://www.loc.gov/standards/iso639-
2/php/code_list.php" codeListValue="eng">eng</gmd:LanguageCode>
  </gmd:language>
  ...
</gmd:MD_Metadata>
```

29.1.6 Schematron rule

```
<sch:pattern fpi="Gemini2-mi33">
  <sch:title>Metadata language</sch:title>
    <sch:rule context="/*[1]">
      <sch:assert test="count(gmd:language) = 1">
        Metadata language is mandatory. One shall be provided.
      </sch:assert>
    </sch:rule>
</sch:pattern>
```

29.2 Language code

29.2.1 Error message

249 Language shall be implemented with gmd:LanguageCode.

29.2.2 Context

250 MD_Metadata.language

29.2.3 Cause

251 The element named gmd:language may have one of two child elements: gco:CharacterString or gmd:LanguageCode. Either is valid according to the ISO 19139 XSD schemas. However, the encoding

guidance [2] requires that only the gmd:LanguageCode element is used. The assertion fails if the child element of the element named gmd:language is gco:CharacterString.

29.2.4 Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:language>
    <gco:CharacterString>eng</gco:CharacterString>
  </gmd:language>
  ...
</gmd:MD_Metadata>
```

29.2.5 Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:language>
    <gmd:LanguageCode codeList="http://www.loc.gov/standards/iso639-
2/php/code_list.php" codeListValue="eng">eng</gmd:LanguageCode>
  </gmd:language>
  ...
</gmd:MD_Metadata>
```

29.2.6 Schematron rule

```
<sch:pattern is-a="LanguagePattern" id="Gemini2-mi33-Language">
  <sch:param name="context" value="/*[1]/gmd:language"/>
</sch:pattern>

<sch:pattern abstract="true" id="LanguagePattern">
  <sch:rule context="$context">
    <sch:assert test="count(gmd:LanguageCode) = 1">
      Language shall be implemented with gmd:LanguageCode.
    </sch:assert>
  </sch:rule>
  ...
</sch:pattern>
```

29.3 Code list value

29.3.1 Error message

252 The language code list value is absent.

29.3.2 Context

253 MD_Metadata.language

29.3.3 Cause

254 This assertion fails if the attribute codeListValue of the element gmd:LanguageCode does not have a value.

29.3.4 Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:language>
    <gmd:LanguageCode codeList="http://www.loc.gov/standards/iso639-
2/php/code_list.php" codeListValue="">eng</gmd:LanguageCode>
  </gmd:language>
  ...
</gmd:MD_Metadata>
```

29.3.5   Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:language>
    <gmd:LanguageCode codeList="http://www.loc.gov/standards/iso639-
2/php/code_list.php" codeListValue="eng">eng</gmd:LanguageCode>
  </gmd:language>
  ...
</gmd:MD_Metadata>
```

29.3.6   Schematron rule

```
<sch:pattern is-a="LanguagePattern" id="Gemini2-mi33-Language">
  <sch:param name="context" value="/*[1]/gmd:language"/>
</sch:pattern>

<sch:pattern abstract="true" id="LanguagePattern">
  ...
  <sch:rule context="$context/gmd:LanguageCode">
    <sch:assert test="string-length(@codeListValue) &gt; 0">
      The language code list value is absent.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

30   METADATA DATE

30.1   Error message

255 The gmd:dateStamp element shall have a value or a valid Nil Reason.

30.2   Context

256 MD_Metadata.dateStamp

30.3   Cause

257 The dateStamp element must have a valid value or a valid nil reason.

30.4   Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:dateStamp/>
  ...
</gmd:MD_Metadata>
```

30.5   Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:dateStamp>
    <gco:Date>2010-11-10</gco:Date>
  </gmd:dateStamp>
  ...
</gmd:MD_Metadata>

<gmd:MD_Metadata>
  ...
  <gmd:dateStamp gco:nilReason="missing"/>
  ...
</gmd:MD_Metadata>

<gmd:MD_Metadata>

  ...
  <gmd:dateStamp>
    <gco:DateTime>2010-11-10T13:50:38</gco:DateTime>
  </gmd:dateStamp>

  ...

</gmd:MD_Metadata>
```

30.6   Schematron rule

```
<sch:pattern is-a="TypeNillablePattern" id="Gemini2-mi30-Nillable">
  <sch:param name="context" value="/*[1]/gmd:dateStamp"/>
</sch:pattern>

<sch:pattern abstract="true" id="TypeNillablePattern">
  <sch:rule context="$context">
    <sch:assert test="(string-length(.) &gt; 0) or
                (@gco:nilReason = 'inapplicable' or
                @gco:nilReason = 'missing' or
                @gco:nilReason = 'template' or
```

```
                @gco:nilReason = 'unknown' or
                @gco:nilReason = 'withheld' or
                starts-with(@gco:nilReason, 'other:'))">
      The <sch:name/> element shall have a value or a valid Nil Reason.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

31 METADATA POINT OF CONTACT

31.1 Not null

31.1.1 Error message

258 The value of metadata point of contact shall not be null.

31.1.2 Context

259 MD_Metadata.contact

31.1.3 Cause

260 The assertion will fail if the metadata item 'metadata point of contact' has a nilReason attribute.

31.1.4 Example – fail

```
<gmd:MD_Metadata>
   ...
   <gmd:contact gco:nilReason="missing"/>
   ...
</gmd:MD_Metadata>
```

31.1.5 Example – success

```
<gmd:MD_Metadata>
   ...
   <gmd:contact>
     ...
   </gmd:contact>
   ...
</gmd:MD_Metadata>
```

31.1.6 Schematron rule

```
<sch:pattern fpi="Gemini2-mi35">
  <sch:title>Metadata point of contact</sch:title>
  <sch:rule context="/*[1]/gmd:contact">
    <sch:assert test="count(@gco:nilReason) = 0">
      The value of metadata point of contact shall not be null.
    </sch:assert>
    ...
  </sch:rule>
</sch:pattern>
```

31.2 Point of contact role

31.2.1 Error message

261 At least one metadata point of contact shall have the role 'pointOfContact'.

31.2.2 Context

262 MD_Metadata.contact > CI_ResponsibleParty.role

31.2.3 Cause

263 This assertion fails if none of the 'metadata point of contact' instances have a role with the value 'pointOfContact'.

31.2.4   Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:contact>
    <gmd:CI_ResponsibleParty>
      ...
      <gmd:role>
        <gmd:CI_RoleCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#CI_RoleCode"
codeListValue="distributor">distributor</gmd:CI_RoleCode>
      </gmd:role>
    </gmd:CI_ResponsibleParty>
  </gmd:contact>
  <gmd:contact>
    <gmd:CI_ResponsibleParty>
      ...
      <gmd:role>
        <gmd:CI_RoleCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#CI_RoleCode"
codeListValue="custodian">custodian</gmd:CI_RoleCode>
      </gmd:role>
    </gmd:CI_ResponsibleParty>
  </gmd:contact>
  ...
</gmd:MD_Metadata>
```

31.2.5   Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:contact>
    <gmd:CI_ResponsibleParty>
      ...
      <gmd:role>
        <gmd:CI_RoleCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#CI_RoleCode"
codeListValue="pointOfContact">pointOfContact</gmd:CI_RoleCode>
      </gmd:role>
    </gmd:CI_ResponsibleParty>
  </gmd:contact>
  <gmd:contact>
    <gmd:CI_ResponsibleParty>
      ...
      <gmd:role>
        <gmd:CI_RoleCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#CI_RoleCode"
codeListValue="custodian">custodian</gmd:CI_RoleCode>
      </gmd:role>
    </gmd:CI_ResponsibleParty>
  </gmd:contact>
  ...
</gmd:MD_Metadata>
```

31.2.6   Schematron rule

```
<sch:pattern fpi="Gemini2-mi35">
  <sch:title>Metadata point of contact</sch:title>
  <sch:rule context="/*[1]/gmd:contact">
```

```
      ...
    <sch:assert
test="count(parent::node()[gmd:contact/*[1]/gmd:role/*[1]/@codeListValue='pointOfCon
tact']) >= 1">
      At least one metadata point of contact shall have the role 'pointOfContact'.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

31.3   Organisation name

31.3.1   Error message

264 One organisation name shall be provided.

31.3.2   Context

265 MD_Metadata.contact

31.3.3   Cause

266 The organisation name has an obligation of conditional in the base ISO 19115 standard. However, it must be provided in GEMINI metadata. It must occur once only within the context of an CI_ResponsibleParty element.

31.3.4   Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:contact>
    <gmd:CI_ResponsibleParty>
      <gmd:individualName>
        <gco:CharacterString>A N Other</gco:CharacterString>
      </gmd:individualName>
      <gmd:positionName>
        <gco:CharacterString>Metadata Manager</gco:CharacterString>
      </gmd:positionName>
      ...
    </gmd:CI_ResponsibleParty>
  </gmd:contact>
  ...
</gmd:MD_Metadata>
```

31.3.5   Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:contact>
    <gmd:CI_ResponsibleParty>
      ...
      <gmd:organisationName>
        <gco:CharacterString>SeaZone Solutions Limited</gco:CharacterString>
      </gmd:organisationName>
      ...
    </gmd:CI_ResponsibleParty>
  </gmd:contact>
  ...
</gmd:MD_Metadata>
```

31.3.6   Schematron rule

```
<sch:pattern is-a="ResponsiblePartyPattern" id="Gemini2-mi35-ResponsibleParty">
  <sch:param name="context" value="/*[1]/gmd:contact"/>
</sch:pattern>
```

```
<sch:pattern abstract="true" id="ResponsiblePartyPattern">
  <!-- Count of Organisation Name and Individual Name >= 1 -->
  <sch:rule context="$context">
    <sch:assert test="count(*/gmd:organisationName) = 1">
      One organisation name shall be provided.
    </sch:assert>
    ...
  </sch:rule>
</sch:pattern>
```

31.4   Email address

31.4.1   Error message

267   One email address shall be provided.

31.4.2   Context

268   MD_Metadata.contact

31.4.3   Cause

269   The element electronicMailAddress is mandatory in GEMINI metadata. One shall be provided within the context of an CI_ResponsibleParty element.

31.4.4   Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:contact>
    <gmd:CI_ResponsibleParty>
      ...
      <gmd:contactInfo>
        <gmd:CI_Contact>
          ...
          <gmd:address>
            <gmd:CI_Address>
              ...
              <gmd:electronicMailAddress>
                <gco:CharacterString>sales@seazone.com</gco:CharacterString>
              </gmd:electronicMailAddress>
              <gmd:electronicMailAddress>
                <gco:CharacterString>info@seazone.com</gco:CharacterString>
              </gmd:electronicMailAddress>
            </gmd:CI_Address>
          </gmd:address>
        </gmd:CI_Contact>
      </gmd:contactInfo>
      ...
    </gmd:CI_ResponsibleParty>
  </gmd:contact>
  ...
</gmd:MD_Metadata>
```

31.4.5   Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:contact>
    <gmd:CI_ResponsibleParty>
      ...
      <gmd:contactInfo>
```

```
        <gmd:CI_Contact>
          ...
          <gmd:address>
            <gmd:CI_Address>
              ...
              <gmd:electronicMailAddress>
                <gco:CharacterString>info@seazone.com</gco:CharacterString>
              </gmd:electronicMailAddress>
            </gmd:CI_Address>
          </gmd:address>
        </gmd:CI_Contact>
      </gmd:contactInfo>
      ...
    </gmd:CI_ResponsibleParty>
  </gmd:contact>
  ...
</gmd:MD_Metadata>
```

31.4.6   Schematron rule

```
<sch:pattern is-a="ResponsiblePartyPattern" id="Gemini2-mi35-ResponsibleParty">
  <sch:param name="context" value="/*[1]/gmd:contact"/>
</sch:pattern>

<sch:pattern abstract="true" id="ResponsiblePartyPattern">
  <sch:rule context="$context">
    ...
    <sch:assert
test="count(*/gmd:contactInfo/*[1]/gmd:address/*[1]/gmd:electronicMailAddress) = 1">
      One email address shall be provided
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

31.5   Email address not nillable

31.5.1   Error message

270 The gmd:electronicMailAddress element is not nillable and shall have a value.

31.5.2   Context

271 MD_Metadata.contact > CI_ResponsibleParty.contactInfo > CI_Contact.address >
CI_Address.electronicMailAddress

31.5.3   Cause

272 The element named gmd:electronicMailAddress has been assigned a gco:nilReason attribute or the value of
the element is an empty string.

31.5.4   Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:contact>
    <gmd:CI_ResponsibleParty>
      ...
      <gmd:contactInfo>
        <gmd:CI_Contact>
          ...
          <gmd:address>
            <gmd:CI_Address>
              ...
              <gmd:electronicMailAddress gco:nilReason="missing"/>
```

```
        </gmd:CI_Address>
      </gmd:address>
    </gmd:CI_Contact>
  </gmd:contactInfo>
  ...
</gmd:CI_ResponsibleParty>
</gmd:contact>
...
</gmd:MD_Metadata>
```

31.5.5   Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:contact>
    <gmd:CI_ResponsibleParty>
      ...
      <gmd:contactInfo>
        <gmd:CI_Contact>
          ...
          <gmd:address>
            <gmd:CI_Address>
              ...
              <gmd:electronicMailAddress>
                <gco:CharacterString>info@seazone.com</gco:CharacterString>
              </gmd:electronicMailAddress>
            </gmd:CI_Address>
          </gmd:address>
        </gmd:CI_Contact>
      </gmd:contactInfo>
      ...
    </gmd:CI_ResponsibleParty>
  </gmd:contact>
  ...
</gmd:MD_Metadata>
```

31.5.6   Schematron rule

```
<sch:pattern is-a="TypeNotNillablePattern" id="Gemini2-mi35-NotNillable">
  <sch:param name="context" value="/*[1]/gmd:contact/*[1]/gmd:organisationName |
/*[1]/gmd:contact/*[1]/gmd:contactInfo/*[1]/gmd:address/*[1]/gmd:electronicMailAddre
ss"/>
</sch:pattern>

<sch:pattern abstract="true" id="TypeNotNillablePattern">
  <sch:rule context="$context">
    <sch:assert test="string-length(.) &gt; 0 and count(./@gco:nilReason) = 0">
      The <sch:name/> element is not nillable and shall have a value.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

32 SPATIAL DATA SERVICE TYPE

32.1 Mandatory for services

32.1.1 Error message

273 If the resource type is service, one spatial data service type shall be provided.

32.1.2 Context

274 MD_Metadata.identificationInfo > SV_ServiceIdentification.serviceType

32.1.3 Cause

275 This assertion fails if the serviceType element is omitted from metadata.

32.1.4 Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:hierarchyLevel>
    <gmd:MD_ScopeCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/ML_gmxCodelists.xml#MD_ScopeCode"
codeListValue="service">service</gmd:MD_ScopeCode>
  </gmd:hierarchyLevel>
  ...
  <gmd:identificationInfo>
    <srv:SV_ServiceIdentification>
      ...
    </srv:SV_ServiceIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

32.1.5 Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:hierarchyLevel>
    <gmd:MD_ScopeCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/ML_gmxCodelists.xml#MD_ScopeCode"
codeListValue="service">service</gmd:MD_ScopeCode>
  </gmd:hierarchyLevel>
  ...
  <gmd:identificationInfo>
    <srv:SV_ServiceIdentification>
      ...
      <srv:serviceType>
        <gco:LocalName>download</gco:LocalName>
      </srv:serviceType>
      ...
    </srv:SV_ServiceIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

32.1.6 Schematron rule

```
<sch:pattern fpi="Gemini2-mi37">
  <sch:title>Spatial data service type</sch:title>
```

```
  <sch:rule context="/*[1]/gmd:identificationInfo[1]/srv:SV_ServiceIdentification |
/*[1]/gmd:identificationInfo[1]/*[@gco:isoType='srv:SV_ServiceIdentification'][1]">
    <sch:assert test="(../../gmd:hierarchyLevel/*[1]/@codeListValue = 'service' and
                count(srv:serviceType) = 1) or
                ../../gmd:hierarchyLevel/*[1]/@codeListValue != 'service'">
      If the resource type is service, one spatial data service type shall be
provided.
    </sch:assert>
    ...
  </sch:rule>
</sch:pattern>
```

32.2   Code list value

32.2.1   Error message

276 Service type shall be one of 'discovery', 'view', 'download', 'transformation', 'invoke' or 'other' following INSPIRE generic names.

32.2.2   Context

277 MD_Metadata.identificationInfo > SV_ServiceIdentification.serviceType

32.2.3   Cause

278 The base standards (ISO 19115 or ISO 19139) do not restrict the value of the service type element. The INSPIRE generic names are:

- discovery
- view
- download
- transformation
- invoke
- other

279 This assertion will fail if any other value is used.

32.2.4   Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:hierarchyLevel>
    <gmd:MD_ScopeCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/ML_gmxCodelists.xml#MD_ScopeCode"
codeListValue="service">service</gmd:MD_ScopeCode>
  </gmd:hierarchyLevel>
  ...
  <gmd:identificationInfo>
    <srv:SV_ServiceIdentification>
      ...
      <srv:serviceType>
        <gco:LocalName>map</gco:LocalName>
      </srv:serviceType>
      ...
    </srv:SV_ServiceIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

32.2.5 Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:hierarchyLevel>
    <gmd:MD_ScopeCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/ML_gmxCodelists.xml#MD_ScopeCode"
codeListValue="service">service</gmd:MD_ScopeCode>
  </gmd:hierarchyLevel>
  ...
  <gmd:identificationInfo>
    <srv:SV_ServiceIdentification>
      ...
      <srv:serviceType>
        <gco:LocalName>download</gco:LocalName>
      </srv:serviceType>
      ...
    </srv:SV_ServiceIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

32.2.6 Schematron rule

```
<sch:pattern fpi="Gemini2-mi37">
  <sch:title>Spatial data service type</sch:title>
  <sch:rule context="/*[1]/gmd:identificationInfo[1]/srv:SV_ServiceIdentification |
/*[1]/gmd:identificationInfo[1]/*[@gco:isoType='srv:SV_ServiceIdentification'][1]">
    ...
    <sch:assert test="srv:serviceType/*[1] = 'discovery' or
                  srv:serviceType/*[1] = 'view' or
                  srv:serviceType/*[1] = 'download' or
                  srv:serviceType/*[1] = 'transformation' or
                  srv:serviceType/*[1] = 'invoke' or
                  srv:serviceType/*[1] = 'other'">
    Service type shall be one of 'discovery', 'view', 'download',
'transformation', 'invoke' or 'other' following INSPIRE generic names.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

32.3 Service type is not nillable

32.3.1 Error message

280 The srv:serviceType element is not nillable and shall have a value.

32.3.2 Context

281 MD_Metadata.identificationInfo > SV_ServiceIdentification.serviceType

32.3.3 Cause

282 The element name srv:serviceType has been assigned a gco:nilReason attribute or the value of the element is an empty string.

32.3.4 Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <srv:SV_ServiceIdentification>
      ...
```

```
      <srv:serviceType gco:nilReason="unknown"/>
      ...
    </srv:SV_ServiceIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

32.3.5   Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <srv:SV_ServiceIdentification>
      ...
      <srv:serviceType>
        <gco:LocalName>download</gco:LocalName>
      </srv:serviceType>
      ...
    </srv:SV_ServiceIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

32.3.6   Schematron rule

```
<sch:pattern is-a="TypeNillablePattern" id="Gemini2-mi37-Nillable">
  <sch:param name="context"
value="/*[1]/gmd:identificationInfo[1]/*[1]/srv:serviceType"/>
</sch:pattern>

<sch:pattern abstract="true" id="TypeNotNillablePattern">
  <sch:rule context="$context">
    <sch:assert test="string-length(.) &gt; 0 and count(./@gco:nilReason) = 0">
      The <sch:name/> element is not nillable and shall have a value.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

33   COUPLED RESOURCE

33.1   Error message

283   Coupled resource shall be implemented by reference using the xlink:href attribute.

33.2   Context

284   MD_Metadata.identificationInfo > SV_ServiceIdentification.operatesOn

33.3   Cause

285   Metadata elements are typically encoded 'by value', that is the value of the element is encoded directly in the metadata instance. The ISO 19139 standard provides a mechanism for encoding values 'by reference' using the xlink:href attribute. The INSPIRE metadata encoding guidance stipulates that the metadata item 'coupled resource' is implemented 'by reference'. This assertion fails if the element is implemented 'by value'. The encoding guidance [2] contains a discussion of 'by value' and 'by reference' encoding (see section 2.2.11).

33.4   Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <srv:SV_ServiceIdentification>
      ...
      <srv:operatesOn>
        <gmd:MD_DataIdentification>
          ...
        </gmd:MD_DataIdentification>
      </srv:operatesOn>
    </srv:SV_ServiceIdentification>
  </gmd:identificationInfo>
</gmd:MD_Metadata>
```

33.5   Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <srv:SV_ServiceIdentification>
      ...
      <srv:operatesOn xlink:href="D562983F-9203-4E59-BF35-87F6FD96134C"/>
    </srv:SV_ServiceIdentification>
  </gmd:identificationInfo>
</gmd:MD_Metadata>
```

33.6   Schematron rule

```
<sch:pattern fpi="Gemini2-mi38">
  <sch:title>Coupled resource</sch:title>
  <sch:rule context="/*[1]/gmd:identificationInfo[1]/*[1]/srv:operatesOn">
    <sch:assert test="count(@xlink:href) = 1">
 Coupled resource shall be implemented by reference using the xlink:href attribute.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

34 ANCILLARY TESTS

34.1 Identification information citation

34.1.1 Error message

286 Identification information citation shall not be null.

34.1.2 Context

287 MD_Metadata.identificationInfo > MD_DataIdentification.citation

288 MD_Metadata.identificationInfo > SV_ServiceIdentification.citation

34.1.3 Cause

289 The citation element can not have a nil reason attribute.

34.1.4 Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

34.1.5 Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      <gmd:citation>
        ...
      </gmd:citation>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

34.1.6 Schematron rule

```
<sch:pattern fpi="Gemini2-at1">
  <sch:title>Data identification citation</sch:title>
  <sch:p>The identification information citation cannot be null.</sch:p>
  <sch:rule context="/*[1]/gmd:identificationInfo[1]/*[1]/gmd:citation">
    <sch:assert test="count(@gco:nilReason) = 0">
      Identification information citation shall not be null.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

34.2 First identification element (dataset and series)

34.2.1 Error message

290 The first identification information element shall be of type gmd:MD_DataIdentification.

34.2.2   Context

291   MD_Metadata.identificationInfo

34.2.3   Cause

292   Where a metadata instance is for a dataset or a series, the first identificationInfo element must have a child
element of the type MD_DataIdentification.

34.2.4   Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:hierarchyLevel>
    <gmd:MD_ScopeCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#MD_ScopeCode"
codeListValue="dataset">dataset</gmd:MD_ScopeCode>
  </gmd:hierarchyLevel>
  ...
  <gmd:identificationInfo>
    <srv:SV_ServiceIdentification>
      ...
    </srv:SV_ServiceIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

34.2.5   Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:hierarchyLevel>
    <gmd:MD_ScopeCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#MD_ScopeCode"
codeListValue="dataset">dataset</gmd:MD_ScopeCode>
  </gmd:hierarchyLevel>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

34.2.6   Schematron rule

```
<sch:pattern fpi="Gemini2-at2">
  <sch:title>Metadata resource type test</sch:title>
  <sch:p>Test to ensure that metadata about datasets include the
gmd:MD_DataIdentification element and metadata about services include the
srv:SV_ServiceIdentification element</sch:p>
  <sch:rule context="/*[1]/gmd:identificationInfo[1]">
    <sch:assert test="((../gmd:hierarchyLevel[1]/*[1]/@codeListValue='dataset' or
                ../gmd:hierarchyLevel[1]/*[1]/@codeListValue='series') and
                (local-name(*) = 'MD_DataIdentification' or
*/@gco:isoType='gmd:MD_DataIdentification')) or
                (../gmd:hierarchyLevel[1]/*[1]/@codeListValue != 'dataset' and
                ../gmd:hierarchyLevel[1]/*[1]/@codeListValue != 'series') or
                count(../gmd:hierarchyLevel) = 0">
      The first identification information element shall be of type
gmd:MD_DataIdentification.
```

```
    </sch:assert>
    ...
  </sch:rule>
</sch:pattern>
```

34.3   First identification element (service)

34.3.1   Error message

293   The first identification information element shall be of type srv:SV_ServiceIdentification.

34.3.2   Context

294   MD_Metadata.identificationInfo

34.3.3   Cause

295   Where a metadata instance is for a service, the first identificationInfo element must have a child element of the type SV_ServiceIdentification.

34.3.4   Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:hierarchyLevel>
    <gmd:MD_ScopeCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#MD_ScopeCode"
codeListValue="service">service</gmd:MD_ScopeCode>
  </gmd:hierarchyLevel>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

34.3.5   Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:hierarchyLevel>
    <gmd:MD_ScopeCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#MD_ScopeCode"
codeListValue="service">service</gmd:MD_ScopeCode>
  </gmd:hierarchyLevel>
  ...
  <gmd:identificationInfo>
    <srv:SV_ServiceIdentification>
      ...
    </srv:SV_ServiceIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

34.3.6   Schematron rule

```
<sch:pattern fpi="Gemini2-at2">
  <sch:title>Metadata resource type test</sch:title>
  <sch:p>Test to ensure that metadata about datasets include the
```

```
gmd:MD_DataIdentification element and metadata about services include the
srv:SV_ServiceIdentification element</sch:p>
  <sch:rule context="/*[1]/gmd:identificationInfo[1]">
    ...
    <sch:assert test="((../gmd:hierarchyLevel[1]/*[1]/@codeListValue='service') and
                  (local-name(*) = 'SV_ServiceIdentification' or
*/@gco:isoType='srv:SV_ServiceIdentification')) or
                  (../gmd:hierarchyLevel[1]/*[1]/@codeListValue != 'service') or
                  count(../gmd:hierarchyLevel) = 0">
      The first identification information element shall be of type
srv:SV_ServiceIdentification.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

34.4 File identifier is mandatory

34.4.1 Error message

296 A metadata file identifier shall be provided. Its value shall be a system generated GUID.

34.4.2 Context

297 MD_Metadata.fileIdentifier

34.4.3 Cause

298 The item 'metadata file identifier' is a system level mandatory element. This assertion will fail if it is omitted from a metadata instance or if there is more than one 'metadata file identifier' in a metadata instance.

34.4.4 Example – fail

```
<gmd:MD_Metadata>
  ...
</gmd:MD_Metadata>
```

34.4.5 Example – success

```
<gmd:MD_Metadata>
  <gmd:fileIdentifier>
    <gco:CharacterString>A0810C40-CD23-430E-97D2-18E73DEF9A5D</gco:CharacterString>
  </gmd:fileIdentifier>
  ...
</gmd:MD_Metadata>
```

34.4.6 Schematron rule

```
<sch:pattern fpi="Gemini2-at3">
  <sch:title>Metadata file identifier</sch:title>
  <sch:p>A file identifier is required</sch:p>
  <sch:rule context="/*[1]">
    <sch:assert test="count(gmd:fileIdentifier) = 1">
      A metadata file identifier shall be provided. Its value shall be a system
generated GUID.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

34.5 File identifier not nillable

34.5.1 Error message

299 The gmd:fileIdentifier element is not nillable and shall have a value.

34.5.2 Context

300 MD_Metadata.fileIdentifier

34.5.3 Cause

301 The item 'metadata file identifier' is a system level mandatory element and it must have a valid globally unique value. This assertion will fail the file identifier has a nil reason attribute.

34.5.4 Example – fail

```
<gmd:MD_Metadata>
  <gmd:fileIdentifier gco:nilReason="missing"/>
  ...
</gmd:MD_Metadata>
```

34.5.5 Example – success

```
<gmd:MD_Metadata>
  <gmd:fileIdentifier>
    <gco:CharacterString>A0810C40-CD23-430E-97D2-18E73DEF9A5D</gco:CharacterString>
  </gmd:fileIdentifier>
  ...
</gmd:MD_Metadata>
```

34.5.6 Schematron rule

```
<sch:pattern is-a="TypeNotNillablePattern" id="Gemini2-at3-NotNillable">
  <sch:param name="context" value="/*[1]/gmd:fileIdentifier"/>
</sch:pattern>

<sch:pattern abstract="true" id="TypeNotNillablePattern">
  <sch:rule context="$context">
    <sch:assert test="string-length(.) &gt; 0 and count(./@gco:nilReason) = 0">
      The <sch:name/> element is not nillable and shall have a value.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

34.6 Constraints

34.6.1 Error message

302 Limitations on public access and use constraints are required.

34.6.2 Context

303 MD_Metadata.identificationInfo > MD_DataIdentification.resourceConstraints

304 MD_Metadata.identificationInfo > SV_ServiceIdentification.resourceConstraints

34.6.3 Cause

305 The resourceConstraints element, within which the constraints metadata items 'limitations on public access' and 'use limitation' are encoded, is an optional element. This assertion is included to ensure that a warning is issued if it is omitted from metadata, to indicate that the constraints items are missing. This assertion fails if resourceConstraints is omitted from metadata.

34.6.4 Example – fail

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
```

```
    ...
  </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

34.6.5   Example – success

```
<gmd:MD_Metadata>
  ...
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      ...
      <gmd:resourceConstraints>
        ...
      </gmd:resourceConstraints>
      ...
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
  ...
</gmd:MD_Metadata>
```

34.6.6   Schematron rule

```
<sch:pattern fpi="Gemini2-at4">
  <sch:title>Constraints</sch:title>
  <sch:p>Constraints (Limitations on public access and use constraints) are
required.</sch:p>
  <sch:rule context="/*[1]/gmd:identificationInfo[1]/*[1]">
    <sch:assert test="count(gmd:resourceConstraints) &gt;= 1">
      Limitations on public access and use constrains are required.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```

34.7   One creation date

34.7.1   Error message

306 The shall not be more than one creation date.

34.7.2   Context

307 CI_Citation.date > CI_Date.dateType

308 Note that, uniquely, the context is not based in MD_Metadata. This assertion tests all CI_Citation elements that occur in a metadata instance.

34.7.3   Cause

309 This assertion fails if there is more than one date element with a date type of 'creation'.

34.7.4   Example – fail

```
<gmd:CI_Citation>
  ...
  <gmd:date>
    <gmd:CI_Date>
      <gmd:date>
        <gco:Date>2003-02-17</gco:Date>
      </gmd:date>
      <gmd:dateType>
        <gmd:CI_DateTypeCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
```

```
/resources/Codelist/gmxCodelists.xml#CI_DateTypeCode"
codeListValue="creation">creation</gmd:CI_DateTypeCode>
      </gmd:dateType>
    </gmd:CI_Date>
  </gmd:date>
  <gmd:date>
    <gmd:CI_Date>
      <gmd:date>
        <gco:Date>2003-02-17</gco:Date>
      </gmd:date>
      <gmd:dateType>
        <gmd:CI_DateTypeCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#CI_DateTypeCode"
codeListValue="creation">creation</gmd:CI_DateTypeCode>
      </gmd:dateType>
    </gmd:CI_Date>
  </gmd:date>
  ...
</gmd:CI_Citation>
```

34.7.5   Example – success

```
<gmd:CI_Citation>
  ...
  <gmd:date>
    <gmd:CI_Date>
      <gmd:date>
        <gco:Date>2003-02-17</gco:Date>
      </gmd:date>
      <gmd:dateType>
        <gmd:CI_DateTypeCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#CI_DateTypeCode"
codeListValue="creation">creation</gmd:CI_DateTypeCode>
      </gmd:dateType>
    </gmd:CI_Date>
  </gmd:date>
  <gmd:date>
    <gmd:CI_Date>
      <gmd:date>
        <gco:Date>2003-02-17</gco:Date>
      </gmd:date>
      <gmd:dateType>
        <gmd:CI_DateTypeCode
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas
/resources/Codelist/gmxCodelists.xml#CI_DateTypeCode"
codeListValue="publication">publication</gmd:CI_DateTypeCode>
      </gmd:dateType>
    </gmd:CI_Date>
  </gmd:date>
  ...
</gmd:CI_Citation>
```

34.7.6   Schematron rule

```
<sch:pattern fpi="Gemini2-at5">
  <sch:title>Creation date type</sch:title>
  <sch:p>Constrain citation date type = creation to one occurrence.</sch:p>
  <sch:rule context="//gmd:CI_Citation | //*[@gco:isoType='gmd:CI_Citation'][1]">
    <sch:assert
test="count(gmd:date/*[1]/gmd:dateType/*[1][@codeListValue='creation']) &lt;= 1">
      The shall not be more than one creation date.
```

```
        </sch:assert>
    </sch:rule>
</sch:pattern>
```

```
        </sch:assert>
```

BIBLIOGRAPHY

Error	Section
The gmd:title element is not nillable and shall have a value.	3
The gmd:alternateTitle element shall have a value or a valid Nil Reason.	4
Language shall be implemented with gmd:LanguageCode.	5.1
The language code list value is absent.	5.2
The gmd:abstract element is not nillable and shall have a value.	6
Topic category is mandatory for datasets and series. One or more shall be provided.	7.1
Topic category shall not be null.	7.2
Descriptive keywords are mandatory.	8.1
The gmd:keyword element shall have a value or a valid Nil Reason.	8.2
The gmd:title element is not nillable and shall have a value.	8.3
The codeListValue attribute does not have a value.	8.4
Temporal extent shall be implemented using gml:TimePeriod or gml:TimeInstant.	9
The codeListValue attribute does not have a value.	10
Lineage is mandatory for datasets and series. One shall be provided.	11.1
The gmd:statement element shall have a value or a valid Nil Reason.	11.2
Geographic bounding box is mandatory for datasets and series. One or more shall be provided.	12.1
West bounding longitude has a value of <X> which is outside bounds.	12.2
East bounding longitude has a value of <X> which is outside bounds.	12.2
North bounding latitude has a value of <Y> which is outside bounds.	12.2
South bounding latitude has a value of <Y> which is outside bounds.	12.2
The gmd:westBoundLongitude element is not nillable and shall have a value.	12.3
The gmd:eastBoundLongitude element is not nillable and shall have a value.	12.4
The gmd:southBoundLatitude element is not nillable and shall have a value.	12.5
The gmd:northBoundLatitude element is not nillable and shall have a value.	12.6
The gmd:code element shall have a value or a valid Nil Reason	13
The gmd:minimumValue element shall have a value or a valid Nil Reason.	14
The gmd:maximumValue element shall have a value or a valid Nil Reason.	14
The gmd:code element shall have a value or a valid Nil Reason.	15
The gmd:distance element shall have a value or a valid Nil Reason.	16
The value of resource locator does not appear to be a valid URL. It has a value of '[VALUE]'. The URL must start with either http://, https:// or ftp://.	17.1
The gmd:linkage element shall have a value or a valid Nil Reason.	17.2
The gmd:name element shall have a value or a valid Nil Reason.	18
The gmd:version element shall have a value or a valid Nil Reason.	18
Responsible organisation is mandatory. At least one shall be provided.	19.1

The value of responsible organisation shall not be null.	19.2
One organisation name shall be provided.	19.3
One email address shall be provided.	19.4
The gmd:organisationName element is not nillable and shall have a value.	19.5
The codeListValue attribute does not have a value.	19.6
The codeListValue attribute does not have a value.	20
Limitations on public access code list value shall be 'otherRestrictions'.	21.1
Limitations on public access shall be expressed using gmd:otherConstraints.	21.2
The gmd:otherConstraints element shall have a value or a valid nil reason.	21.3
The codeListValue attribute does not have a value.	21.4
Use constraints shall be provided.	22.1
The gmd:useLimitation element shall have a value or a valid Nil Reason.	22.2
The gmd:supplementalInformation element shall have a value or a valid Nil Reason	23
Unique resource identifier is mandatory for datasets and series. One or more shall be provided.	24.1
The gmd:code element is not nillable and shall have a value.	24.2
The gmd:codeSpace element shall have a value or a valid Nil Reason	24.3
Resource type is mandatory. One shall be provided.	25.1
Value of resource type shall be 'dataset', 'series' or 'service'.	25.2
The codeListValue attribute does not have a value.	25.3
The gmd:pass element is not nillable and shall have a value.	26.1
The gmd:explanation element shall have a value or a valid Nil Reason.	26.2
The gmd:title element is not nillable and shall have a value.	27.1
The gmd:date element shall have a value or a valid Nil Reason.	27.2
The codeListValue attribute does not have a value.	27.3
The gmd:denominator element shall have a value or a valid Nil Reason.	28
Language shall be implemented with gmd:LanguageCode.	29.1
The language code list value is absent.	29.3
The gmd:dateStamp element shall have a value of a valid Nil Reason.	30
The value of metadata point of contact shall not be null.	31.1
At least one metadata point of contact shall have the role 'pointOfContact'.	31.2
One organisation name shall be provided.	31.3
One email address shall be provided.	31.4
The gmd:electronicMailAddress element is not nillable and shall have a value.	31.5
If the resource type is service, one spatial data service type shall be provided.	32.1
Service type shall be one of 'discovery', 'view', 'download', 'transformation', 'invoke' or 'other' following INSPIRE generic names.	32.2
The srv:serviceType element is not nillable and shall have a value.	32.3
Coupled resource shall be implemented by reference using the xlink:href attribute.	33

Identification information citation shall not be null.	34.1
The first identification information element shall be of type gmd:MD_DataIdentification.	34.2
The first identification information element shall be of type srv:SV_ServiceIdentification.	34.3
A metadata file identifier shall be provided. Its value shall be a system generated GUID.	34.4
The gmd:fileIdentifier element is not nillable and shall have a value.	34.5
Limitations on public access and use constraints are required.	34.6
The shall not be more than one creation date.	34.7

APPENDIX 1

Context expression

311 The context will be expressed in the following way:

312 ClassName.propertyName > ClassName.propertyName

313 For example:

314 MD_Metadata.identificationInfo > MD_DataIdentification
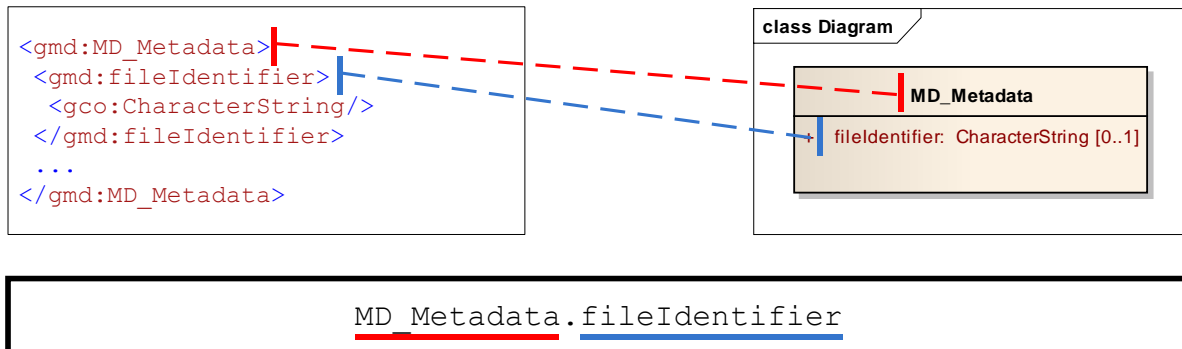

Figure 1 – Context expression for fileIdentifier

315 Figure 1 is an attempt to show how the context expression signifies the structure in XML and ISO 19115 UML classes. In this case the context is the fileIdentifier property of the class MD_Metadata. The red and blue lines indicate how the XML elements on the left are represented in a UML class diagram, which is a simplified view of ISO 19115. Below is the corresponding context expression.

316 An example which resolves to a deeper level is shown in Figure 2. The context is the class MD_DataIdentification. This class is the type of the identificationInfo property of the class MD_Metadata. The context expression resolves to MD_Metadata.identificationInfo > MD_DataIdentification.

317 The class MD_DataIdentification is a sub-type of the class MD_Identification. The class SV_ServiceIdentification is also a sub-type of the class MD_Identification. The corresponding XML may, as a result, exhibit either an element named gmd:MD_DataIdentification (for dataset or series metadata) or an element named srv:SV_ServiceIdentification (for service metadata), as an element of gmd:identificationInfo. Both sub-type classes inherit properties of the class MD_Identification. The property descriptiveKeywords, for example, is inherited by both. So, descriptive keywords may occur in the context:

318 MD_Metadata.identificationInfo > MD_DataIdentification

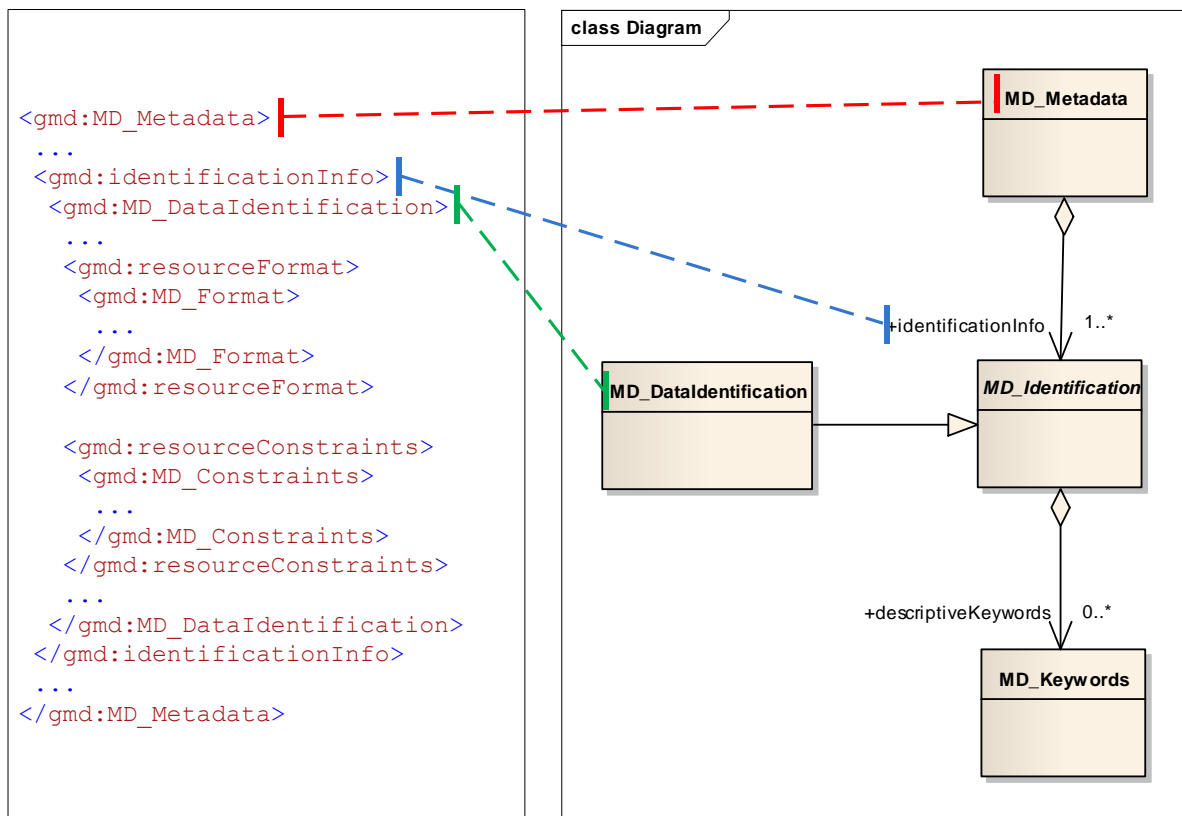319 or

320 MD_Metadata.identificationInfo > SV_ServiceIdentification

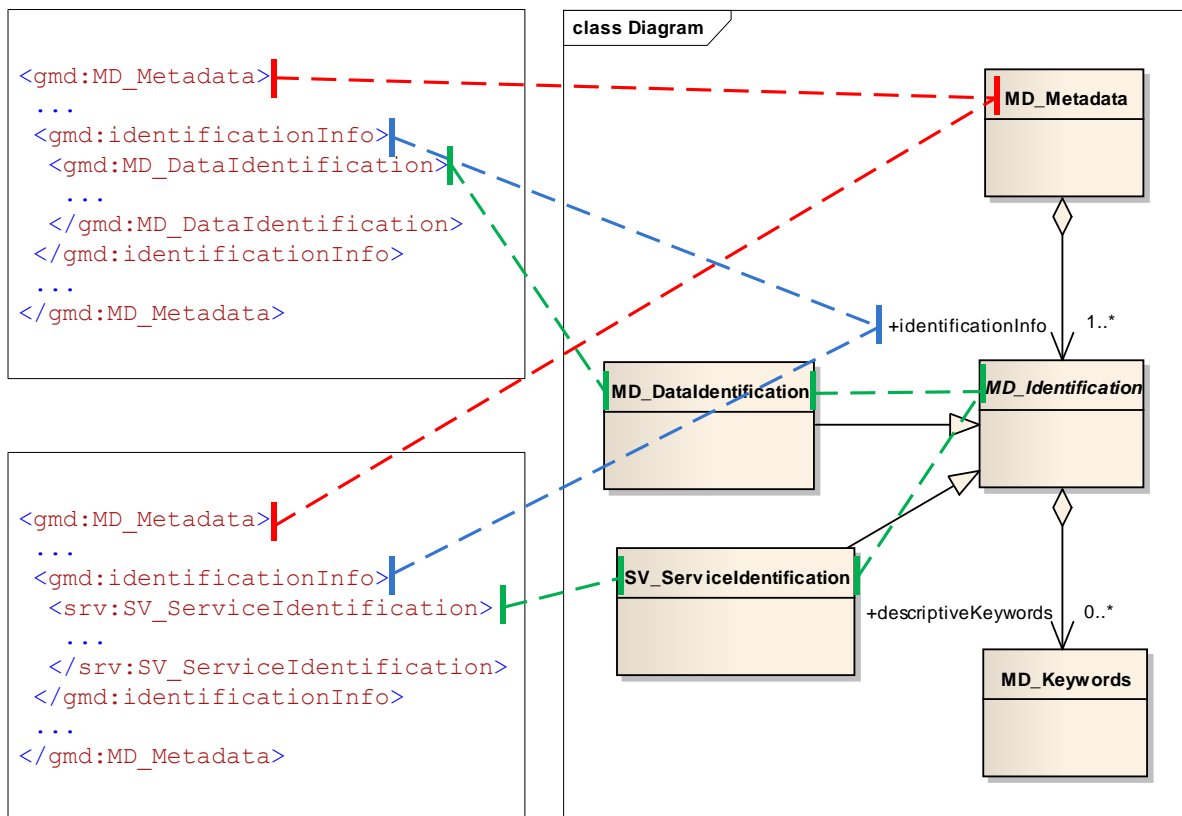321 In this and similar cases, the context expression will show both cases.

322 Incidentally, the element gmd:MD_Identification can never appear in XML because it is an abstract type. Abstract types can never be instantiated.

323 Figure 3 shows the context expression diagrammatically.

```
<gmd:MD_Metadata>
 ...
 <gmd:identificationInfo>
  <gmd:MD_DataIdentification>
   ...
   <gmd:resourceFormat>
    <gmd:MD_Format>
     ...
    </gmd:MD_Format>
   </gmd:resourceFormat>

   <gmd:resourceConstraints>
    <gmd:MD_Constraints>
     ...
    </gmd:MD_Constraints>
   </gmd:resourceConstraints>
   ...
  </gmd:MD_DataIdentification>
 </gmd:identificationInfo>
 ...
</gmd:MD_Metadata>
```

MD_Metadata.identificationInfo > MD_DataIdentification

Figure 2 – Context expression for MD_DataIdentification

Figure 3 – Context for MD_Identification

APPENDIX 2

Schematron pattern

324 A rule in a Schematron schema contains an unordered collection of assertions. An assertion is a statement that a logical test is true. An assertion either succeeds or fails. If, during a validation process, one or more assertions in a Schematron schema fails, the XML instance being validated is said to be invalid with respect to the Schematron schema.

325 A rule has a context. The context defines where, in the hierarchy of an XML instance, the assertions contained in the rule will fire. The context is expressed using XPath. For example, the context for the Keyword rule is:

326 /*[1]/gmd:identificationInfo[1]/*[1]

327 The declaration [1] in the XPath indicates that the first child element in the tree is tested. There may be more than one gmd:identificationInfo element in a metadata instance, but for the purposes of GEMINI and INSPIRE, only the first is considered. However, there can only be one parent of gmd:identificationInfo, and it can contain only one child element, so the other [1] declarations may seem superfluous. These were added to the Schematron schema because GeoNetwork inserts other child elements to XML as part of its internal validation processes. The [1] declarations prevent these from being assessed by the Schematron schema and causing irrelevant errors. In terms of ISO 19115 classes and properties, the XPath can be expressed as:

328 MD_Metadata.identificationInfo > MD_Identification

329 Any assertion listed in the Keyword rule will fire only in the context of the MD_Identification class. This is reasonable because keywords in ISO 19115 are found as a property of MD_Identification.

330 An assertion has a test. The test must evaluate to true for an assertion to succeed. The Keyword rule has only one assertion and the test, expressed in XPath again, is:

331 count(gmd:descriptiveKeywords) >= 1

332 This is how it is expressed in the Schematron schema. The characters '>' are a way of writing the '>' character in XML. This character is reserved in XML because it is part of the element name notation so a means of showing that we really do mean the character '>' and not the end of an XML element name is needed. Other escape sequences, as these sets of characters are known, in use in the Schematron schema are '&' for the character '&' and '<' for the character '<'.

333 In natural language, this test means that the count of gmd:descriptiveKeywords elements [in the context of MD_Metadata.identificationInfo > MD_Identification] must be greater than or equal to one.

334 Put simply, Keywords is a mandatory element in GEMINI and must occur at least once in a metadata instance.

335 An assertion also has a value. In the case of Keywords, the value is:

336 Descriptive keywords are mandatory

337 This text appears in the Schematron schema output if the assertion fails, that is to say that the metadata instance being validated has no gmd:descriptiveKeywords elements.

338 The Schematron pattern for Keywords is shown below.

```xml
<sch:pattern fpi="Gemini2-mi6">
  <sch:title>Keyword</sch:title>
  <sch:rule context="/*[1]/gmd:identificationInfo[1]/*[1]">
    <sch:assert test="count(gmd:descriptiveKeywords) &gt;= 1">
      Descriptive keywords are mandatory.
    </sch:assert>
  </sch:rule>
</sch:pattern>
```