OGC® Catalogue Services Specification 2.0
Extension Package for ebRIM (ISO/TS 15000-3) Application Profile:
Earth Observation Products

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i. Preface

This document describes the mapping of Earth Observation Products – defined in the OGC® GML 3.1.1 Application schema for Earth Observation products [OGC 06-080r2] (version 0.1.4r5) – to an ebRIM structure within an OGC™ Catalogue 2.0.2 (Corrigendum 2 Release) [OGC 07-006r1] implementing the CSW-ebRIM Registry Service – part 1: ebRIM profile of CSW [OGC 07-110r2].

It defines the way HMA (Heterogeneous Earth Observation Missions Accessibility) resources (Earth Observation products metadata) are organized and implemented in the Catalogue for the discovery, retrieval and management.

ii. Document terms and definitions

This document uses the specification terms defined in Subclause 5.3 of [OGC 05-008], which is based on the ISO/IEC Directives, Part 2. Rules for the structure and drafting of International Standards. In particular, the word “shall” (not “must”) is the verb form used to indicate a requirement to be strictly followed to conform to this specification.

iii. Submitting organizations

The following organizations submitted the original document to the OGC® Catalogue Services Specification 2.0 Revision Working Group.

- Leica Geosystems Geospatial Imaging (was Ionic Software s.a.)
- Spacebel s.a.
- European Space Agency
iv. Document contributor contact points

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v. Revision history

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vi. **Changes to the OGC Abstract Specification**

The OGC® Abstract Specification does not require changes to accommodate the technical contents of this document.

vii. **Future work**

At this stage, the current document is a work in progress.
Foreword

This document has been created under the impulsion of European Space Agency in the scope of the Heterogeneous Missions Accessibility project. This document is built in conformance with the [OGC 06-080r3] GML Application Schema for EO Products document proposed by the European Space Agency, the French Space Agency, the European Satellite Center, Spacebel s.a. and Spot Image in an early phase of the HMA Project.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. The Open Geospatial Consortium Inc. shall not be held responsible for identifying any or all such patent rights.

Recipients of this document are requested to submit, with their comments, notification of any relevant patent claims or other intellectual property rights of which they may be aware that might be infringed by any implementation of the standard set forth in this document, and to provide supporting documentation.
Introduction

This Best Practice document is part of a set that describes services for managing Earth Observation (EO) data products. The services include collection level and product level catalogues, online-ordering for existing and future products, online access, etc. These services are put into context in an overall document [HMA TN] HMA Architectural Design Technical Note version 1.7 14/09/2007.

The services described in this document are intended to support the identification of (EO) data products from previously identified data collections. In other words, the search and present of metadata from catalogues of EO data products through standard compliant operations. The intent of this profile is to describe a cost effective interface that can be supported by many data providers (satellite operators, data distributors …), most of whom have existing (and relatively complex) facilities for the management of these data.

EO data product collections are usually structured to describe data products derived from a single sensor onboard a satellite or series of satellites. Products from different classes of sensors usually require specific product metadata. The following classes of products have been identified so far: radar, optical, atmospheric. The proposed approach is to identify a common set of elements grouped in a common (EOP) schema and extend this common schema to add sensors specific metadata.

1 Scope

This OGC® document specifies the Earth Observation Products Extension Package for ebRIM (ISO/TS 15000-3) Application Profile of CSW 2.0, based on the [OGC 06-080r3] OGC® GML Application Schema for EO Products.

It enables CSW-ebRIM catalogues to handle a variety of metadata pertaining to earth observation, like EO Products defined in [OGC 06-080r3].

This proposed application profile document describes the interfaces, bindings and encodings required to discover, search and present metadata from catalogues of Earth Observation products. The profile presents a minimum specification for catalogue interoperability within the EO domain, with extensions for specific classes of data.

2 Compliance

Compliance with this specification shall be checked using all the relevant tests specified in Annex A (normative).

3 Normative references

Parts of the following normative documents are referenced in this text. For dated references, subsequent amendments to, or revisions of, any of these publications do
not apply. For undated references, the latest edition of the normative document referred to applies.

[ebRIM] OASIS ebXML Registry Information Model Version 3.0


[OGC 04-095] OGC™ Filter Encoding Implementation Specification, version 1.1.0, 2005/05/03

[OGC 05-008] OGC™ Web Services Common Specification Corrigendum, version 1.0.0, 2005/11/22


[OGC 07-144r2] OGC™ CSW-ebRIM Registry Service – Part 2 : Basic extension package, version 1.0.0, 2008/02/29

[OGC 06-080r3] OGC™ GML 3.1.1 Application Schema for Earth Observation Products, version 0.9.1, 2007/08/01

[OGC 07-006r1] OGC™ Catalogue Services Specification, version 2.0.2 (Corrigendum 2 Release), 2007/02/23

[OGC 06-023r1] OGC™ Definition identifier URNs in OGC namespace, version 1.1.0, 2006/08/08.


In addition to this document, this specification includes several normative XML Schema Document files as specified in Annex B.

4 Terms and definitions

For the purposes of this specification, the definitions specified in Clause 4 of the [OGC 05-008] OGC™ OWS Common Implementation Specification shall apply. In addition, the following terms and definitions apply.

4.1 application profile
see the term “profile” in this list.

4.2 client
software component that can invoke an operation from a server
4.3 data level
stratum within a set of layered levels in which data is recorded that conforms to
definitions of types found at the application model level [ISO 19101]

4.4 dataset series (dataset collection)
collection of datasets sharing the same product specification [ISO 19113, ISO 19114, ISO 19115]. In the earth observation context, a collection typically corresponds to
datasets (i.e. products) derived from data acquired by a single sensor onboard a
satellite or series of satellites.

4.5 datastrip
a satellite acquisition

4.6 geographic dataset
dataset with a spatial aspect [ISO 19115]

4.7 geographic information
information concerning phenomena implicitly or explicitly associated with a location
relative to the Earth [ISO 19128 draft]

4.8 georesource
geographic information of a specific type (e.g. geographic dataset, geographic
application, geographic service)

4.9 identifier
linguistically independent sequence of characters capable of uniquely and
permanently identifying that with which it is associated.

4.10 interface
named set of operations that characterize the behavior of an entity [ISO 19119]

4.11 metadata dataset (metadataset)
metadata describing a specific dataset [ISO 19101]

4.12 metadata entity
group of metadata elements and other metadata entities describing the same aspect of
data

1 Due to historical reasons we will mainly use the term ‘dataset collection’ in this document although the term
‘dataset series’ is used in the ISO/TC211 Terminology Maintenance Group.
NOTE 1  A metadata entity may contain one or more metadata entities.

NOTE 2  A metadata entity is equivalent to a class in UML terminology [ISO 19115].

4.13  metadata schema  
conceptual schema describing metadata

NOTE  ISO 19115 describes a standard for a metadata schema. [ISO 19101]

4.14  metadata section  
subset of metadata that defines a collection of related metadata entities and elements [ISO 19115]

4.15  operation  
specification of a transformation or query that an object may be called to execute [ISO 19119]

4.16  parameter  
variable whose name and value are included in an operation request or response

4.17  profile  
set of one or more base standards and – where applicable – the identification of chosen clauses, classes, subsets, options and parameters of those base standards that are necessary for accomplishing a particular function [ISO 19101, ISO 19106]

NOTE  The terms “profile” and “application profile” are used interchangeably in this document.

4.18  qualified name  
name that is prefixed with its naming context

4.19  request  
invocation of an operation by a client

4.20  response  
result of an operation, returned from a server to a client

4.21  schema  
formal description of a model [ISO 19101, ISO 19103, ISO 19109, ISO 19118]

4.22  server  
service instance  
a particular instance of a service [ISO 19119]
4.23 service
distinct part of the functionality that is provided by an entity through interfaces [ISO 19119]
capability which a service provider entity makes available to a service user entity at the interface between those entities [ISO 19104 terms repository]

4.24 service interface
shared boundary between an automated system or human being and another automated system or human being [ISO 19101]

4.25 service metadata
metadata describing the operations and geographic information available at a server [ISO 19128 draft]

4.26 state
condition that persists for a period

NOTE The value of a particular feature attribute describes a condition of the feature [ISO 19108].

4.27 transfer protocol
common set of rules for defining interactions between distributed systems [ISO 19118]

4.28 version
version of an Implementation Specification (document) and XML Schemas to which the requested operation conforms

NOTE An OWS Implementation Specification version may specify XML Schemas against which an XML encoded operation request or response must conform and should be validated.

5 Conventions

5.1 Abbreviated terms
Some more frequently used abbreviated terms:

API Application Program Interface
ATM Atmospheric Type (Namespace)
BPEL Business Process Execution Language
COTS Commercial Off The Shelf
CQL Common Query Language
CRS Coordinate Reference System
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<td>Geography Markup Language</td>
</tr>
<tr>
<td>HMA</td>
<td>Heterogeneous Missions Accessibility</td>
</tr>
<tr>
<td>HTTP</td>
<td>HyperText Transport Protocol</td>
</tr>
<tr>
<td>ISO</td>
<td>International Organization for Standardization</td>
</tr>
<tr>
<td>OGC</td>
<td>Open Geospatial Consortium</td>
</tr>
<tr>
<td>OPT</td>
<td>Optical Type (Namespace)</td>
</tr>
<tr>
<td>PHR</td>
<td>Pleiades High Resolution Type (Namespace)</td>
</tr>
<tr>
<td>SAR</td>
<td>Synthetic Aperture Radar Type (Namespace)</td>
</tr>
<tr>
<td>SOAP</td>
<td>Simple Object Access Protocol</td>
</tr>
<tr>
<td>SQL</td>
<td>Structured Query Language</td>
</tr>
<tr>
<td>UML</td>
<td>Unified Modeling Language</td>
</tr>
<tr>
<td>URI</td>
<td>Uniform Resource Identifier</td>
</tr>
<tr>
<td>URL</td>
<td>Uniform Resource Locator</td>
</tr>
<tr>
<td>URN</td>
<td>Uniform Resource Name</td>
</tr>
<tr>
<td>UTF-8</td>
<td>Unicode Transformation Format-8</td>
</tr>
<tr>
<td>WSDL</td>
<td>Web Service Definition Language</td>
</tr>
<tr>
<td>W3C</td>
<td>World Wide Web Consortium</td>
</tr>
<tr>
<td>XML</td>
<td>eXtensible Markup Language</td>
</tr>
</tbody>
</table>

### 5.2 UML notation

Some of the diagrams in this document are presented using the Unified Modeling Language (UML) static structure diagram. The UML notations used in this document are described in Figure 1, below.
Association between classes

```
<table>
<thead>
<tr>
<th>Role-1</th>
<th>Role-2</th>
<th>Association Name</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Class #1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Class #2</td>
</tr>
</tbody>
</table>
```

Association Cardinality

```
<table>
<thead>
<tr>
<th>Association Cardinality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Only one Class</td>
</tr>
<tr>
<td>Zero or more Class</td>
</tr>
<tr>
<td>Optional (zero or one)</td>
</tr>
<tr>
<td>One or more Class</td>
</tr>
<tr>
<td>Specific number</td>
</tr>
</tbody>
</table>
```

Aggregation between classes

```
<table>
<thead>
<tr>
<th>Aggregate Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Component Class #1</td>
</tr>
<tr>
<td>Component Class #2</td>
</tr>
<tr>
<td>…………</td>
</tr>
</tbody>
</table>
```

Class Inheritance (subtyping of classes)

```
<table>
<thead>
<tr>
<th>Superclass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subclass #1</td>
</tr>
<tr>
<td>Subclass #2</td>
</tr>
<tr>
<td>…………</td>
</tr>
<tr>
<td>Subclass #n</td>
</tr>
</tbody>
</table>
```

Figure 1: UML notations

In these UML class diagrams, the class boxes with a light background are the primary classes being shown in this diagram, often the classes from one UML package. The class boxes with a gray background are other classes used by these primary classes, usually classes from other packages.

In this diagram, the following stereotypes of UML classes are used:

<<Interface>> A definition of a set of operations that is supported by objects having this interface. An Interface class cannot contain any attributes.

<<Type>> A stereotyped class used for specification of a domain of instances (objects), together with the operations applicable to the objects. A Type class may have attributes and associations.

<<DataType>> A descriptor of a set of values that lack identity (independent existence and the possibility of side effects). A DataType is a class with no operations whose primary purpose is to hold the information.

<<CodeList>> A flexible enumeration that uses string values for expressing a list of potential values. If the list alternatives are completely known, an enumeration shall be used; if the only likely alternatives are known, a code list shall be used.

<<Enumeration>> A data type whose instances form a list of alternative literal values. Enumeration means a short list of well-understood potential values within a class.
In this document, the following standard data types are used:

**CharacterString** – A sequence of characters

**Boolean** – A value specifying TRUE or FALSE

**Integer** – An integer number

**Identifier** – Unique identifier of an object

**URI** – An identifier of a resource that provides more information

**URL** – An identifier of an on-line resource that can be electronically accessed

### 5.3 Used parts of other documents

This document uses significant parts of OGC™ GML Application Schema for EO Products document [OGC 06-080r3]. To reduce the need to refer to that document, this document copies some of those parts.

### 6 System context

This section focuses on the purpose, scope and policies of catalogue services that comply with the given profile. It documents special requirements and describes the context of use.

#### 6.1 Application domain

The catalogue services proposed in this profile are intended to support the retrieval of EO products metadata possibly in two steps.

Step 1: identification of collections of interest through a catalogue of collections metadata.

Step 2: identification of EO products of interest within one or several collections through a catalogue of EO products metadata. This profile covers step 2. For the retrieval of EO products metadata, the defined interface should allow to implement both generic clients not aware of sensor specific metadata and more specialized clients aware of sensors specific metadata.

#### 6.2 Essential use cases

The use cases for this profile are the ebRIM profile of CSW use cases applied to Earth Observation. See [OGC 07-110r2].

### 7 Catalogue Infrastructure Overview

Catalogues are intended to store metadata describing resources published by providers and allow clients to find these resources. These resources metadata are organized in Catalogues according to specific data models, based on registry information model.
This schema clearly describes the following:

- **Resources** are described using **Metadata**, 

- **Metadata** are stored in **Catalogues**, according to a **ExtensionPackage** defining accurately the mapping of such type of resources (**ExtensionPackage** is resource-specific),

- **ExtensionPackage** is based on a generic model, called the **RegistryInformationModel** (aka **RIM**). The **RegistryInformationModel** is common to all resources within a catalogue,

- **Applications** use **Catalogues** to discover resources through their metadata.

In the Earth Observation context:

- **Resources** are **Earth Observation Products** (aka **EOProducts**),

- **Metadata** (describing **EOProducts**) are encoded into GML documents in conformance with [OGC 06-080r3],

- **Metadata** are stored in **Catalogues** according to the **EOProducts ExtensionPackage**

- The **EOProducts ExtensionPackage** is based on the **ebRIM** (a **RegistryInformationModel** used in an **Application Profile** of CSW 2.0 compliant catalogues),
Specifications define:

- The way to interact with Catalogues through operations on the service (a Web Service in this case), to publish and query data,
- The way to use a registry information model (in this case ebRIM) to allow mapping of resources in Catalogues,
- The way to map each kind of metadata in the RIM (this way is called the extension package). A specific kind of resource (e.g., an Earth Observation Product) shall be modeled using the same set of ebRIM objects in all Catalogues. Indeed, discover queries are strongly dependent on the chosen mapping. Even if this strong dependance can be a drawback for client implementation, flexibility can be enhanced and complexity reduced to the client point of view using mechanisms like stored queries (see chapter 16 of [OGC 07-110r2]). A single and common (standardized) mapping ensures interoperability between Catalogue implementations.

This document defines the extension package for Earth Observation Products. This document extends the the [OGC 07-006r1] OGC™ Catalogue Services Specification 2.0.2 (Corrigendum 2 Release) and the [OGC 07-110r2] CSW-ebRIM Registry Service - Part 1: ebRIM profile of CSW by adding mandatory support of requests and responses in SOAP 1.2.

8 Earth Observation Resource Mapping

8.1 General Information
The scope of the information managed within this profile is the core metadata that are required to distinguish and identify EO Products. Two levels of metadata describe the EO Products, the collection level (i.e., dataset collection) and the product level (i.e., dataset).
Collection level metadata are defined using the [ISO 19115:2003] ISO/TC211 Metadata Standards. Product level metadata are defined using the [OGC 06-080r3] OGC™ GML Application Schema for EO Products (version 0.1.4r5).

This document defines how the product level metadata can be registered smoothly into CS-W Catalogues implementing the ebRIM Application Profile. It also defines the set of fields that are available for efficient discovery.

**Table 1 — EOProduct Metadata Levels**

<table>
<thead>
<tr>
<th>Information resource</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EO Product Collection</td>
<td>Mapped to <em>dataset collection</em> in OGC Terminology. Set of metadata that describes an EO Product Collection.</td>
</tr>
<tr>
<td>EO Product</td>
<td>Mapped to <em>dataset</em> in OGC Terminology. Set of metadata that describes an EO Product.</td>
</tr>
</tbody>
</table>

These two levels are interrelated according the following schema:

![Figure 4: Relationship between EO dataset collections and datasets](image-url)

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8.2 EO Products Metadata Mapping

8.2.1 Earth Observation Product Types

The following picture describes the layered structure of the schemas used to define the different classes of product metadata. The layer structure means that the upper layer main element type is defined by extending a type from the lower level schema.

Figure 5: A layered view of GML EO Products data.
The layered approach explained above is extensible. The purpose of the top layer in Figure 6 is to define the most commonly used EO metadata specific to the mission type. This layer can be extended for mission-specific needs as shown in the figure below, e.g. to add Pleiades specific metadata. In this particular example, the optical opt.xsd schema extensions are grouped in an additional schema phr.xsd which is a layer on top of opt.xsd.
The element that describes the EO metadata is the “EarthObservation” element which is defined in the SAR (Synthetic Aperture Radar), OPT (Optical), ATM (Atmospheric) specific schemas as an extension of a common EarthObservation element defined in the EOP schema.

EO Products are described using one instance of the following types (or possibly subtypes, more specific) deriving from the eop:EarthObservation,

- sar:EarthObservation
- opt:EarthObservation
- atm:EarthObservation

The eop:EarthObservation element derives from gml:Observation.

### 8.2.2 ebXML Slot Types Definition

In order to map the EO products to an ebRIM structure, we need to define the range of slot types that will be used in the model.

Slot types range should be defined in the CSW-ebRIM Registry Service - Part 1: ebRIM profile of CSW [OGC 07-110r2], but since its not the case, the definition takes place in this document.

The following table defines the types allowed for the slotType attribute of ebXML slots. A lot of slot types are based on datatypes defined in the XML Schemas scope.

<table>
<thead>
<tr>
<th>Slot Types</th>
<th>Definition and representation of the slot values</th>
</tr>
</thead>
<tbody>
<tr>
<td>anyURI</td>
<td>Represent a Uniform Resource Identifier (URI). An anyURI value can be absolute or relative, and may have an optional fragment identifier (i.e., it may be a URI Reference). This type should be used to specify the intention that the value fulfills the role of a URI as defined by the RFC 2396, as amended by the RFC 2732.</td>
</tr>
<tr>
<td>Boolean</td>
<td>Defined as the mathematical concept of binary-valued logic. Accepted values are true and false.</td>
</tr>
<tr>
<td>Byte</td>
<td>Defined as the mathematical concept of the integer numbers. Accepted values are integers from -128 (inclusive) to +127 (inclusive). Note that if the sign is omitted, “+” is assumed.</td>
</tr>
<tr>
<td>dateTime</td>
<td>Consist of objects with integer-valued year, month, day, hour and minute properties, a decimal-valued second property, and a boolean timezone property. Each such object also has one decimal-valued method or computed property, timeOnTimeline, whose value is always a decimal number; the values are dimensioned in seconds, the integer 0 is 0001-01-01T00:00:00 and the value of timeOnTimeline for other dateTime values is</td>
</tr>
</tbody>
</table>
Slot Types | Definition and representation of the slot values
--- | ---
computed using the Gregorian algorithm as modified for leap-seconds. The timeOnTimeline values form two related “timelines”, one for timezoned values and one for non-timezoned values.
Lectical representation is ISO 8601. For example, 2002-10-10T12:00:00-05:00 (noon on 10 October 2002, Central Daylight Savings Time as well as Eastern Standard Time in the U.S.) is 2002-10-10T17:00:00Z, five hours later than 2002-10-10T12:00:00Z.

**Double**
Consist of the values $m \times 2^e$ where $m$ is an integer whose absolute value is less than $2^{53}$ and $e$ is an integer between -1075 and 970, inclusive. In addition, float also contains the following three special numbers: positive infinity (INF), negative infinity (-INF) and not-a-number (NaN). Positive infinity is greater than all other non-NaN values, negative infinity is smaller than all other non-NaN values. NaN equals itself but is incomparable with any other value.
Allowed lexical representations includes -1E4, 1267.43233E12, 17.78e-2, 12, 0, INF, …

**Float**
Consist of the values $m \times 2^e$ where $m$ is an integer whose absolute value is less than $2^{24}$ and $e$ is an integer between -149 and 104, inclusive. In addition, float also contains the following three special numbers: positive infinity (INF), negative infinity (-INF) and not-a-number (NaN). Positive infinity is greater than all other non-NaN values, negative infinity is smaller than all other non-NaN values. NaN equals itself but is incomparable with any other value.
Allowed lexical representations includes -1E4, 1267.43233E12, 17.78e-2, 12, 0, INF, …

**geometry**
Represent a GML geometry, expressed in its XML format.

**Int**
Defined as the mathematical concept of the integer numbers.
Accepted values are integers from -2147483648 (inclusive) to +2147483647 (inclusive). Note that if the sign is omitted, “+” is assumed.

**Long**
Defined as the mathematical concept of the integer numbers.
Accepted values are integers from -9223372036854775808 (inclusive) to +9223372036854775807 (inclusive). Note that if the sign is omitted, “+” is assumed.

**Short**
Defined as the mathematical concept of the integer numbers.
Accepted values are integers from -32768 (inclusive) to +32767 (inclusive). Note that if the sign is omitted, “+” is assumed.

**String**
Represent alphanumeric character strings.

8.2.3 Mapping Schema Structure
The following sections will describe the ebRIM schema needed to map the Earth Observation metadata onto the eBusiness Registry Information Model (ebRIM). That schema defines the Catalogue discovery abilities and efficiency.

The EO schema is composed of three parts:
- the main container to store the observation metadata and the acquisition parameters,
- the EO Product Types taxonomy (hierarchical) to classify the main container
- multiple associated metadata containers

8.2.4 Acquisition Parameters

In an ebRIM Catalogue, each EO Product instance is represented by an `ExtrinsicObject` with the `'urn:x-ogc:specification:csw-ebrim:ObjectType:EO:EOProduct'` `objectType` attribute. This `ExtrinsicObject` is the main object of the EO Product mapping schema. It contains a set of attributes, matching the queryable metadata coming from the GML document. These attributes characterize directly the product acquisition.
Figure 9: EO Products instance

The GML metadata file is linked to the main ExtrinsicObject as content (this is the related RepositoryItem). This can be done either internally if the Catalogue is also a repository (the GML file is stored in the Catalogue), or externally if the Catalogue is only a registry (the GML file is linked, or generated from available up-to-date metadata). These implementation details are explained in depth in the Annex C.

All representative acquisition parameters are available (as fields or slots) for extended search. It allows queries like:

- “Give me all EO Product instances intersecting this footprint, measured after this date and acquired with an Accross-Track Pointing Angle less than x degrees”.

More formally:

- “Give me all ExtrinsicObjects with the objectType equals to ‘urn:x:ogc:specification:csw-ebrim:ObjectType:EO:EOProduct’, the extentOf slot value – a geometry – intersecting this box, the beginPosition value – a ISO 8601 date - greater than this date and the alongTrackPointingAngle slot value – a double - less than x”.

Using the CS-W ebRIM request, it gives:

```xml
<<?xml version="1.0" encoding="UTF-8"?>
<ows:GetRecords
 xmlns:csw="http://www.opengis.net/csw/2.0.2"
 xmlns:ogc="http://www.opengis.net/ogc"
 xmlns:gmt="http://www.opengis.net/gmt"
 xmlns:wrs="http://www.opengis.net/cat/wrs/1.0"
 xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:3.0"
 xmlns:pg="urn:oasis:names:tc:ebxml-regrep:xsd:pg:2.0"
 service="CSW"
 version="2.0.2"
 resultType="full"
 startPosition="1"
 maxRecords="20"
 xsi:querytypeNames="rim:ExtrinsicObject">
  <ows:Constraint version="1.1.0">
    <pg:Filter>
      <pg:And>
        <pg:PropertyIsEqualTo>
          <pg:PropertyName>rim:ExtrinsicObject/objectType</pg:PropertyName>
        </pg:PropertyIsEqualTo>
        <pg:PropertyIsGreaterThan>
          <pg:PropertyName>rim:ExtrinsicObject/rim:beginPosition</pg:PropertyName>
        </pg:PropertyIsGreaterThan>
      </pg:And>
      <pg:PropertyIsEqualTo>
        <pg:PropertyName>rim:ExtrinsicObject/rim:extentOf</pg:PropertyName>
      </pg:PropertyIsEqualTo>
    </pg:Filter>
    <pg:PropertyIsEqualTo>
    </pg:PropertyIsEqualTo>
    <pg:PropertyIsGreaterThanOrEqualTo>
      <pg:Literal>2006-07-15T00:00:00Z</pg:Literal>
    </pg:PropertyIsGreaterThanOrEqualTo>
    <pg:PropertyIsEqualTo>
    </pg:PropertyIsEqualTo>
    <pg:PropertyIsEqualTo>
    </pg:PropertyIsEqualTo>
    <pg:PropertyIsEqualTo>
    </pg:PropertyIsEqualTo>
    <pg:PropertyIsEqualTo>
    </pg:PropertyIsEqualTo>
    <pg:PropertyIsEqualTo>
    </pg:PropertyIsEqualTo>
    <pg:PropertyIsEqualTo>
    </pg:PropertyIsEqualTo>
  </ows:Constraint>
</ows:GetRecords>
```
Every EO Product instance will have the general eop fields in common, plus their theme and mission-specific fields. The main \textit{ExtrinsicObject} enables searches on the EO Products metadata and acquisition parameters.

Following table details the use of predefined attributes and slots, in order to map information coming from the GML metadata file to the \textit{ExtrinsicObject} representing the EOProduct.

The eop EO Product identifier is mapped to an \textit{ExternalIdentifier} linked to this \textit{ExtrinsicObject}, as shown in the figure.

\textbf{Figure 10: EO Products instance}
<table>
<thead>
<tr>
<th>GML Metadata XPath</th>
<th>EOProduct ExtrinsicObject Attribute</th>
<th>(Slot)</th>
<th>Queryable</th>
</tr>
</thead>
<tbody>
<tr>
<td>“urn:x-ogc:specification:csw-ebrim:ObjectType:EO:EOProduct” (fixed value)</td>
<td>/rim:ExtrinsicObject/@objectType</td>
<td>/</td>
<td>Yes</td>
</tr>
<tr>
<td>/eop:EarthObservation/gml:metaDataProperty/eop:EarthObservation</td>
<td>/rim:ExternalIdentifier/@value (linked to the EOProduct ExtrinsicObject by the ExternalIdentifier’s registryObject attribute)</td>
<td>/</td>
<td>No</td>
</tr>
<tr>
<td>MetaData/eop:identifier</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MetaData/eop:doi</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MetaData/eop:parentIdentifier</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MetaData/eop:productType</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MetaData/eop:status</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2 This field is intended to define if properties are queryable. Actually, some description metadata are present in the ebRIM model only for presentation reasons. These information are not queryable, so they cannot appears in catalog request, but they are useful in catalog responses to enhance the presentation. By adding these metadata in the eBXML response to a query, we avoid multiple GML EO Products fetching. As far as legacy catalogues are not able to support all the queryable properties, these legacy systems should ignore unsupported queryables and process the query as far as possible.
<table>
<thead>
<tr>
<th>GML Metadata XPath</th>
<th>EOProduct ExtrinsicObject Attribute</th>
<th>(Slot) Type</th>
<th>Queryable</th>
</tr>
</thead>
</table>

³ Slots “vendorSpecificAttributes” and “vendorSpecificValues” are intimately linked, since the first one contains all values of eop:localAttribute’s elements (ordered) and the second one all values of eop:localValue’s elements (ordered). So they are either both present or both missing, and they always have the same number of slot values. Value n of the Slot “vendorSpecificValues” is the localValue corresponding to the localAttribute encoded as the n’ value of the Slot “vendorSpecificAttributes”.

⁴ See section 7.8 (Spatial References) of the doc [OGC 07-110] (ebRIM profile of CSW) to see how to include GML data into ebRIM Slots.
<table>
<thead>
<tr>
<th>GML Metadata XPath</th>
<th>EOProduct ExtrinsicObject Attribute</th>
<th>(Slot) Type</th>
<th>Queryable</th>
</tr>
</thead>
<tbody>
<tr>
<td>GML Metadata XPath</td>
<td>EOProduct ExtrinsicObject Attribute</td>
<td>(Slot) Type</td>
<td>Queryable</td>
</tr>
<tr>
<td>-------------------</td>
<td>-------------------------------------</td>
<td>-------------</td>
<td>-----------</td>
</tr>
<tr>
<td>GML Metadata XPath</td>
<td>EOProduct ExtrinsicObject Attribute</td>
<td>(Slot)</td>
<td>Queryable</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>--------------------------------------</td>
<td>--------</td>
<td>-----------</td>
</tr>
<tr>
<td>GML Metadata XPath</td>
<td>EOProduct ExtrinsicObject Attribute</td>
<td>(Slot)</td>
<td>Queryable</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------</td>
<td>--------</td>
<td>-----------</td>
</tr>
</tbody>
</table>
8.2.5 Earth Observation Taxonomy

A taxonomy is needed to distinguish EOProduct types in the ebRIM Catalogue (at the thematic or mission-specific levels). That taxonomy is modeled using a ClassificationScheme object and a hierarchy of ClassificationNodes:

![Figure 11: EO Product Types Taxonomy](image)

Each EO Product is classified in the taxonomy. The EO Product ExtrinsicObject is linked to its corresponding ClassificationNode through a Classification object. This allows EO Products discovery by acquisition type.

For example, the following query allows to fetch the EOProducts types ClassificationScheme in order to retrieve all children or descendants ClassificationNodes. Classified ExtrinsicObject representing EOProducts can be discovered through Classifications linked to such ClassificationNodes.

Example 1 – GetRecords query, to fetch ClassificationScheme.

```xml
<?xml version="1.0" encoding="UTF-8"?>
<csw:GetRecords
 xmlns:csw="http://www.opengis.net/cat/csw/2.0.2"
 xmlns:ogc="http://www.opengis.net/ogc"
 xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0"
 outputSchema="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0"
 version="2.0.2"
 resultType="results"
 startPosition="1"
 maxRecords="20"
 service="CSW">
 <csw:Query typeName="rim:ClassificationScheme">
  <csw:ElementSetName typeNames="rim:ClassificationScheme">full</csw:ElementSetName>
  <csw:Constraint version="1.1.0">
   <ogc:Filter>
    <!-- This clause means "Get the EO_Product_Types ClassificationScheme" -->
    <ogc:PropertyIsEqualTo>
     <ogc:PropertyName>rim:ClassificationScheme/Name/LocalizedString/@value</ogc:PropertyName>
     <ogc:Literal>EO_Product_Types</ogc:Literal>
    </ogc:PropertyIsEqualTo>
   </ogc:Filter>
  </csw:Constraint>
 </csw:Query>
</csw:GetRecords>
```
Such relationship allows queries like:

- “Give me all EO Products instances of type PHR”

More formally:

- “Give me all objects linked to the PHR ClassificationNode through a Classification”.

Example 2 – GetRecords query based on acquisition type.

```xml
<?xml version="1.0" encoding="UTF-8"?>
<csw:GetRecords
 xmlns:csw="http://www.opengis.net/cat/csw/2.0.2"
 xmlns:ogc="http://www.opengis.net/ogc"
 xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0"
 outputSchema="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0"
 version="2.0.2"
 resultType="results"
 startPosition="1"
 maxRecords="20"
 service="CSW">

  <csw:Query
   typeNames="rim:ExtrinsicObject rim:Classification rim:ClassificationNode">

   <csw:ElementSetName typeNames="rim:ExtrinsicObject">full</csw:ElementSetName>

   <csw:Constraint version="1.1.0">
     <ogc:Filter>

       <ogc:And/>

       <!-- This clause means "Select the PHR ClassificationNode" -->
       <ogc:PropertyIsEqualTo>
         <ogc:PropertyName>/rim:ClassificationNode/@code</ogc:PropertyName>
         <ogc:Literal>PHR</ogc:Literal>
       </ogc:PropertyIsEqualTo>

       <!-- This clause means "Get Classification linked to the PHR ClassificationNode" -->
       <ogc:PropertyIsEqualTo>
         <ogc:PropertyName>/rim:Classification/@classificationNode</ogc:PropertyName>
         <ogc:PropertyName>/rim:ClassificationNode/@id</ogc:PropertyName>
       </ogc:PropertyIsEqualTo>

       <!-- This clause means "Such Classifications must classify ExtrinsicObject" -->
       <ogc:PropertyIsEqualTo>
         <ogc:PropertyName>/rim:Classification/@classifiedObject</ogc:PropertyName>
         <ogc:PropertyName>/rim:ExtrinsicObject/@id</ogc:PropertyName>
       </ogc:PropertyIsEqualTo>

       <!-- This clause means "Classified ExtrinsicObjects must be of type urn:…:EOProduct" -->
       <ogc:PropertyIsEqualTo>
         <ogc:PropertyName>/rim:ExtrinsicObject/@objectType</ogc:PropertyName>
       </ogc:PropertyIsEqualTo>

     </ogc:Filter>
   </csw:Constraint>

   <csw:Query/>

   <csw:GetRecords/>

 </csw:GetRecords>
```
8.2.6 Platform, Product and Archiving Metadata

Additional information is linked to the main EO Product ExtrinsicObject. These additional metadata are stored into specific ExtrinsicObjects, linked to the main one using Associations.

The Acquisition Platform parameters (i.e., Platform, Instrument and Sensor) are stored in an ExtrinsicObject having the objectType attribute set to ‘urn:x-ogc:specification:csw-ebrium:ObjectType:EO:EOAcquisitionPlatform’. It is linked to the main ExtrinsicObject through an Association object, with the associationType attribute equals to ‘urn:x-ogc:specification:csw-ebrium:AssociationType:EO:AcquiredBy’.

An acquisition Platform metadata set will be common to multiple acquisitions, defining therefore a n:1 association from the EO Product ExtrinsicObject to the matching EO Acquisition Platform ExtrinsicObject.

Such information ensures EO Products search by acquisition platform, and provides a way to do queries like:

- “Give me all EO Product acquired by this kind of Sensor”
More formally:

- “Give me all ExtrinsicObjects with objectType equals to ‘urn:x-ogc:specification:csw-ebrim:ObjectType:EO:EOProduct’, which are source of an Association of type ‘urn:x-ogc:specification:csw-ebrim:AssociationType:EO:AcquiredBy’ pointing – as target – to an ExtrinsicObject having as objectType ‘urn:x-ogc:specification:csw-ebrim:ObjectType:EO:EOAcquisitionPlatform’ and having this as sensorType slot value”.

In ebRIM, the CS-W request is formulated as:

```xml
<?xml version='1.0' encoding='utf-8' ?>
<csw:GetRecords
xmlns:csw="http://www.opengis.net/cat/csw/2.0.2"
xmlns:ogc="http://www.opengis.net/ogc"
xmlns:gml="http://www.opengis.net/gml"
xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0"
outputSchema="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0"
service="CSW"
version="2.0.2"
resultType="results"
startPosition="1"
maxRecords="20">
<csw:Query typeNames="rim:ExtrinsicObject rim:ExtrinsicObject_ACQPLAT rim:Association">
<csw:ElementSetName typeNames="rim:ExtrinsicObject">full</csw:ElementSetName>
<csw:Constraint version="1.1.0">
<ogc:Filter>
<ogc:And>
<ogc:PropertyIsEqualTo>
<ogc:PropertyName>/rim:ExtrinsicObject/@objectType</ogc:PropertyName>
</ogc:PropertyIsEqualTo>
<ogc:PropertyIsEqualTo>
<ogc:PropertyName>$ACQPLAT/@objectType</ogc:PropertyName>
</ogc:PropertyIsEqualTo>
<ogc:PropertyIsEqualTo>
<ogc:Literal>OPTICAL</ogc:Literal>
</ogc:PropertyIsEqualTo>
<ogc:PropertyIsEqualTo>
<ogc:PropertyName>/rim:Association/@associationType</ogc:PropertyName>
</ogc:PropertyIsEqualTo>
<ogc:PropertyIsEqualTo>
<ogc:PropertyName>/rim:Association/@sourceObject</ogc:PropertyName>
<ogc:PropertyName>/rim:ExtrinsicObject/@id</ogc:PropertyName>
</ogc:PropertyIsEqualTo>
</ogc:Filter>
</csw:Query>
</csw:GetRecords>
```
Product Information, associated to the EOProduct, are mapped to *ExtrinsicObjects* (with `objectType` attribute equals to ‘urn:x-ogc:specification:csw-ebrim:ObjectType:EO:EOProductInformation’) and linked to the EO Product through *Associations* having the `associationType` attribute equals to ‘urn:x-ogc:specification:csw-ebrim:AssociationType:EO:HasProductInformation’.

Browse Information, associated to the EOProduct, are mapped to *ExtrinsicObjects* (with `objectType` attribute equals to ‘urn:x-ogc:specification:csw-ebrim:ObjectType:EO:EOBrowseInformation’) and linked to the EO Product through *Associations* having the `associationType` attribute equals to ‘urn:x-ogc:specification:csw-ebrim:AssociationType:EO:HasBrowseInformation’.

Mask Information, associated to the EOProduct, are mapped to *ExtrinsicObjects* (with `objectType` attribute equals to ‘urn:x-ogc:specification:csw-ebrim:ObjectType:EO:EOMaskInformation’) and linked to the EO Product through *Associations* having the `associationType` attribute equals to ‘urn:x-ogc:specification:csw-ebrim:AssociationType:EO:HasMaskInformation’.

Note that *ExtrinsicObjects* representing Product Information, Browse Information and Mask Information are intended to provide useful information in the ebXML representation of Earth Observation Products (e.g. the response of a `getRecords` operation). Some of these properties are nevertheless also queryable, as you will see in the mapping tables for these additional Information Objects.
Figure 13: EO Products additional information

Following tables define the use of predefined attributes and slots, in order to map information coming from the GML metadata file to these additional *ExtrinsicObjects*. 
Table 4 — EOAcquisitionPlatform ExtrinsicObject Correspondence

<table>
<thead>
<tr>
<th>GML Metadata Xpath</th>
<th>EOAcquisitionPlatform ExtrinsicObject Attribute</th>
<th>(Slot) Type</th>
<th>Queryable</th>
</tr>
</thead>
<tbody>
<tr>
<td>“urn:x-ogc:specification:cswebrim:ObjectType:EO:EOAcquisitionPlatform” (fixed value)</td>
<td>/rim:ExtrinsicObject/@objectType</td>
<td>/</td>
<td>Yes</td>
</tr>
<tr>
<td>GML Metadata Xpath</td>
<td>EOAcquisitionPlatform ExtrinsicObject Attribute</td>
<td>(Slot) Type</td>
<td>Queryable</td>
</tr>
<tr>
<td>-----------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------</td>
<td>------------</td>
<td>----------</td>
</tr>
</tbody>
</table>
Table 5 — EOProductInformation ExtrinsicObject Correspondence

<table>
<thead>
<tr>
<th>GML Metadata XPath</th>
<th>EOProductInformation ExtrinsicObject Attribute</th>
<th>(Slot) Type</th>
<th>Queryable</th>
</tr>
</thead>
<tbody>
<tr>
<td>“urn:x-ogc:specification:cswebrim:ObjectType:EO:EOProductInformation” (Fixed value)</td>
<td>/rim:ExtrinsicObject/@objectType</td>
<td>/</td>
<td>Yes</td>
</tr>
</tbody>
</table>

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Table 6 — EOBrowseInformation ExtrinsicObject Correspondence

<table>
<thead>
<tr>
<th>GML Metadata XPath</th>
<th>EOBrowseInformation ExtrinsicObject Attribute</th>
<th>(Slot) Type</th>
<th>Queryable</th>
</tr>
</thead>
<tbody>
<tr>
<td>“urn:x-ogc:specification:csw-ebrim:ObjectType:EO:EOBrowseInformation” (Fixed value)</td>
<td>/rim:ExtrinsicObject/@objectType</td>
<td>/</td>
<td>Yes</td>
</tr>
<tr>
<td>GML Metadata XPath</td>
<td>EOMaskInformation ExtrinsicObject Attribute</td>
<td>(Slot) Type</td>
<td>Queryable</td>
</tr>
<tr>
<td>---------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
<td>-------------</td>
<td>-----------</td>
</tr>
<tr>
<td>“urn:x-ogc:specification:csw- ebrim:ObjectType:EO:EOMaskInformation” (Fixed value)</td>
<td>/rim:ExtrinsicObject/@objectType</td>
<td>/</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Finally, an object modeling the archiving information is linked to the EOProduct \textit{ExtrinsicObject} through an \textit{Association} with \textit{associationType} attribute equals to \textquote{urn:x-ogc:specification:csw-ebrim:AssociationType:EO:ArchivedIn}. This \textit{Association} has the EOProduct \textit{ExtrinsicObject}'s \textit{objectType} as \textit{sourceObject} and the EOArchivingInformation \textit{ExtrinsicObject}'s \textit{objectType} as \textit{targetObject}.

![Diagram of EO Products additional information](image)

\textbf{Figure 14: EO Products additional information}
### Table 8 — EOArchivingInformation ExtrinsicObject Correspondence

<table>
<thead>
<tr>
<th>GML Metadata XPath</th>
<th>EOArchivingInformation ExtrinsicObject Attribute</th>
<th>(Slot) Type</th>
<th>Queryable</th>
</tr>
</thead>
<tbody>
<tr>
<td>“urn:x-ogc:specification:csw-ebrim:ObjectType:EO:EOArchivingInformation” (fixed value)</td>
<td>/rim:ExtrinsicObject/@objectType</td>
<td>/</td>
<td>Yes</td>
</tr>
</tbody>
</table>
8.2.7 The Complete Mapping Schema

Here is what the complete schema looks like:

![Diagram of the complete mapping schema]

Figure 15: Complete EO Products Data Model

8.2.8 Thematic and Mission-Specific Metadata

Next sections describe the thematic-specific metadata and their mapping in the complete structure described earlier.

8.2.8.1 Synthetic Aperture Radar EarthObservation Product Mapping

Following table defines mapping for SAR specific additional information.
### Table 9 — EOProduct ExtrinsicObject Correspondence

<table>
<thead>
<tr>
<th>GML Metadata XPath</th>
<th>EOProduct ExtrinsicObject Attribute</th>
<th>(Slot) Type</th>
<th>Queryable</th>
</tr>
</thead>
<tbody>
<tr>
<td>GML Metadata XPath</td>
<td>EOProduct ExtrinsicObject Attribute</td>
<td>(Slot) Type</td>
<td>Queryable</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>-------------</td>
<td>----------</td>
</tr>
</tbody>
</table>

### 8.2.8.2 Optical EarthObservation Product Mapping

Following table defines mapping for OPT specific metadata.

<table>
<thead>
<tr>
<th>GML Metadata Xpath</th>
<th>EOProduct ExtrinsicObject Attribute</th>
<th>(Slot) Type</th>
<th>Queryable</th>
</tr>
</thead>
<tbody>
<tr>
<td>GML Metadata Xpath</td>
<td>EOProduct ExtrinsicObject Attribute</td>
<td>(Slot) Type</td>
<td>Queryable</td>
</tr>
<tr>
<td>--------------------------------------------------------</td>
<td>-------------------------------------</td>
<td>-------------</td>
<td>-----------</td>
</tr>
</tbody>
</table>
8.2.8.3 Atmospheric Earth Observation Product Mapping

ATM defines several Data Layers by EO Product. These Data Layers are modeled in an ebRIM Catalogue using ExtrinsicsObjects (with objectType attribute equals to 'urn:x-ogc:specification:csw-ebrim:ObjectType:EO:EODataLayer') associated to the EOProduct ExtrinsicObject (with objectType attribute equals to 'urn:x-ogc:specification:csw-ebrim:ObjectType:EO:EOProduct') through an Association with associationType attribute equals to 'urn:x-ogc:specification:csw-ebrim:AssociationType:EO:HasDataLayer'.
Table 11 — EODataLayer ExtrinsicObject Correspondence

<table>
<thead>
<tr>
<th>GML Metadata Xpath</th>
<th>EODataLayer ExtrinsicObject Attribute</th>
<th>(Slot) Type</th>
<th>Queryable</th>
</tr>
</thead>
<tbody>
<tr>
<td>“urn:x-ogc:specification:cswebrim:ObjectType:EO:EODataLayer” (fixed value)</td>
<td>/rim:ExtrinsicObject/@objectType</td>
<td>/</td>
<td>Yes</td>
</tr>
</tbody>
</table>
8.3 RegistryPackage Definition

8.3.1 Introduction

The previous subsection describes Earth Observation mapping choices – what we call the Extension Package – through a list of diagrams, mapping tables and full-text explanations.

It allows the reader to understand the structure of the mapped resources and the way these are represented within the ebRIM metamodel, allowing fast search and retrieving through the standardized OGC catalogue interface.

This section is intended to provide a more formalized view of this mapping, through a set of XML definitions removing any ambiguity or possible level of freedom.

8.3.2 RegistryPackage Role

An Extension Package is represented as a rim:RegistryPackage instance. Package members are RegistryObjects that are subject to the following constraint: a member object may only be deleted if the package as a whole is deleted. This effectively treats an Extension Package as a composition.

So the rim:RegistryPackage is a formalized way to represent a Extension Package, through a set of elements and extensibility points offered by ebRIM that enable it to be tailored for specific purposes; these extensibility points include:

- **Additional ExtrinsicObject Types**: possible value for the ExtrinsicObject.objectType attribute, representing new kinds of resources elements in the ebRIM model,
- **Additional Association Types**: possible value for the Association.associationType attribute, representing new kinds of associations that link registry objects,
- **Additional ClassificationSchemes or ClassificationNodes**: used to classify and organize objects within the registry,
- **Additional RegistryObject Slots**: intended to further characterize particular types of registry objects,
- **Stored Queries**: that reflect common search patterns in the context of a specific resource mapping.

8.3.3 RegistryPackage Content

This subsection defines the RegistryPackage identified by:

- urn:x-ogc:specification:csw-ebrim:package:EOProducts
It provides Earth Observation extensions to the CSW ebRIM Basic Package, through a list of registry objects in the RegistryObjectList XML element:

```xml
<?xml version="1.0" encoding="UTF-8"?>
 objectType="urn:oasis:names:tc:ebxml-regrep:ObjectType:RegistryObject:RegistryPackage">
  <!-- Contact : Renato Primavera, Leica Geosystems Geospatial Imaging - renato.primavera@ionicsoft.com -->
  <rim:LocalizedString xml:lang="en-US" xml:charset="UTF-8" value="Earth Observation Products extension package for CSW-ebRIM"/>
  <rim:Name/>
  <rim:Description>
    <rim:LocalizedString xml:lang="en-US" xml:charset="UTF-8" value="Provides Earth Observation Products extensions to the Basic package of the CSW-ebRIM catalogue profile."/>
  </rim:Description>
  <rim:RegistryObjectList>
    <!-- Note that the whole XML file is available in the Annex B of this document. -->
  </rim:RegistryObjectList>
</rim:RegistryPackage>
```

8.3.3.1 Additional ExtrinsicObject Types

New objectType are needed to represent:

- EOProduct ExtrinsicObject,
- EOAcquisitionPlatform ExtrinsicObject,
- EOProductInformation ExtrinsicObject,
- EOMaskInformation ExtrinsicObject,
- EOBrowseInformation ExtrinsicObject,
- EOArchivingInformation ExtrinsicObject,
- EODataLayer ExtrinsicObject.

These new objectType are additional ClassificationNode of the canonical objectType scheme. All are children of the ‘ExtrinsicObject’ objectType.

```xml
<rim:ClassificationNode code="EOProduct"
 objectType="urn:oasis:names:tc:ebxml-regrep:ObjectType:RegistryObject:ClassificationNode" id="urn:o-ogc:specification:csw-ebrim:ObjectType:EO:EOProduct"
 parent="urn:oasis:names:tc:ebxml-regrep:ObjectType:RegistryObject:ExtrinsicObject">
  <rim:LocalizedString xml:lang="en-US" xml:charset="UTF-8" value="Earth Observation Product"/>
  <rim:Name/>
  <rim:Description>
    <rim:LocalizedString xml:lang="en-US" xml:charset="UTF-8" value="Represents an Earth Observation Product"/>
  </rim:Description>
</rim:ClassificationNode>
```

```xml
<rim:ClassificationNode code="EOAcquisitionPlatform"
 objectType="urn:oasis:names:tc:ebxml-regrep:ObjectType:RegistryObject:ClassificationNode" id="urn:o-ogc:specification:csw-ebrim:ObjectType:EO:EOAcquisitionPlatform"
 parent="urn:oasis:names:tc:ebxml-regrep:ObjectType:RegistryObject:ExtrinsicObject">
  <rim:LocalizedString xml:lang="en-US" xml:charset="UTF-8" value="Earth Observation Product"/>
  <rim:Name/>
  <rim:Description>
    <rim:LocalizedString xml:lang="en-US" xml:charset="UTF-8" value="Represents an Earth Observation Product"/>
  </rim:Description>
</rim:ClassificationNode>
```
8.3.3.2 Additional Association Types

New associationType are needed to represent:

- AcquiredBy Association (from EOProduct to EOAcquisitionPlatform objects),
- HasProductInformation (from EOProduct to EOProductInformation objects),
- HasMaskInformation (from EOProduct to EOMaskInformation objects),
- HasBrowseInformation (from EOProducts to EOBrowseInformation)
- ArchivedIn (from EOProduct to EOArchivingInformation objects),
- HasDataLayer (from EOProduct to EODataLayer objects).

These new associationType are additional ClassificationNode of the canonical associationType scheme. All are direct children of the ClassificationScheme object itself.

```xml
<!-- extensions to canonical AssociationType scheme -->
<ebrim:ClassificationNode code="AcquiredBy"
  objectType="urn:oasis:names:tc:ebxml-regp:ObjectType:RegistryObject:ClassificationNode"
  id="urn:x-ogc:specification:csw-ebrim:AssociationType:EO:AcquiredBy"
  parent="urn:oasis:names:tc:ebxml-regp:classificationScheme:AssociationType">
  <ebrim:LocalizedString xml:lang="en-US" charset="UTF-8" value="AcquiredBy"/>
</ebrim:ClassificationNode>

<ebrim:ClassificationNode code="HasProductInformation"
  objectType="urn:oasis:names:tc:ebxml-regp:ObjectType:RegistryObject:ClassificationNode"
  id="urn:x-ogc:specification:csw-ebrim:AssociationType:EO:HasProductInformation"
  parent="urn:oasis:names:tc:ebxml-regp:classificationScheme:AssociationType">
  <ebrim:LocalizedString xml:lang="en-US" charset="UTF-8" value="HasProductInformation"/>
</ebrim:ClassificationNode>

<ebrim:ClassificationNode code="HasMaskInformation"
  objectType="urn:oasis:names:tc:ebxml-regp:ObjectType:RegistryObject:ClassificationNode"
  id="urn:x-ogc:specification:csw-ebrim:AssociationType:EO:HasMaskInformation"
  parent="urn:oasis:names:tc:ebxml-regp:classificationScheme:AssociationType">
  <ebrim:LocalizedString xml:lang="en-US" charset="UTF-8" value="HasMaskInformation"/>
</ebrim:ClassificationNode>

<ebrim:ClassificationNode code="HasBrowseInformation"
  objectType="urn:oasis:names:tc:ebxml-regp:ObjectType:RegistryObject:ClassificationNode"
  id="urn:x-ogc:specification:csw-ebrim:AssociationType:EO:HasBrowseInformation"
  parent="urn:oasis:names:tc:ebxml-regp:classificationScheme:AssociationType">
  <ebrim:LocalizedString xml:lang="en-US" charset="UTF-8" value="HasBrowseInformation"/>
</ebrim:ClassificationNode>

<ebrim:ClassificationNode code="ArchivedIn"
  objectType="urn:oasis:names:tc:ebxml-regp:ObjectType:RegistryObject:ClassificationNode"
  id="urn:x-ogc:specification:csw-ebrim:AssociationType:EO:ArchivedIn"
  parent="urn:oasis:names:tc:ebxml-regp:classificationScheme:AssociationType">
  <ebrim:LocalizedString xml:lang="en-US" charset="UTF-8" value="ArchivedIn"/>
</ebrim:ClassificationNode>
```

OGC 06-131r4
Constraints for sourceObject and targetObject attributes of these new kind of Associations are represented through Meta-Associations (which are like classical Association):

8.3.3.3 Additional ClassificationSchemes or ClassificationNodes

The hierarchical taxonomy used in the ebRIM mapping to classify type of EOProduct is defined as following:

The list of slots for each type of objects is defined as following:

```
<rs:ClassificationNode
  code="SAR"
  id="urn:x:ogc:specification:csw:ebRIM:EO:EOProductTypes:SAR">
  <rs:LocalizedString xml:lang="en-US" charset="UTF-8" value="SAR />
  <rs:Name />
  <rs:Description />
</rs:ClassificationNode>

<rs:ClassificationNode
  code="ATM"
  id="urn:x:ogc:specification:csw:ebRIM:EO:EOProductTypes:ATM">
  <rs:LocalizedString xml:lang="en-US" charset="UTF-8" value="ATM />
  <rs:Name />
  <rs:Description />
</rs:ClassificationNode>

<rs:ClassificationNode
  code="OPT"
  id="urn:x:ogc:specification:csw:ebRIM:EO:EOProductTypes:OPT">
  <rs:LocalizedString xml:lang="en-US" charset="UTF-8" value="OPT />
  <rs:Name />
  <rs:Description />
</rs:ClassificationNode>

<rs:ClassificationNode
  code="PHR"
  id="urn:x:ogc:specification:csw:ebRIM:EO:EOProductTypes:PHR">
  <rs:LocalizedString xml:lang="en-US" charset="UTF-8" value="PHR />
  <rs:Name />
  <rs:Description />
</rs:ClassificationNode>

<rs:ClassificationScheme>
</rs:ClassificationScheme>
```

8.3.3.4 Additional RegistryObjects Slots

The list of slots for each type of objects is defined as following:

```
<!-- Meta-registryObjects to list allowed slots by objectType -->
<ro:RegistryObject objectType="urn:o:ogc:specification:csw:ebRIM:ObjectType:EO:EOProduct">
  <ro:Slot name="urn:o:ogc:defineRIM-Slot:OGC-06-131:acquisitionType" slotType="string" />
  <ro:Slot name="urn:o:ogc:defineRIM-Slot:OGC-06-131:acquisitionStation" slotType="string" />
  <ro:Slot name="urn:o:ogc:defineRIM-Slot:OGC-06-131:acquisitionSubType" slotType="string" />
  <ro:Slot name="urn:o:ogc:defineRIM-Slot:OGC-06-131:acrossTrackPointingAngle" slotType="double" />
  <ro:Slot name="urn:o:ogc:defineRIM-Slot:OGC-06-131:alongTrackPointingAngle" slotType="double" />
  <ro:Slot name="urn:o:ogc:defineRIM-Slot:OGC-06-131:beginPosition" slotType="dateTime" />
  <ro:Slot name="urn:o:ogc:defineRIM-Slot:OGC-06-131:cloudCoveragePercentage" slotType="double" />
  <ro:Slot name="urn:o:ogc:defineRIM-Slot:OGC-06-131:cloudPosition" slotType="string" />
  <ro:Slot name="urn:o:ogc:defineRIM-Slot:OGC-06-131:dopplerFrequency" slotType="double" />
  <ro:Slot name="urn:o:ogc:defineRIM-Slot:OGC-06-131:endPosition" slotType="dateTime" />
  <ro:Slot name="urn:o:ogc:defineRIM-Slot:OGC-06-131:extentOf" slotType="geometry" />
  <ro:Slot name="urn:o:ogc:defineRIM-Slot:OGC-06-131:illuminationAzimuthAngle" slotType="double" />
  <ro:Slot name="urn:o:ogc:defineRIM-Slot:OGC-06-131:illuminationElevationAngle" slotType="double" />
</ro:RegistryObject>
```

### 9 EO Products Catalogue External Interfaces

This chapter describes the interactions with the EO ebRIM Catalogue, and the behavior of its CSW interface. It provides some examples of request and response message structures as part of the operation signatures, as specified in the [OGC 07-006r1] OGC™ Catalogue Service 2.0.2 (Corrigendum 2 Release) and [OGC 07-110r2] CSW-ebRIM Registry Service - Part 1: ebRIM profile of CSW. It also documents supported query facilities and implementation guidelines.

It should be noted that the EO Products Data Model defined in this specification is perfectly compliant with the [OGC 07-006r1] OGC™ Catalogue Service 2.0.2 specification (Corrigendum 2 Release) and with the [OGC 07-110r2] CSW-ebRIM
Registry Service - Part 1: ebRIM profile of CSW. Chapter 7 has shown that no modifications or extensions are needed in the information model. This chapter will show that no modifications or extensions are needed in the requests and responses.

The following sections use significant parts of the [OGC 07-006r1] OGC™ Catalogue Service 2.0.2 specification (Corrigendum 2 Release) and the [OGC 07-110r2] CSW-ebRIM Registry Service - Part 1: ebRIM profile of CSW documents. To reduce the need to refer to those documents, this document copies some of their parts.

9.1 Supported Protocol Binding and Available Operations

All operations must support the embedding of requests and responses in SOAP 1.2 (with Attachment Feature for operations which need data transfert, like GetRepositoryItem described below).

The value of the ‘action’ attribute (representing the SOAPAction in SOAP 1.1) on the ‘application/soap+xml’ media type can be set to ‘urn:x-ogc:specification:cswebbrim:EO’ for all requests, but this is optional: servers shall work if this attribute is missing. Note that the presence of this attribute can be used by servers such as firewalls to appropriately filter SOAP request messages in HTTP.

The following table summarizes required operations on ebRIM Catalogues supporting EO Extension Package, in order to provide discovery abilities:

<table>
<thead>
<tr>
<th>Operation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GetCapabilities</td>
<td>Allows a client to retrieve service metadata that describe the computational</td>
</tr>
<tr>
<td></td>
<td>and non-computational characteristics of the service.</td>
</tr>
<tr>
<td>GetRecords</td>
<td>The principal operation used to search Catalogue content and retrieve all</td>
</tr>
<tr>
<td></td>
<td>or some members of the result set.</td>
</tr>
<tr>
<td>DescribeRecord</td>
<td>Allows a client to discover the information model(s) supported by the</td>
</tr>
<tr>
<td></td>
<td>Catalogue and to retrieve type definitions.</td>
</tr>
<tr>
<td>GetRecordById</td>
<td>A simple means of retrieving one or more registry objects by their identifier.</td>
</tr>
<tr>
<td>GetRepositoryItem</td>
<td>Requests the repository item for some ExtrinsicObject.</td>
</tr>
</tbody>
</table>

The following table summarizes optional operations on ebRIM Catalogues supporting EO Extension Package, in order to provide publication abilities. Publication
operations are optional, so if they are omitted, the catalogue is seen as a ‘read-only’ (with only discovery abilities) implementation.

### Table 13 — Optional Operation on ebRIM Catalogue Service

<table>
<thead>
<tr>
<th>Operation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harvest <em>(Publication)</em></td>
<td>Enables a ‘pull’ style of publication whereby a resource is retrieved from some remote location (URL) and inserted into the Catalogue</td>
</tr>
</tbody>
</table>

Following figure is an UML diagram summarizing the service interfaces. Optional operations are not shown on the schema.

![Figure 17: Service Interface (CSW-ebRIM)](image)

### 9.2 Interface Specifications

This chapter highlights syntax and semantic details of the interface operations specified in both [OGC 06-007r1] OGC™ Catalogue Service 2.0.2 (Corrigendum 2 Release) and [OGC 07-110r2] CSW-ebRIM Registry Service - Part 1: ebRIM profile of CSW. It gives formal, language-independent interface (W3C WSDL) specifications that admit multiple programming language bindings and shows error conditions that can occur.
9.2.1 GetCapabilities Operation

The GetCapabilities operation allows clients to retrieve service metadata from a server. The response to a GetCapabilities request should be an XML document containing service metadata about the server (ISO 19119 document).

Here is a list of sections available in CSW ebRIM Capabilities Document:

<table>
<thead>
<tr>
<th>Section Names</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>ServiceIdentification</td>
<td>General information about the service (type, version, etc.).</td>
</tr>
<tr>
<td>ServiceProvider</td>
<td>Information about the organization providing this service.</td>
</tr>
<tr>
<td>OperationsMetadata</td>
<td>Summarizes the operational characteristics of the service</td>
</tr>
<tr>
<td>Filter_Capabilities</td>
<td>Describes supported OGC filter operations</td>
</tr>
<tr>
<td>ServiceFeatures</td>
<td>Information about implemented features</td>
</tr>
<tr>
<td>ServiceProperties</td>
<td>Information about general service properties.</td>
</tr>
</tbody>
</table>

9.2.1.1 GetCapabilities Request

The value of the mandatory service parameter shall be the following service type identifier: ‘urn:x-ogc:specification:csw-ebrim:Service:OGC-CSW:ebRIM’. When included within a query component of the Request-URI, the ‘:’ character (COLON) must be percent-encoded as ‘%3A’, since that character is not a delimiter in this context.

The following XML-Schema fragment defines the XML encoding of the GetCapabilities operation request.
9.2.1.2 GetCapabilities Response

If the request is processed successfully, the body of the response message shall include an XML document where the document element has the following infoset properties:

- A [local name] of ‘Capabilities’,

The response advertises supported parentIdentifier (collection name) values in a CSW service capabilities document.

The ows:ExtendedCapabilities element provides an open extensibility point. Any supplementary operational metadata may be added here. An example is given below.

```xml
<ows:OperationsMetadata>
  <!-- other content here -->
  <ows:ExtendedCapabilities xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0">
    <rim:Slot name="http://earth.esa.int/eop/parentIdentifier" slotType="urn:oasis:names:tc:ebxml-regrep:DataType[String]">
      <rim:ValueList>
        <rim:Value>urn:x-EOP:ING:EOLI:ESA.EECF.ENVISAT_APx_xS</rim:Value>
        <rim:Value>urn:x-EOP:ING:EOLI:ESA.EECF.ENVISAT_RA2_MWx_2C</rim:Value>
      </rim:ValueList>
    </rim:Slot>
  </ows:ExtendedCapabilities>
</ows:OperationsMetadata>
```

The document element MUST be valid against the schema that can be found in the Annex B of the [OGC 07-110r2].

An example of capabilities document is provided in the Annex E of this document.
9.2.1.3 Web Service Description Language (WSDL)

The Web Services Description Language (WSDL) is an XML language to describe the computational characteristics of web services in terms of interfaces, protocol bindings, and service endpoints. WSDL 2.0 is currently a W3C Working Draft that defines a component model in terms of an abstract XML infoSet.

A WSDL description may be used to complement the metadata provided in an OGC service capabilities document. The \(<\text{wrs:WSDL-services}>\) element is a simple link element that may be used to include a reference to a WSDL description containing service and binding elements. The value of the \(xlink:href\) attribute must be a resolvable URI that produces the WSDL document when it is the target of a GET request, the \(xlink:role\) attribute must indicate the relevant version of the WSDL specification (by namespace URI).

9.2.1.4 Exceptions

If an error condition arises while performing a GetCapabilities request, the service shall return an exception report as specified in [OGC 07-110r2] CSW-ebRIM Registry Service - Part 1: ebRIM profile of CSW.

9.2.2 GetRecords Operation

The mandatory GetRecords operation is the principal operation used to search the catalogue content. Some or all the registry objects in the result set that satisfy the search criteria may be piggy-backed in the response message. The messages are defined in a schema that can be found in the Annex B of the [OGC 07-110r2].

9.2.2.1 GetRecords Request

If the Content-Type of the request entity body is an XML content type (application/xml), the document element must be the ‘csw:GetRecords’ element.

Following table specifies attributes of the GetRecords operation message.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data type and value</th>
<th>Optionality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service</td>
<td>Character String. Fixed value of ‘CSW’</td>
<td>Mandatory</td>
</tr>
<tr>
<td>Version</td>
<td>Character String. Fixed value of ‘2.0.2’</td>
<td>Mandatory</td>
</tr>
<tr>
<td>RequestId</td>
<td>Character String.</td>
<td>Not Supporteda</td>
</tr>
<tr>
<td>ResultType</td>
<td>CodeList. One of ‘hits’ (default value), ‘results’ or ‘validate’.</td>
<td>Optional</td>
</tr>
<tr>
<td>Parameter</td>
<td>Data type and value</td>
<td>Optionality</td>
</tr>
<tr>
<td>-------------------</td>
<td>-------------------------------------------------------------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>OutputFormat</td>
<td>CharacterString. The only supported value is ‘application/xml’ (default value)</td>
<td>Optional</td>
</tr>
<tr>
<td>StartPosition</td>
<td>PositiveInteger. Default Value is 1</td>
<td>Optional</td>
</tr>
<tr>
<td>MaxRecords</td>
<td>PositiveInteger. Default Value is 10</td>
<td>Optional</td>
</tr>
<tr>
<td>TypeNames</td>
<td>List of Character String, comma separated. Unordered List of object types implicated in the query. Allowed values are standard objectTypes plus all objectTypes specified in this extension package: (e.g. ‘RegistryObject’, ‘Association’, ‘urn:x-ogc:specification:cswebrim:ObjectType:EO:EOProduct’, ‘urn:x-ogc:specification:cswebrim:ObjectType:EO:EOArchivingInformation’, … ).</td>
<td>Optional</td>
</tr>
<tr>
<td>ElementSetName or ElementName</td>
<td>CodeList. One of ‘brief’, ‘summary’ (default value) or ‘full’.</td>
<td>Optional</td>
</tr>
<tr>
<td>ConstraintLanguage</td>
<td>CodeList. The only supported value is ‘FILTER’ (default value). Note that the support of the 1.1.0 version of OGC Filter Encoding [OGC 04-095] is mandatory.</td>
<td>Optional</td>
</tr>
<tr>
<td>Constraint</td>
<td>String. The predicate expression specified in the language indicated by the ConstraintLanguage parameter. Default action is to execute an unconstrained query.</td>
<td>Optional.</td>
</tr>
<tr>
<td>SortBy</td>
<td>List of Character String, comma separated Ordered list of names of metadata elements to use for sorting the response. Default action is to present the records in the order in which they are received.</td>
<td>Optional</td>
</tr>
<tr>
<td>DistributedSearch</td>
<td>Boolean.</td>
<td>Not Supported(^a)</td>
</tr>
<tr>
<td>HopCount</td>
<td>Integer.</td>
<td>Not Supported(^a)</td>
</tr>
<tr>
<td>ResponseHandler</td>
<td>URL.</td>
<td>Not Supported(^a)</td>
</tr>
</tbody>
</table>

\(^a\) Not supported yet in the ebRIM Application Profile

The following XML-Schema fragments define the XML encoding of the GetRecords operation request:
The principal means of searching the catalogue. The matching catalogue entries may be included with the response. The client may assign a request (absolute URI). A distributed search is performed if the DistributedSearch element is present and the catalogue is a member of a federation. Profiles may allow alternative query expressions.

<xsd:complexType name="GetRecordsType" id="GetRecords">
    <xsd:annotation>
        <xsd:documentation xml:lang="en">
            The principal means of searching the catalogue. The matching catalogue entries may be included with the response. The client may assign a request (absolute URI). A distributed search is performed if the DistributedSearch element is present and the catalogue is a member of a federation. Profiles may allow alternative query expressions.
        </xsd:documentation>
    </xsd:annotation>

    <xsd:complexType name="RequestBaseType" abstract="true" id="RequestBaseType">
        <xsd:annotation>
            <xsd:documentation>
                Base type for all request messages except GetCapabilities. The attributes identify the relevant service type and version.
            </xsd:documentation>
        </xsd:annotation>

        <xsd:attribute name="service" type="aws:ServiceType" use="required" fixed="CSW"/>
        <xsd:attribute name="version" type="aws:VersionType" use="required" fixed="2.0.2"/>
    </xsd:complexType>
</xsd:complexType>
9.2.2.2 GetRecords Response

If the request is processed successfully, the body of the response message shall include an XML document where the document element has the following infoset properties:

- A [namespace name] of ‘http://www.opengis.net/cat/csw/2.0.2’ (usually represented by the ‘csw’ prefix).

The search results may include a sequence of either <csw:Record> or <rim:RegistryObject> elements. In any case valid substitution elements may also be included, where these typically correspond to different views or instances of record subtypes.

The record representation must conform to the requested output schema. The value of the outputSchema attribute in the request restricts which elements may appear in the response. If not specified, ebRIM representations are returned.
Table 16 — Allowable Catalogue Record Representation

<table>
<thead>
<tr>
<th>OutputSchema</th>
<th>Record representations</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="http://www.opengis.net/cat/csw/2.0.2">http://www.opengis.net/cat/csw/2.0.2</a></td>
<td>csw:Record</td>
</tr>
<tr>
<td></td>
<td>csw:SummaryRecord</td>
</tr>
<tr>
<td></td>
<td>csw:BriefRecord</td>
</tr>
<tr>
<td>urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0</td>
<td>rim:RegistryObject</td>
</tr>
<tr>
<td></td>
<td>Any subtype of rim:RegistryObject</td>
</tr>
</tbody>
</table>

The following XML-Schema fragments define the XML format response to a GetRecords operation:

```xml
<?xml version="1.0" encoding="UTF-8"?>
<GetRecordsResponse type="csw:GetRecordsResponseType" id="GetRecordsResponse"/>
```

```xml
<GetRecordsResponseType>
  <annotation/>
  <documentation xml:lang="en">
    The response message for a GetRecords request. Some or all of the matching records may be included as children of the SearchResults element. The RequestId is only included if the client specified it.
  </documentation>
</GetRecordsResponseType>
```

```xml
<SearchResults type="csw:SearchResultsType"/>
```

```xml
<RequestStatusType id="RequestStatusType">
  <annotation/>
  <documentation>
    This element provides information about the status of the search request.
  </documentation>
  <status>status of the search</status>
  <timestamp>date and time when the result set was modified (ISO 8601 format: YYYY-MM-DD'T'HH:mm:ss[+/-]hh:mm)</timestamp>
</RequestStatusType>
```

The OGC Catalogue Services specification (OGC 07-006r1) distinguishes three abstract property sets—or views—that provide differing levels of detail about a catalogue item: brief, summary, and full. These abstract views are mapped to the ebRIM schema as indicated in Table 17.
Table 17 — Registry object views

<table>
<thead>
<tr>
<th>View name</th>
<th>ebRIM information items</th>
</tr>
</thead>
<tbody>
<tr>
<td>brief</td>
<td>rim:RegistryObject/@id</td>
</tr>
<tr>
<td></td>
<td>rim:RegistryObject/@lid&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>rim:RegistryObject/@objectType</td>
</tr>
<tr>
<td></td>
<td>rim:RegistryObject/@status</td>
</tr>
<tr>
<td></td>
<td>rim:RegistryObject/rim:VersionInfo</td>
</tr>
<tr>
<td>summary</td>
<td>As for Brief view, plus:</td>
</tr>
<tr>
<td></td>
<td>rim:RegistryObject/rim:Slot</td>
</tr>
<tr>
<td></td>
<td>rim:RegistryObject/rim:Name (in preferred languages)&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>rim:RegistryObject/rim:Description (in preferred languages)&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>full</td>
<td>Complete representation (all the ExtrinsicObject, Association, Classification elements).</td>
</tr>
</tbody>
</table>

The brief and summary views map to reduced rim:RegistryObject representations for any object type. A full view yields the element information item corresponding to the actual object type.

<sup>a</sup> The value of the @lid attribute implicitly identifies the "version history" resource for a registry object. Its value is set by the service to coincide with the @id value of the original registry object.

<sup>b</sup> As specified by the value of the the Accept-Language request header field (if present).

Example 3 – Brief view of ebRIM registry object.

```xml
<rim:ExtrinsicObject id="urn:x-dali:sat:Shift0:a21:26103079704021639551X:dn:572863:0"
objectType="urn:x-ogc:specification:csw-ebrim:ObjectType:EO:EOProduct">
</rim:ExtrinsicObject>
```

Example 4 – Summary view of ebRIM registry object.

```xml
<rim:ExtrinsicObject id="urn:x-dali:sat:Shift0:a21:26103079704021639551X:dn:572863:0"
objectType="urn:x-ogc:specification:csw-ebrim:ObjectType:EO:EOProduct">
<rim:Slot name="urn:ogc:def:ebRIM-Slot:OGC-06-131:imageQualityDegradation" slotType="double">
  <rim:ValueList>
    <rim:Value>75.0</rim:Value>
  </rim:ValueList>
</rim:Slot>
<rim:Slot name="urn:ogc:def:ebRIM-Slot:OGC-06-131:centerOf" slotType="geometry">
  <wrs:ValueList xmlns:wrs="http://www.opengis.net/cat/wrs/1.0">
    <wrs:AnyValue xmlns:gml="http://www.opengis.net/gml">
      <gml:Point srsName="EPSG:4326">
        <gml:pos>-87.7258 21.51230 0491333008</gml:pos>
      </gml:Point>
    </wrs:AnyValue>
  </wrs:ValueList>
</rim:Slot>
<rim:Slot name="urn:ogc:def:ebRIM-Slot:OGC-06-131:productType" slotType="string">
  <rim:ValueList>
    <rim:Value>Scene</rim:Value>
  </rim:ValueList>
</rim:Slot>
<rim:Slot name="urn:ogc:def:ebRIM-Slot:OGC-06-131:beginPosition" slotType="dateTime">
  <rim:ValueList>
    <rim:Value>2009-01-01 00:00:00</rim:Value>
  </rim:ValueList>
</rim:Slot>
</rim:ExtrinsicObject>
```
Example 5 – Full view of ebRIM registry object (example from DALI)

```
  <rim:Slot name="urn:ogc:def:ebRIM-Slot:OGC-06-131:imageQualityDegradation" slotType="double">
    <rim:ValueList>
      <rim:Value>75.0</rim:Value>
    </rim:ValueList>
  </rim:Slot>
  <rim:Slot name="urn:ogc:def:ebRIM-Slot:OGC-06-131:centerOf" slotType="geometry">
    <wrs:ValueList xmlns:wrs="http://www.opengis.net/cat/wrs/1.0">
      <wrs:AnyValue xmlns:gml="http://www.opengis.net/gml">
        <gml:Point srsName="EPSG:4326">
          <gml:pos>147.89204939003056 -15.015514612197876</gml:pos>
        </gml:Point>
      </wrs:AnyValue>
    </wrs:ValueList>
  </rim:Slot>
  <rim:Slot name="urn:ogc:def:ebRIM-Slot:OGC-06-131:productType" slotType="string">
    <rim:ValueList>
      <rim:Value>Scene</rim:Value>
    </rim:ValueList>
  </rim:Slot>
  <rim:Slot name="urn:ogc:def:ebRIM-Slot:OGC-06-131:beginPosition" slotType="dateTime">
    <rim:ValueList>
      <rim:Value>2007-01-10T00:16:31Z</rim:Value>
    </rim:ValueList>
  </rim:Slot>
  <rim:Slot name="urn:ogc:def:ebRIM-Slot:OGC-06-131:endPosition" slotType="dateTime">
    <rim:ValueList>
      <rim:Value>2007-01-10T00:16:31Z</rim:Value>
    </rim:ValueList>
  </rim:Slot>
  <rim:Slot name="urn:ogc:def:ebRIM-Slot:OGC-06-131:doi" slotType="string">
    <rim:ValueList>
    </rim:ValueList>
  </rim:Slot>
  <rim:Slot name="urn:ogc:def:ebRIM-Slot:OGC-06-131:lastOrbitNumber" slotType="int">
    <rim:ValueList>
      <rim:Value>235</rim:Value>
    </rim:ValueList>
  </rim:Slot>
  <rim:Slot name="urn:ogc:def:ebRIM-Slot:OGC-06-131:multiExtentOf" slotType="geometry">
    <wrs:ValueList xmlns:wrs="http://www.opengis.net/cat/wrs/1.0">
      <wrs:AnyValue xmlns:gml="http://www.opengis.net/gml">
        <gml:Polygon srsName="EPSG:4326">
          <gml:exterior>
            <gml:LinearRing srsName="EPSG:4326">
              <gml:pos>147.49 -15.22700023651123</gml:pos>
              <gml:pos>148.2935882414475 -14.803518295288086</gml:pos>
              <gml:pos>147.62540931867474 -14.691240310668945</gml:pos>
            </gml:LinearRing>
          </gml:exterior>
          <gml:exterior>
            <gml:Polygon srsName="EPSG:4326">
              <gml:exterior>
                <gml:LinearRing srsName="EPSG:4326">
                  <gml:pos>147.49 -15.22700023651123</gml:pos>
                </gml:LinearRing>
              </gml:exterior>
            </gml:exterior>
          </gml:exterior>
        </gml:Polygon>
      </wrs:AnyValue>
    </wrs:ValueList>
  </rim:Slot>
</rim:ExtrinsicObject>
```
9.2.2.3 Samples

The `<csw:Query>` element is documented in Subclause 10.2.3 of [OGC 07-110r2]. It explains the use of binding variables – or aliases – to avoid ambiguity when specifying complex queries that navigate associations by traversing multiple links between related registry objects.

The value of the `Query/@typeNames` attribute is a whitespace-separated list of object types that constitute the scope of the query. Each value in the list MUST be a qualified type name. One or more variables may be bound to a type name.

For example if you want to do a query like:

```
"Give all EO Product having a begin position greater than 2007-01-01T00:00:00.000 and an acquisition platform sensor type equals to OPTICAL"
```

More formally:

```
"Give all EO Product with an objectType equals to 'urn:x-ogc:specification:csw:ebRIM:ObjectType:EO:EOProduct', having a begin position greater than 2007-01-01T00:00:00.000, which are source of an Association of type 'urn:x-ogc:specification:csw-ebRIM:AssociationType:EO:AcquiredBy' pointing – as target – to an ExtrinsicObject having as objectType 'urn:x-ogc:specification:csw-ebRIM:ObjectType:EO:EOAcquisitionPlatform' and having a sensorType equals to OPTICAL"
```
Example 6 – GetRecords example.

```xml
<?xml version="1.0" encoding="UTF-8"?>
<csw:GetRecords xmlns:csw="http://www.opengis.net/cat/csw/2.0.2"
xmlns:ogc="http://www.opengis.net/ogc"
xmlns:gml="http://www.opengis.net/gml"
xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0"
outputSchema="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0"
version="2.0.2"
service="CSW"
resultType="results"
startPosition="1"
maxRecords="20">
  <csw:Query typeNames="rim:ExtrinsicObject rim:ExtrinsicObject_ACQPLAT
rim:Association">
    <csw:ElementSetName typeNames="rim:ExtrinsicObject">
      full</csw:ElementSetName>
    <ogc:Filter>
      <ogc:And>
        <ogc:PropertyIsEqualTo>
          <ogc:PropertyName>/rim:ExtrinsicObject/@objectType
          <ogc:PropertyIsEqualTo>
            <ogc:Literal>2007-01-10T00:00:00.000</ogc:Literal>
            <ogc:PropertyIsGreaterThanEqualTo>
              <ogc:PropertyName>$ACQPLAT/@objectType</ogc:PropertyName>
              <ogc:PropertyIsEqualTo>
                <ogc:Literal>OPTICAL</ogc:Literal>
                <ogc:PropertyIsEqualTo>
                  <ogc:PropertyName>$ACQPLAT[@id</ogc:PropertyName>
                  <ogc:Literal>/rim:Association/@associationType</ogc:Literal>
                  <ogc:PropertyIsEqualTo>
                    <ogc:PropertyName>/rim:Association/@sourceObject</ogc:PropertyName>
                    <ogc:PropertyIsEqualTo>
                      <ogc:PropertyName>/rim:ExtrinsicObject/@id</ogc:PropertyName>
                      <ogc:PropertyIsEqualTo>
                        <ogc:PropertyName>$ACQPLAT/@id</ogc:PropertyName>
                        <ogc:PropertyIsEqualTo>
                          <ogc:And>
                            <ogc:Filter>
                            <csw:Constraint version="1.1.0"/>
                          </ogc:Filter>
                      </csw:Constraint>
                    </ogc:PropertyIsEqualTo>
                  </ogc:PropertyIsEqualTo>
                </ogc:PropertyIsEqualTo>
              </ogc:PropertyIsGreaterThanEqualTo>
            </ogc:PropertyIsEqualTo>
          </ogc:PropertyIsEqualTo>
        </ogc:And>
      </ogc:Filter>
    </csw:Constraint>
  </csw:Query>
</csw:GetRecords>
```
In this request we declare 3 alias in the typenames attribute of the <csw:query>. Two alias have the rim:ExtrinsicObject type and one have the rim:Association type. If you take a look at the rim:extrinsicObject alias, you see that one has the ACQPLAT name and the other one has no name. If no name is used for the alias you have to refer it in the request using the type (I mean rim:ExtrinsicObject or rim:Association). If you have a name for the alias you have to use $AliasName to refer it. You have to use a name as soon as you need to filter several objects with the same type. Here we have the acquisitionPlatform object and the EOProduct object with the same ExtrinsicObject type so we use a name for one of them.

So here we filter the rim:ExtrinsicObject alias saying that it is an EOProduct object with a beginDate greater than ‘2007-01-01T00:00:00.000’. Then we filter the ACQPLAT alias saying that it is an AcquisitionPlatform type with a sensor type equals to ‘OPTICAL’. Finally we have to link the two objects. This is done by an Association object with an AcquiredBy as objectType, a sourceObject equals to the EOProduct id and a target Object equals to the AcquisitionPlatform id.

This should return the ‘full’ information (EOProduct, ExternalIdentifier, classification, AcquisitionPlatform and association objects) as you can see below:

Example 7 – GetRecordsResponse example.

```
<?xml version="1.0" encoding="UTF-8"?>
  <csw:SearchStatus/>
  <csw:SearchResults xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0" numberOfRecordsMatched="3128834" numberOfRecordsReturned="2" nextRecord="21" xsi:schemaLocation="">
      <rim:Slot name="urn:ogc:def:ebRIM-Slot:OGC-06-131:imageQualityDegradation" slotType="double">
        <rim:ValueList>
          <rim:Value>75.0</rim:Value>
        </rim:ValueList>
      </rim:Slot>
      <rim:Slot name="urn:ogc:def:ebRIM-Slot:OGC-06-131:centerOf" slotType="geometry">
        <wrs:ValueList xmlns:wrs="http://www.opengis.net/cat/wrs/1.0" xsi:schemaLocation="http://www.opengis.net/gml">
          <wrs:AnyValue xmlns:gml="http://www.opengis.net/gml">
            <gml:Point srsName="EPSG:4326">
              <gml:pos>147.89204939003056 -15.015514612197876</gml:pos>
            </gml:Point>
          </wrs:AnyValue>
        </wrs:ValueList>
      </rim:Slot>
      <rim:Slot name="urn:ogc:def:ebRIM-Slot:OGC-06-131:productType" slotType="string">
        <rim:ValueList>
          <rim:Value>Scene</rim:Value>
        </rim:ValueList>
      </rim:Slot>
      <rim:Slot name="urn:ogc:def:ebRIM-Slot:OGC-06-131:beginPosition" slotType="dateTime">
        <rim:ValueList>
          <rim:Value/>
        </rim:ValueList>
      </rim:Slot>
    </rim:ExtrinsicObject>
  </csw:SearchResults>
</csw:GetRecordsResponse>
```
<rim:ValueList>
	<rim:Value>2007-01-10T00:16:31Z</rim:Value>
</rim:ValueList>

<rim:Slot>
	<rim:Slot name="urn:ogc:def:ebRIM:OGC-06-131:doi" slotType="string">
		<rim:ValueList>
		</rim:ValueList>
	</rim:Slot>
</rim:Slot>

<rim:Slot>
	<rim:Slot name="urn:ogc:def:ebRIM:OGC-06-131:lastOrbitNumber" slotType="int">
		<rim:ValueList>
			<rim:Value>235</rim:Value>
		</rim:ValueList>
	</rim:Slot>
</rim:Slot>

<rim:Slot>
	<rim:Slot name="urn:ogc:def:ebRIM:OGC-06-131:multiExtentOf" slotType="geometry">
		<wrs:ValueList xmlns:wrs="http://www.opengis.net/cat/wrs/1.0">
			<wrs:AnyValue xmlns:gml="http://www.opengis.net/gml">
				<gml:Polygon srsName="EPSG:4326">
					<gml:exterior>
						<gml:LinearRing srsName="EPSG:4326">
							<gml:pos>147.49 -15.22700023651123</gml:pos>
							<gml:pos>148.2935882414475 -14.803518295288086</gml:pos>
							<gml:pos>147.625409318674 -14.691240310668945</gml:pos>
							<gml:pos>147.49 -15.22700023651123</gml:pos>
						</gml:LinearRing>
					</gml:exterior>
				</gml:Polygon>
		</wrs:AnyValue>
	</wrs:ValueList>
</rim:Slot>

<rim:Slot>
	<rim:Slot name="urn:ogc:def:ebRIM:OGC-06-131:endPosition" slotType="dateTime">
		<rim:ValueList>
			<rim:Value>2007-01-10T00:16:31Z</rim:Value>
		</rim:ValueList>
	</rim:Slot>
</rim:Slot>

<rim:Slot>
	<rim:Slot name="urn:ogc:def:ebRIM:OGC-06-131:alongTrackPointingAngle" slotType="double">
		<rim:ValueList>
			<rim:Value>-25.784143</rim:Value>
		</rim:ValueList>
	</rim:Slot>
</rim:Slot>

<rim:Slot>
	<rim:Slot name="urn:ogc:def:ebRIM:OGC-06-131:acquisitionType" slotType="string">
		<rim:ValueList>
			<rim:Value>NOMINAL</rim:Value>
		</rim:ValueList>
	</rim:Slot>
</rim:Slot>

<rim:Slot>
	<rim:Slot name="urn:ogc:def:ebRIM:OGC-06-131:cloudCoverPercentage" slotType="double">
		<rim:ValueList>
			<rim:Value>100.0</rim:Value>
		</rim:ValueList>
	</rim:Slot>
</rim:Slot>

<rim:Slot>
	<rim:Slot name="urn:ogc:def:ebRIM:OGC-06-131:acrossTrackPointingAngle" slotType="double">
		<rim:ValueList>
			<rim:Value>13.800000190734863</rim:Value>
		</rim:ValueList>
	</rim:Slot>
</rim:Slot>

<rim:Slot>
	<rim:Slot name="urn:ogc:def:ebRIM:OGC-06-131:snowCoverPercentage" slotType="double">
		<rim:ValueList>
			<rim:Value></rim:Value>
		</rim:ValueList>
	</rim:Slot>
</rim:Slot>
<rim:ValueList>
  <rim:Value>100.0</rim:Value>
</rim:ValueList>

<rim:Slot>
  <rim:Slot name="urn:ogc:def:ebRIM-OGC-06-131:orbitNumber" slotType="int">
    <rim:ValueList>
      <rim:Value>235</rim:Value>
    </rim:ValueList>
  </rim:Slot>

<rim:Slot name="urn:ogc:def:ebRIM-OGC-06-131:status" slotType="string">
  <rim:ValueList>
    <rim:Value>ACQUIRED</rim:Value>
  </rim:ValueList>
</rim:Slot>

<rim:ExtrinsicObject>
    <rim:Slot name="urn:ogc:def:ebRIM-OGC-06-131:archivingDate" slotType="dateTime">
      <rim:ValueList>
        <rim:Value>2007-01-10T01:04:01Z</rim:Value>
      </rim:ValueList>
    </rim:Slot>
  </rim:ExtrinsicObject>
    <rim:Slot name="urn:ogc:def:ebRIM-OGC-06-131:fileName" slotType="string">
      <rim:ValueList>
        <rim:Value>http://dev.ionicsoft.com:80/daliproxy/wrs/DALIPROXYLAZY?REQUEST=GetRepositoryItem&amp;Id=urn:x-dali%3Asat%3AShift0%3Aa21%3A4373338007011000163121%3Adata%3A4377990%3A4</rim:Value>
      </rim:ValueList>
    </rim:Slot>
  </rim:ExtrinsicObject>
</rim:ExtrinsicObject>


<rim:Slot name="urn:ogc:def:ebRIM-OGC-06-131:sensorType" slotType="string">
  <rim:ValueList>
    <rim:Value>OPTICAL</rim:Value>
  </rim:ValueList>
</rim:Slot>

<rim:Slot name="urn:ogc:def:ebRIM-OGC-06-131:instrumentShortName" slotType="string">
  <rim:ValueList>
    <rim:Value>HRVIR-Nb2</rim:Value>
  </rim:ValueList>
</rim:Slot>
<gml:LinearRing srsName="EPSG:4326">
  <gml:pos>147.3624 -15.726499557495117</gml:pos>
  <gml:pos>147.497 -15.1995008392334</gml:pos>
  <gml:pos>147.3624 -15.726499557495117</gml:pos>
</gml:LinearRing>

<ws:Polyigon>
  <gml:exterior>
    <gml:LinearRing>
      <gml:pos>147.3624 -15.726499557495117</gml:pos>
      <gml:pos>147.497 -15.1995008392334</gml:pos>
      <gml:pos>147.3624 -15.726499557495117</gml:pos>
    </gml:LinearRing>
  </gml:exterior>
</ws:Polyigon>
ogc:specification:csw-ebRIM:ObjectType:EO:EOArchivingInformation">
    <rim:Slot name="urn:ogc:def:ebRIM-Slot:OGC-06-131:archivingDate" slotType="dateTime">
      <rim:ValueList>
        <rim:Value>2007-01-10T01:04:01Z</rim:Value>
      </rim:ValueList>
    </rim:Slot>
  </rim:ExtrinsicObject>

  
    <rim:Slot name="urn:ogc:def:ebRIM-Slot:OGC-06-131:file_Name" slotType="string">
      <rim:ValueList>
        <rim:Value>
          http://dev.ionicsoft.com:80/daliproxy/wrs/DALIPROXYLAZY?REQUEST=GetRepositoryItem&amp;Id=urn:dali%3Asat%3Ashift0%3aab21%3aa43733810701100016392%3adn%3aa4377990%3a4
        </rim:Value>
      </rim:ValueList>
    </rim:Slot>
  </rim:ExtrinsicObject>


    <rim:Slot name="urn:ogc:def:ebRIM-Slot:OGC-06-131:sensorType" slotType="string">
      <rim:ValueList>
        <rim:Value>OPTICAL</rim:Value>
      </rim:ValueList>
    </rim:Slot>
  </rim:ExtrinsicObject>


  <rim:SearchResults>
    </csw:GetRecordsResponse>
9.2.2.4 Exceptions

If the request is deemed invalid for any reason (e.g. missing a required element), the service must return an ows:ExceptionReport containing a service exception with the code wrs:InvalidRequest.

9.2.3 DescribeRecord Operation

The DescribeRecord operation allows a client to discover the information model(s) supported by the catalogue and to retrieve record type definitions.

9.2.3.1 DescribeRecord Request

The DescribeRecord operation is described in Clause 9 of [OGC 07-110r2]. The XML representation of the entity body, if present, must conform to the csw:DescribeRecord element declaration. The TypeName elements, if present, identify the model elements for which type definitions are requested.

The only schema language currently supported by the ebRIM Profile is W3C XML Schema. The corresponding value of the schemaLanguage attribute is given by the following URI: “http://www.w3c.org/2001/XMLSchema”

9.2.3.2 DescribeRecord Response

If the request is processed successfully, the body of the response message shall include an XML document where the document element has the following infoset properties:

- A [local name] of ‘DescribeRecordResponse’,
- A [namespace name] of ‘http://www.opengis.net/cat/csw/2.0.2’ (usually represented by the ‘csw’ prefix).

If no TypeName elements were provided in the request, whole schemas defining the information model must be included within csw:SchemaComponent elements. If there are no matching schema components, the document element must be empty.

The content of a csw:SchemaComponent element may be a complete schema or a fragment of one. If it is a fragment, the parentSchema attribute must reference the source schema (by identifier).

9.2.3.3 Exceptions

If the request is deemed invalid for any reason (e.g. missing a required element), the service must return an ows:ExceptionReport containing a service exception with the code wrs:InvalidRequest.
9.2.4 GetRecordById Operation

The GetRecordById operation provides a simple mean of retrieving one or more records by identifier; the identifier may be that of some registry object (rim:RegistryObject/@id) or an external identifier (rim:ExternalIdentifier/@value) assigned to a registry object. The messages are defined in a schema that can be found in the Annex B of the [OGC 07-110r2].

9.2.4.1 GetRecordById Request

The GetRecordById operation is described in Clause 11 of [OGC 07-110r2]. The XML representation of the entity body, if present, must conform to the csw:GetRecordById element declaration. All reserved characters (e.g., general delimeters) appearing in identifier values must be suitably percent-encoded in the KVP representation when using the GET method.

The value of an Id (message parameter) item identifies a registry objet either directly or by an external identifier that corresponds to a child rim:ExternalIdentifier element.

```xml
<xsd:element name="GetRecordById" type="csw:GetRecordByIdType" id="GetRecordById"/>
<xsd:complexType name="GetRecordByIdType" id="GetRecordByIdType">
  <xsd:annotation>
    <xsd:documentation xml:lang="en">
      Convenience operation to retrieve default record representations by identifier.
      Id - object identifier (a URI) that provides a reference to a catalogue item (or a result set if the catalogue supports persistent result sets).
      ElementSetName - one of "brief", "summary", or "full"
    </xsd:documentation>
  </xsd:annotation>
  <xsd:complexType>
    <xsd:extension base="csw:RequestBaseType">
      <xsd:sequence>
        <xsd:element name="Id" type="xsd:anyURI" maxOccurs="unbounded"/>
      </xsd:sequence>
    </xsd:extension>
  </xsd:complexType>
</xsd:complexType>
```

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data type and value</th>
<th>Optionality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service</td>
<td>Character String. Fixed value of &quot;CSW&quot;</td>
<td>Mandatory</td>
</tr>
<tr>
<td>Version</td>
<td>Character String. Fixed value of '2.0.2'</td>
<td>Mandatory</td>
</tr>
<tr>
<td>Parameter</td>
<td>Data type and value</td>
<td>Optionality</td>
</tr>
<tr>
<td>--------------------</td>
<td>--------------------------------------------------------------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>OutputFormat</td>
<td>CharacterString. The only supported value is ‘application/xml’ (default value)</td>
<td>Optional</td>
</tr>
</tbody>
</table>

9.2.4.2 GetRecordById Response

If the request is processed successfully, the body of the response message shall include an XML document where the document element has the following infoset properties:

- A [local name] of ‘GetRecordByIdResponse’,
- A [namespace name] of ‘http://www.opengis.net/cat/csw/2.0.2’ (usually represented by the ‘csw’ prefix).

The child elements must be registry object representations (i.e. rim:RegistryObject or some valid substitution element) corresponding to the requested property set. If a match for an external identifier is found, the parent registry object is included. If there are no matching records, an empty response is returned.

The following XML-Schema fragments define the XML format response to a GetRecordById operation:

```xml
<complexType name="GetRecordByIdResponseType" id="GetRecordByIdResponseType">
  <sequence>
    <element name="Id" type="string" minOccurs="0" maxOccurs="unbounded"/>
  </sequence>
</complexType>
```

9.2.4.3 Samples

Example 8 – GetRecordById example.

```xml
<?xml version="1.0" encoding="UTF-8"?>
<GetRecordById xmlns="http://www.opengis.net/cat/csw/2.0.2"
                xmlns:wrs="http://www.opengis.net/cat/wrs/1.0" service="CSW" version="2.0.2"
                outputSchema="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0">
  <Id>urn:x-dali:sat:Shift0:a21:41503310111130725211M:dn:1326556:0</Id>
  <ElementSetName typeNames="rim:ExtrinsicObject">full</ElementSetName>
</GetRecordById>
```
This request returns the following response:

Example 9 – GetRecordByIdResponse example.

```xml
<?xml version="1.0" encoding="UTF-8"?>
<csw:GetRecordByIdResponse xmlns:csw="http://www.opengis.net/cat/csw/2.0.2" xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0"
    <rim:Slot name="urn:ogc:def:ebRIM- Slot:OGC-06-131:imageQualityDegradation" slotType="double">
        <rim:ValueList>
            <rim:Value>75.0</rim:Value>
        </rim:ValueList>
    </rim:Slot>
    <rim:Slot name="urn:ogc:def:ebRIM- Slot:OGC-06-131:centerOf" slotType="geometry">
        <wrs:ValueList xmlns:wrs="http://www.opengis.net/cat/wrs/1.0">
            <wrs:AnyValue xmlns:gml="http://www.opengis.net/gml">
                <gml:Point srsName="EPSG:4326">
                    <gml:pos>45.04605927906287 9.517748355865479</gml:pos>
                </gml:Point>
            </wrs:AnyValue>
        </wrs:ValueList>
    </rim:Slot>
    <rim:Slot name="urn:ogc:def:ebRIM- Slot:OGC-06-131:productType" slotType="string">
        <rim:ValueList>
            <rim:Value>Scene</rim:Value>
        </rim:ValueList>
    </rim:Slot>
    <rim:Slot name="urn:ogc:def:ebRIM- Slot:OGC-06-131:beginPosition" slotType="dateTime">
        <rim:ValueList>
        </rim:ValueList>
    </rim:Slot>
    <rim:Slot name="urn:ogc:def:ebRIM- Slot:OGC-06-131:doi" slotType="string">
        <rim:ValueList>
        </rim:ValueList>
    </rim:Slot>
    <rim:Slot name="urn:ogc:def:ebRIM- Slot:OGC-06-131:lastOrbitNumber" slotType="int">
        <rim:ValueList>
            <rim:Value>69</rim:Value>
        </rim:ValueList>
    </rim:Slot>
    <rim:Slot name="urn:ogc:def:ebRIM- Slot:OGC-06-131:multiExtentOf" slotType="geometry">
        <wrs:ValueList xmlns:wrs="http://www.opengis.net/cat/wrs/1.0">
            <wrs:AnyValue xmlns:gml="http://www.opengis.net/gml">
                <gml:Polygon srsName="EPSG:4326">
                    <gml:exterior>
                        <gml:LinearRing srsName="EPSG:4326">
                            <gml:pos>44.6863 9.295999526977539</gml:pos>
                            <gml:pos>45.2884 9.207300186157227</gml:pos>
                            <gml:pos>45.406181338079406 9.739493370056152</gml:pos>
                        </gml:LinearRing>
                    </gml:exterior>
                </gml:Polygon>
            </wrs:AnyValue>
        </wrs:ValueList>
    </rim:Slot>
</rim:ExtrinsicObject>
</csw:GetRecordByIdResponse>
```
9.2.4.4 Exceptions

If the request is deemed invalid for any reason (e.g. missing a required element), the service must return an ows:ExceptionReport containing a service exception with the code wrs:InvalidRequest.

9.2.5 GetRepositoryItem Operation

The GetRepositoryItem operation is used to retrieve the repository item corresponding to some extrinsic object. In this context, this operation is used to retrieve the GML document related to the EO Product. If available, the item is included in the body of the response; it must be an instance of a MIME media type, as indicated by the value of the Content-Type header field.

An extrinsic object may also be used to catalogue an external repository item that is managed by another party. In this case, the ExtrinsicObject must be associated (using the ‘RepositoryItemFor’ association) with an ExternalLink that specifies an absolute URL for retrieving the item.

9.2.5.1 GetRepositoryItem Request

The request is bound only to the GET method. All reserved characters appearing in parameter values must be suitably percent-encoded. The request parameters are listed in the following table:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data type and value</th>
<th>Optionality</th>
</tr>
</thead>
<tbody>
<tr>
<td>service</td>
<td>Character String. Fixed value of ‘CSW’</td>
<td>Mandatory</td>
</tr>
<tr>
<td>request</td>
<td>Character String. Fixed value of ‘GetRepositoryItem’</td>
<td>Mandatory</td>
</tr>
<tr>
<td>id</td>
<td>CharacterString. Absolute URI that refers to some extrinsic object</td>
<td>Mandatory</td>
</tr>
</tbody>
</table>

9.2.5.2 GetRepositoryItem Response

If the request is processed successfully and a repository item is accessible, the body of the response message shall include the repository item as a MIME entity. If any
additional encodings have been applied to the resource (e.g., compression using gzip), these must be specified by the Content-Encoding header field.

In some cases the resource may reside in an external repository maintained by another party. In this case, the catalogue shall redirect the client using the standard HTTP redirection mechanism (i.e., status code 303, “See Other”) and set the value of location header field according to the value of ExternalLink/@externalURI attribute.

9.2.5.3 Exceptions

If the request is deemed invalid for any reason (e.g., missing identifier), then the service must return an ows:ExceptionReport containing a service exception with the code wrs:InvalidRequest. If the supplied identifier does not match any registry object or if a repository item cannot be located, the response must include an exception with the code wrs:NotFound.

9.2.6 Harvest Operation

The Harvest operation is described in Clause 14 of [OGC 07-110r2]. It allows a user to request the catalogue to harvest a resource from a specified network location, thereby realizing a ‘pull’ model for publishing registry content. If the catalogue successfully retrieves the resource and successfully processes it, then one or more corresponding registry objects are created or updated. Brief representations (see subclause 14.1 of [OGC 07-110r2]) of all modified records are returned to the client when processing is complete.

This publication operation is optional in Earth Observation ebRIM Catalogue. If not implemented, the catalogue is ‘read-only’ and only discovery operations are available.

9.2.6.1 Harvest Request

The csw:Source element specifies a URL from which the resource may be retrieved. The scheme component should correspond to a protocol supported by the catalogue; support for the ‘http’ scheme is required by all conforming implementations, and ‘HTTP/1.1’ must be listed in the capabilities document as a value for the ‘harvest-protocols’ system property.

If specified, the csw:ResourceType element must indicate the object type of the corresponding extrinsic object. It may be possible for the catalogue to deduce this from the content of the resource (for example, a data set description that conforms to the ISO 19139 schemas). The value should correspond to a type supported by the catalogue, as identified in the objectType classification scheme.

The harvest operation definition shall advertise the support for EO Metadata resourceType using the following values:

- eop:EarthObservation,
- sar:EarthObservation
- opt:EarthObservation
- atm:EarthObservation

Note 1 – the 3 letters acronyms (eop, sar, opt and atm) are not XML prefixes. ResourceType is not a QName. To avoid such a confusing behavior, we suggest that these should become URNs register by the OGC as in [07-110r2].

Example 10 – Harvest Operation Definition in the Capabilities

```xml
<Operation name="Harvest">
  <DCP>
    <HTTP>
    </HTTP>
  </DCP>
  <Parameter name="resourceType">
    <Value>eop:EarthObservation</Value>
    <Value>sar:EarthObservation</Value>
    <Value>opt:EarthObservation</Value>
    <Value>atm:EarthObservation</Value>
    <Value>ISO19139</Value>
    <Value>Context</Value>
    <Value>SOS</Value>
    <Value>WMS</Value>
    <Value>WCS</Value>
    <Value>WFS</Value>
  </Parameter>
  <Parameter name="source"></Parameter>
</Operation>
```

9.2.6.2 Harvest Response

If the request is processed successfully, the body of the response message shall include an XML document where the document element has the following infoset properties:

- A [local name] of ‘HarvestResponse’,
- A [namespace name] of ‘http://www.opengis.net/cat/csw/2.0.2’ (usually represented by the ‘csw’ prefix).

The document element must include a csw:TransactionResponse element that contains the csw:InsertResults child element; this element must list all registry objects that were created as a result of the harvesting operation.

9.2.6.3 Exceptions

If the resource cannot be retrieved from the source URL, an exception with the code wrs:NotFound must be included in an ogc:ExceptionReport. If the resource format is not supported by the catalogue or the object type is not recognized, an exception with code wrs:NotSupported must be returned. In the event that the transaction cannot be completed for any reason, an exception with the wrs:TransactionFailed code must be returned.
10 Implementation Guidance

10.1 Use of ParentIdentifier

Typically, the filter expression passed in the GetRecords request will contain a subexpression:

```xml
<ogc:PropertyIsEqualTo>
  <ogc:Literal>collectionid</ogc:Literal>
</ogc:PropertyIsEqualTo>
```

This allows an implementation to search the catalogue for matching products with the same parentIdentifier, typically a collection of EO products. Often EO collections are organized per satellite, instrument or even submode of the instrument. When a client wants products from multiple collections, typically this means that one request will be made per collection (i.e. parentIdentifier).

The current specification allows to go further and have in the Filter expression more complex containing “or” or “and” expressions. In this way, a single request can be used to search several EO collections with a single request, which improves the efficiency of the communication between catalogue client and catalogue server. It is understood however, that not all catalogue owners may support GetRecords requests addressing multiple collections at once and may only provide support for this in future versions of their catalogue interfaces.

The convention for the parentIdentifier is as defined in "Definition identifier URNs in OGC namespace" [OGC 06-023r1] i.e. `urn:ogc:def:objectType:authority:version:code`. where the registered namespace authority is ogc, the objectType is EOP, the authority representing the Ground Segment i.e ESA, SPOT, EUM etc… The version is optional.

The code is a unique identifier specified by the authority which corresponds here to the collection name. The ":" will delimit the start of the collection name. The collection name can be defined as required by the Ground Segment but to ensure unique names the following representation is proposed:

```plaintext
programme.satellite_instrument_processing
```


10.2 Distributed Search Implementation

Although this application profile does not support DISTRIBUTEDSEARCH keyword in the GetRecords request, distributed searches can be implemented via a Web service orchestration engine, e.g. using OASIS BPEL as depicted below.
Figure 18: Implementing distributed search
Annex A
(normative)

Abstract test suite

In each Implementation Specification document, Annex A shall specify the Abstract Test Suite, as specified in Clause 9 and Annex A of ISO 19105. That Clause and Annex specify the ISO/TC 211 requirements for Abstract Test Suites. Examples of Abstract Test Suites are available in an annex of most ISO 191XX documents, one of the more useful is in ISO 191TBD. Note that this guidance may be more abstract than needed in an OGC™ Implementation Specification.

Inclusion of the Abstract Test Suite is expected in version 1.0.0 of each OGC Implementation Specification. In earlier versions, the following paragraph can be used:

A.1 General

An abstract test suite is not provided in this version of this Implementation Specification, but will be provided in version 1.0.0.
Annex B
(normative)

XML Schema Documents

This template recommends referencing the XML Schema Documents here, and not including the schema document contents in an OWS specification. However, some readers prefer including the schema document contents in a specification. The personal preferences of the specification editor(s) should not be a significant consideration. This template leaves the choice up to the editor(s).

The term “XML schema“ means all the XML schema parts having the same XML namespace, usually separated into multiple XML Schema Document files (with the file type “.xsd”. The XML schema parts in one XML namespace are usually separated into multiple XML Schema Documents to ease human understanding.

B.1 General

XML Schemas instances are not provided in this version of this Implementation Specification, but will be provided in version 1.0.0.
Annex C
(informative)

XML RegistryPackage Documents

This annex contains the XML RegistryPackage document for EO Extension Package, as described in the subsection 7.3 of this document.

```xml
<?xml version="1.0" encoding="UTF-8"?>
<rim:RegistryPackage xmlns:rim="urn:oasis:names:tc:ebxml-rim:3.0"
    id="urn:o:gc:specification:csw-ebrim:package:EOProducts"
    objectType="urn:oasis:names:tc:ebxml-rim:ObjectType:RegistryObject:RegistryPackage">
    <!-- Contact : Renato Primavera, Leica Geosystems Geospatial Imaging - renato.primavera@ionicsoft.com -->
    <rim:Name/>
    <rim:LocalizedString xml:lang="en-US" charset="UTF-8" value="Earth Observation Products extension package for CSW-ebRIM"/>
</rim:Name>
</rim:Description>
<rim:ObjectTypeList>
    <!-- extensions to canonical ObjectType scheme -->
    <rim:ClassificationNode code="EOProduct"
        objectType="urn:oasis:names:tc:ebxml-rim:ObjectType:RegistryObject:ClassificationNode"
        id="urn:o:gc:specification:csw-ebrim:ObjectType:EO:EOProduct"
        parent="urn:oasis:names:tc:ebxml-rim:ObjectType:RegistryObject:ExtrinsicObject">
        <rim:Name/>
        <rim:LocalizedString xml:lang="en-US" charset="UTF-8" value="EOProduct"/>
    </rim:Name>
</rim:Description>
<rim:Description>
    <rim:LocalizedString xml:lang="en-US" charset="UTF-8" value="Provides Earth Observation Products extensions to the Basic package of the CSW-ebRIM catalogue profile."/>
</rim:Description>
<rim:ClassificationNode>
    <rim:ClassificationNode code="EOAcquisitionPlatform"
        objectType="urn:oasis:names:tc:ebxml-rim:ObjectType:RegistryObject:ClassificationNode"
        id="urn:o:gc:specification:csw-ebrim:ObjectType:EO:EOAcquisitionPlatform"
        parent="urn:oasis:names:tc:ebxml-rim:ObjectType:RegistryObject:ExtrinsicObject">
        <rim:Name/>
        <rim:LocalizedString xml:lang="en-US" charset="UTF-8" value="EOAcquisitionPlatform"/>
    </rim:Name>
</rim:Description>
<rim:Description>
    <rim:LocalizedString xml:lang="en-US" charset="UTF-8" value="Represents an Earth Observation Acquisition Platform"/>
</rim:Description>
<rim:ClassificationNode>
    <rim:ClassificationNode code="EOProductInformation"
        objectType="urn:oasis:names:tc:ebxml-rim:ObjectType:RegistryObject:ClassificationNode"
        id="urn:o:gc:specification:csw-ebrim:ObjectType:EO:EOProductInformation"
        parent="urn:oasis:names:tc:ebxml-rim:ObjectType:RegistryObject:ExtrinsicObject">
        <rim:Name/>
        <rim:LocalizedString xml:lang="en-US" charset="UTF-8" value="EOProductInformation"/>
    </rim:Name>
</rim:Description>
<rim:Description>
    <rim:LocalizedString xml:lang="en-US" charset="UTF-8" value="Represents an Earth Observation Product Information"/>
</rim:Description>
<rim:ClassificationNode>
    <rim:ClassificationNode code="EOMaskInformation"
        objectType="urn:oasis:names:tc:ebxml-rim:ObjectType:RegistryObject:ClassificationNode"
        id="urn:o:gc:specification:csw-ebrim:ObjectType:EO:EOMaskInformation"
        parent="urn:oasis:names:tc:ebxml-rim:ObjectType:RegistryObject:ExtrinsicObject">
        <rim:Name/>
        <rim:LocalizedString xml:lang="en-US" charset="UTF-8" value="EOMaskInformation"/>
    </rim:Name>
</rim:Description>
<rim:Description>
    <rim:LocalizedString xml:lang="en-US" charset="UTF-8" value="Represents an Earth Observation Mask Information"/>
</rim:Description>
</rim:ClassificationNode>
</rim:RegistryObjectList>
</rim:RegistryPackage>
```

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<item Name>
<item Description>
<item LocalizedString xml:lang="en-US" charset="UTF-8" value="Associates a EOProduct with a EOBrowseInformation."></item>
</item Description>
</item ClassificationNode>

<item ClassificationNode code="ArchivedIn"
objectType="urn:oasis:names:tc:ebxml-regrep:ObjectType:RegistryObject:ClassificationNode"
id="urn:oasis:specification:csw-ebbrim:AssociationType:EO:ArchivedIn"
parent="urn:oasis:names:tc:ebxml-regrep:classificationScheme:AssociationType">
<item Name>
<item LocalizedString xml:lang="en-US" charset="UTF-8" value="ArchivedIn"/>
</item Name>
</item Description>
</item ClassificationNode>

<item ClassificationNode code="HasDataLayer"
objectType="urn:oasis:names:tc:ebxml-regrep:ObjectType:RegistryObject:ClassificationNode"
id="urn:oasis:specification:csw-ebbrim:AssociationType:EO:HasDataLayer"
parent="urn:oasis:names:tc:ebxml-regrep:classificationScheme:AssociationType">
<item Name>
<item LocalizedString xml:lang="en-US" charset="UTF-8" value="HasDataLayer"/>
</item Name>
</item Description>
</item ClassificationNode>

<!-- Meta-assocations to constrain source and target object types by AssociationType -->
<item Association
sourceObject="urn:oasis:specification:csw-ebbrim:ObjectType:EO:EOProduct"
associationType="urn:oasis:specification:csw-ebbrim:AssociationType:EO:AcquiredBy"

<item Association
sourceObject="urn:oasis:specification:csw-ebbrim:ObjectType:EO:EOProduct"
associationType="urn:oasis:specification:csw-ebbrim:AssociationType:EO:HasProductInformation"
targetObject="urn:oasis:specification:csw-ebbrim:ObjectType:EO:EOProductInformation"/>

<item Association
sourceObject="urn:oasis:specification:csw-ebbrim:ObjectType:EO:EOProduct"
associationType="urn:oasis:specification:csw-ebbrim:AssociationType:EO:HasMaskInformation"
targetObject="urn:oasis:specification:csw-ebbrim:ObjectType:EO:EOMaskInformation"/>

<item Association
sourceObject="urn:oasis:specification:csw-ebbrim:ObjectType:EO:EOProduct"
associationType="urn:oasis:specification:csw-ebbrim:AssociationType:EO:HasBrowseInformation"
targetObject="urn:oasis:specification:csw-ebbrim:ObjectType:EO:EOBrowseInformation"/>

<item Association
sourceObject="urn:oasis:specification:csw-ebbrim:ObjectType:EO:EOProduct"
associationType="urn:oasis:specification:csw-ebbrim:AssociationType:EO:ArchivedIn"
targetObject="urn:oasis:specification:csw-ebbrim:ObjectType:EO:EOArchivingInformation"/>

<item Association
sourceObject="urn:oasis:specification:csw-ebbrim:ObjectType:EO:EOProduct"
associationType="urn:oasis:specification:csw-ebbrim:AssociationType:EO:HasDataLayer"
targetObject="urn:oasis:specification:csw-ebbrim:ObjectType:EO:EODataLayer"/>

<!-- ClassificationScheme - Earth Observation Product Types taxonomy -->
<item ClassificationScheme
id="urn:oasis:specification:csw-ebbrim:EO:EOProductTypes"
objectType="urn:oasis:names:tc:ebxml-regrep:ObjectType:RegistryObject:ClassificationScheme"
isInternal="true"
nodetype="urn:oasis:names:tc:ebxml-regrep:NodeType:UniqueCode">
<item Name>
<item LocalizedString xml:lang="en-US" charset="UTF-8" value="EOProductTypes"/>
</item Name>
</item Description>
</item ClassificationNode>

<item ClassificationNode
id="urn:oasis:specification:csw-ebbrim:EO:EOProductTypes:EOP"
code="EOP"
id="urn:oasis:specification:csw-ebbrim:EO:EOProductTypes:EOP">
<item Name>
<item LocalizedString xml:lang="en-US" charset="UTF-8" value="EOP"/>
</item Name>
</item Description>
<rim:LocalizedString xml:lang="en-US" charset="UTF-8" value="EOP General type">
  <rim:Description/>
</rim:LocalizedString>

<rim:ClassificationNode>
  <id>urn:x-ogc:specification:csw-ebRIM:EO:EOProductTypes:SAR</id>
  <code>SAR</code>
</rim:ClassificationNode>

<rim:LocalizedString xml:lang="en-US" charset="UTF-8" value="SAR'">
  <rim:Name/>
  <rim:Description/>
</rim:LocalizedString>

<rim:ClassificationNode>
  <id>urn:x-ogc:specification:csw-ebRIM:EO:EOProductTypes:ATM</id>
  <code>ATM</code>
</rim:ClassificationNode>

<rim:LocalizedString xml:lang="en-US" charset="UTF-8" value="ATM'">
  <rim:Name/>
  <rim:Description/>
</rim:LocalizedString>

<rim:ClassificationNode>
  <id>urn:x-ogc:specification:csw-ebRIM:EO:EOProductTypes:OPT</id>
  <code>OPT</code>
</rim:ClassificationNode>

<rim:LocalizedString xml:lang="en-US" charset="UTF-8" value="Optical type'">
  <rim:Name/>
  <rim:Description/>
</rim:LocalizedString>

<rim:ClassificationNode>
  <id>urn:x-ogc:specification:csw-ebRIM:EO:EOProductTypes:PHR</id>
  <code>PHR</code>
</rim:ClassificationNode>

<rim:LocalizedString xml:lang="en-US" charset="UTF-8" value="PHR'">
  <rim:Name/>
  <rim:Description/>
</rim:LocalizedString>

<rim:LocalizedString xml:lang="en-US" charset="UTF-8" value="Atmospheric type'">
  <rim:Name/>
  <rim:Description/>
</rim:LocalizedString>

<rim:LocalizedString xml:lang="en-US" charset="UTF-8" value="Spot Pleiades Optical High-Resolution type'">
  <rim:Name/>
  <rim:Description/>
</rim:LocalizedString>

<rim:LocalizedString xml:lang="en-US" charset="UTF-8" value="Radargraphy type'">
  <rim:Name/>
  <rim:Description/>
</rim:LocalizedString>

<rim:LocalizedString xml:lang="en-US" charset="UTF-8" value="Radar type'">
  <rim:Name/>
  <rim:Description/>
</rim:LocalizedString>

<rim:ClassificationScheme>
  <!-- Meta-registryObjects to list allowed slots by objectType -->
  <rim:RegistryObject objectTypes="urn:x-ogc:specification:csw-ebRIM:ObjectType:EO:EOProduct"/>
  <rim:RegistryObject objectTypes="urn:x-ogc:specification:csw-ebRIM:EO:EOProductTypes:SAR"/>
  <rim:RegistryObject objectTypes="urn:x-ogc:specification:csw-ebRIM:EO:EOProductTypes:ATM"/>
  <rim:RegistryObject objectTypes="urn:x-ogc:specification:csw-ebRIM:EO:EOProductTypes:OPT"/>
  <rim:RegistryObject objectTypes="urn:x-ogc:specification:csw-ebRIM:EO:EOProductTypes:PHR"/>
  <rim:RegistryObject objectTypes="urn:x-ogc:specification:csw-ebRIM:EO:EOProductTypes:AR"/>
  <rim:RegistryObject objectTypes="urn:x-ogc:specification:csw-ebRIM:EO:EOProductTypes:RAD"/>
  <rim:RegistryObject objectTypes="urn:x-ogc:specification:csw-ebRIM:EO:EOProductTypes:ALT"/>
  <rim:RegistryObject objectTypes="urn:x-ogc:specification:csw-ebRIM:EO:EOProductTypes:MOB"/>
  <rim:RegistryObject objectTypes="urn:x-ogc:specification:csw-ebRIM:EO:EOProductTypes:MOB"/>
  <rim:RegistryObject objectTypes="urn:x-ogc:specification:csw-ebRIM:EO:EOProductTypes:AR"/>
  <rim:RegistryObject objectTypes="urn:x-ogc:specification:csw-ebRIM:EO:EOProductTypes:RAD"/>
  <rim:RegistryObject objectTypes="urn:x-ogc:specification:csw-ebRIM:EO:EOProductTypes:ALT"/>
  <rim:RegistryObject objectTypes="urn:x-ogc:specification:csw-ebRIM:EO:EOProductTypes:MOB"/>
  <rim:RegistryObject objectTypes="urn:x-ogc:specification:csw-ebRIM:EO:EOProductTypes:AR"/>
  <rim:RegistryObject objectTypes="urn:x-ogc:specification:csw-ebRIM:EO:EOProductTypes:RAD"/>
  <rim:RegistryObject objectTypes="urn:x-ogc:specification:csw-ebRIM:EO:EOProductTypes:ALT"/>
  <rim:RegistryObject objectTypes="urn:x-ogc:specification:csw-ebRIM:EO:EOProductTypes:MOB"/>
  <rim:RegistryObject objectTypes="urn:x-ogc:specification:csw-ebRIM:EO:EOProductTypes:AR"/>
  <rim:RegistryObject objectTypes="urn:x-ogc:specification:csw-ebRIM:EO:EOProductTypes:RAD"/>
  <rim:RegistryObject objectTypes="urn:x-ogc:specification:csw-ebRIM:EO:EOProductTypes:ALT"/>
  <rim:RegistryObject objectTypes="urn:x-ogc:specification:csw-ebRIM:EO:EOProductTypes:MOB"/>
  <rim:RegistryObject objectTypes="urn:x-ogc:specification:csw-ebRIM:EO:EOProductTypes:AR"/>
  <rim:RegistryObject objectTypes="urn:x-ogc:specification:csw-ebRIM:EO:EOProductTypes:RAD"/>
  <rim:RegistryObject objectTypes="urn:x-ogc:specification:csw-ebRIM:EO:EOProductTypes:ALT"/>
  <rim:RegistryObject objectTypes="urn:x-ogc:specification:csw-ebRIM:EO:EOProductTypes:MOB"/>
  <rim:RegistryObject objectTypes="urn:x-ogc:specification:csw-ebRIM:EO:EOProductTypes:AR"/>
  <rim:RegistryObject objectTypes="urn:x-ogc:specification:csw-ebRIM:EO:EOProductTypes:RAD"/>
  <rim:RegistryObject objectTypes="urn:x-ogc:specification:csw-ebRIM:EO:EOProductTypes:ALT"/>
  <rim:RegistryObject objectTypes="urn:x-ogc:specification:csw-ebRIM:EO:EOProductTypes:MOB"/>
  <rim:RegistryObject objectTypes="urn:x-ogc:specification:csw-ebRIM:EO:EOProductTypes:AR"/>
  <rim:RegistryObject objectTypes="urn:x-ogc:specification:csw-ebRIM:EO:EOProductTypes:RAD"/>
  <rim:RegistryObject objectTypes="urn:x-ogc:specification:csw-ebRIM:EO:EOProductTypes:ALT"/>
  <rim:RegistryObject objectTypes="urn:x-ogc:specification:csw-ebRIM:EO:EOProductTypes:MOB"/>
  <rim:RegistryObject objectTypes="urn:x-ogc:specification:csw-ebRIM:EO:EOProductTypes:AR"/>
  <rim:RegistryObject objectTypes="urn:x-ogc:specification:csw-ebRIM:EO:EOProductTypes:RAD"/>
  <rim:RegistryObject objectTypes="urn:x-ogc:specification:csw-ebRIM:EO:EOProductTypes:ALT"/>
<rim:Slot name="urn:ogc:defeRIM-Slot:OGC-06-131:incidenceAngleVariation" slotType="string"/>
<rim:Slot name="urn:ogc:defeRIM-Slot:OGC-06-131:lastOrbitNumber" slotType="int"/>
<rim:Slot name="urn:ogc:defeRIM-Slot:OGC-06-131:maximumIncidenceAngle" slotType="double"/>
<rim:Slot name="urn:ogc:defeRIM-Slot:OGC-06-131:minimumIncidenceAngle" slotType="double"/>
<rim:Slot name="urn:ogc:defeRIM-Slot:OGC-06-131:orbitDirection" slotType="string"/>
<rim:Slot name="urn:ogc:defeRIM-Slot:OGC-06-131:orbitNumber" slotType="int"/>
<rim:Slot name="urn:ogc:defeRIM-Slot:OGC-06-131:parentIdentifier" slotType="string"/>
<rim:Slot name="urn:ogc:defeRIM-Slot:OGC-06-131:pitch" slotType="int"/>
<rim:Slot name="urn:ogc:defeRIM-Slot:OGC-06-131:polariizationChannels" slotType="string"/>
<rim:Slot name="urn:ogc:defeRIM-Slot:OGC-06-131:polarizationMode" slotType="string"/>
<rim:Slot name="urn:ogc:defeRIM-Slot:OGC-06-131:productType" slotType="string"/>
<rim:Slot name="urn:ogc:defeRIM-Slot:OGC-06-131:roll" slotType="int"/>
<rim:Slot name="urn:ogc:defeRIM-Slot:OGC-06-131:snwCoverPercentage" slotType="double"/>
<rim:Slot name="urn:ogc:defeRIM-Slot:OGC-06-131:status" slotType="string"/>
<rim:Slot name="urn:ogc:defeRIM-Slot:OGC-06-131: swath" slotType="string"/>
<rim:Slot name="urn:ogc:defeRIM-Slot:OGC-06-131:vendorSpecificAttributes" slotType="string"/>
<rim:Slot name="urn:ogc:defeRIM-Slot:OGC-06-131:vendorSpecificValues" slotType="string"/>
<rim:Slot name="urn:ogc:defeRIM-Slot:OGC-06-131: yaw" slotType="int"/>
</rim:RegistryObject>

<rim:RegistryObject objectType="urn:o:gs: specification:csw:ebRIM:ObjectType:EO:EOAcquisitionPlatform">
<rim:Slot name="urn:o:gs:specification:csw:ebRIM-Slot:OGC-06-131:instrumentShortName" slotType="string"/>
<rim:Slot name="urn:o:gs:specification:csw:ebRIM-Slot:OGC-06-131:platformOrbitType" slotType="string"/>
<rim:Slot name="urn:o:gs:specification:csw:ebRIM-Slot:OGC-06-131:platformSerialIdentifier" slotType="string"/>
<rim:Slot name="urn:o:gs:specification:csw:ebRIM-Slot:OGC-06-131: sensorOperationalMode" slotType="string"/>
<rim:Slot name="urn:o:gs:specification:csw:ebRIM-Slot:OGC-06-131: sensorResolution" slotType="double"/>
<rim:Slot name="urn:o:gs:specification:csw:ebRIM-Slot:OGC-06-131: sensorType" slotType="string"/>
<rim:Slot name="urn:o:gs:specification:csw:ebRIM-Slot:OGC-06-131: swathIdentifier" slotType="string"/>
</rim:RegistryObject>

<rim:RegistryObject objectType="urn:o:gs:specification:csw:ebRIM:ObjectType:EO:EOProductInformation">
<rim:Slot name="urn:o:gs:specification:csw:ebRIM-Slot:OGC-06-131:fileDate" slotType="anyURI"/>
</rim:RegistryObject>

<rim:RegistryObject objectType="urn:o:gs:specification:csw:ebRIM:ObjectType:EO:EOBrowseInformation">
<rim:Slot name="urn:o:gs:specification:csw:ebRIM-Slot:OGC-06-131:fileDate" slotType="anyURI"/>
</rim:RegistryObject>

<rim:RegistryObject objectType="urn:o:gs:specification:csw:ebRIM:ObjectType:EO:EOArchivingInformation">
<rim:Slot name="urn:o:gs:specification:csw:ebRIM-Slot:OGC-06-131:archivingDate" slotType="dateTime"/>
</rim:RegistryObject>

<rim:RegistryObject objectType="urn:o:gs:specification:csw:ebRIM:ObjectType:EO:EDatalayer">
<rim:Slot name="urn:o:gs:specification:csw:ebRIM-Slot:OGC-06-131:algorithmName" slotType="string"/>
<rim:Slot name="urn:o:gs:specification:csw:ebRIM-Slot:OGC-06-131: highestLocation" slotType="double"/>
<rim:Slot name="urn:o:gs:specification:csw:ebRIM-Slot:OGC-06-131: lowestLocation" slotType="double"/>
<rim:Slot name="urn:o:gs:specification:csw:ebRIM-Slot:OGC-06-131:unit" slotType="string"/>
</rim:RegistryObject>

</rim:RegistryObjectList>
</rim:RegistryPackage>
Annex D
(informative)

Implementation Architectures

This specification describes interface and behavior of ebRIM Catalogues able to deal with Earth Observation Product Metadata. Such Catalogues can be deployed to manage EO Resources, in a ‘stand-alone’ mode (the catalogue acts as a registry and a repository where metadata are stored and indexed), or to provide an OGC compliant layer upon legacy catalogues, already deployed and serving existing data.

This annex focuses on these two possibilities, and provides some guidance on the way to implement both architectures.

D.1 Stand-Alone Architecture

This is the simplest architecture. Catalogue is used as a repository (for storing data) and a registry (for indexing data). It is OGC compliant and provides all capabilities and operations defined in OGC ebRIM Application Profile for CSW document. It is able to map incoming data (in this case EO Products) to objects defined by the Data Model described in this specification.

Every resource (EarthObservation Product) is stored within the Catalogue and indexed to allow complex queries and fast retrieving. If needed, additional ebRIM associations and classifications (e.g., to additional business-related taxonomies) can extend the EO data model and provide additional metadata discovery facilities to implement new use-cases. EO Products might, for example, be linked to an object or structure describing their pricing model, in an eBusiness use-case.

![Figure 19: Stand-Alone Architecture](image-url)
D.2 Proxy Architecture

If Earth Observation Products are already stored in legacy (non OGC-compliant) catalogues, the goal of this architecture is to provide an OGC compliant interface onto existing data.

From a very high-level point of view, two modes can be considered:

- The OGC layer is viewed as a **front-end** layer on the legacy catalogue: incoming requests are linked on the fly to the legacy catalogue, result sets are converted from the legacy format to the OGC CSW ebRIM format and responses are sent back to the user.

- The OGC layer is viewed as a **replication** of the legacy catalogue: metadata are harvested from the legacy catalogue, resulting in indexes (and eventually metadata themselves) available for discovery directly in the OGC layer. Queries are processed without querying on the legacy catalogue. Synchronization mechanisms exist between the two catalogues.

D.2.1 Front-End Architecture

In this architecture, OGC queries must be translated to their native version (understandable by legacy catalogues) and executed on proxied catalogue in real time. Native responses must then be translated to be sent to the final user in an OGC compliant way.

OGC CSW ebRIM Interface operations must either be directly mapped to operations available on the legacy catalogue, or processed (or emulated) by the CSW front-end. It can result in some limitations; the legacy catalogue might not provide all the functionalities needed to implement a compliant OGC CSW ebRIM interface.

Such architecture requires a permanent connection between the legacy catalogue and the front-end, and can considerably increases network traffic. Performance is strongly dependant of the legacy infrastructure. Each required CSW operation should be emulated using a combination of one or more legacy operations. The results will then be processed and formatted to be returned in an OGC compliant way.

A source of limitation and complexity appears if the legacy catalogue is not able to serve the metadata in the EO GML format. Indeed, if requested, the EO GML should be generated on-the-fly, and the information available in the legacy catalogue might not be sufficient to fill in the EO GML structure. Moreover, the legacy metadata might be organized in very different way, needing multiple requests to gather needed information.
If metadata are rather static in the legacy database, a minimal caching mechanism can be used in the front-end layer to speed up queries, and avoid roundtrips to the legacy catalogue.

Figure 20: Front-End Architecture

This architecture avoids replication of data and synchronization mechanism to keep published data updated, indeed nothing is stored in the front-end layer.

D.2.2 Replication Architecture

The OGC layer is viewed as a replication of the legacy catalogue: indexes on metadata - and eventually metadata themselves - are available for discovery directly in the OGC layer. Queries are processed without querying in real-time the legacy catalogue. Synchronization (periodical or permanent) is needed between the two catalogues. This synchronization may be bidirectional if the replicated OGC Catalogue allows harvesting and/or transactional operations.

Harvest operation provides a publication ability to replicate every EarthObservation Products coming from the legacy catalogue to the OGC compliant one. Every resource is periodically submitted to the ebRIM Catalogue for storing and indexing, allowing complex queries and fast retrieving.

In this case, the only source of limitation and complexity comes from the quality and organization of the metadata coming from the legacy Catalogue. The legacy catalogue might not able to serve the metadata in the EO GML format. The EO GML should be generated on-the-fly when requested, or generated during the Harvesting operation and stored in the replicated OGC Catalogue. Once again, the information available in the legacy catalogue might not be sufficient to fill in the EO GML structure.

Note that, if needed, like for the stand-alone architecture, additional ebRIM associations and classifications (e.g., to additional business-related taxonomies) can
extend the EO data model and provide additional metadata discovery facilities to implement new use-cases. EO Products might, for example, be linked to an object or structure describing their pricing model, in an eBusiness use-case.

Figure 21: Replication Architecture

D.2.3 ‘Front-End’ vs ‘Replication’ Comparison

Following table highlights benefits and disadvantages in both proxied architectures:

<table>
<thead>
<tr>
<th>Front-End Architecture</th>
<th>Replication Architecture</th>
</tr>
</thead>
<tbody>
<tr>
<td>( + ) No database duplication,</td>
<td>( + ) Full compliance on query requirements can be fulfilled,</td>
</tr>
<tr>
<td>( + ) Always ‘synchronized’ with the legacy catalogue,</td>
<td>( + ) Use of additional classifications or associations if needed,</td>
</tr>
<tr>
<td></td>
<td>( + ) No direct access to the legacy database, metadata are available in CSW database,</td>
</tr>
<tr>
<td>Front-End Architecture</td>
<td>Replication Architecture</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>(- ) Inherits limitations from the legacy database and data access,</td>
<td>(- ) Database duplication,</td>
</tr>
<tr>
<td>(- ) Permanent connection required to access legacy database,</td>
<td>(- ) Synchronization process needed,</td>
</tr>
<tr>
<td>(- ) Time and network-traffic consuming,</td>
<td></td>
</tr>
<tr>
<td>(- ) Full power of ebRIM cannot be exploited (additional classifications or associations),</td>
<td></td>
</tr>
</tbody>
</table>
Annex E
(informative)

Examples

E.1 Service capabilities document

```xml
<?xml version="1.0" encoding="UTF-8"?>
<wrs:Capabilities
 xmlns:wrs="http://www.opengis.net/cat/wrs/1.0"
 xmlns:csw="http://www.opengis.net/cat/csw"
 xmlns:ows="http://www.opengis.net/ows"
 xmlns:ogc="http://www.opengis.net/ogc"
 xmlns:xlink="http://www.w3.org/1999/xlink"
 version="1.0.0">
 <ows:ServiceIdentification>
  <ows:Title>EarthObservation ebRIM Catalogue</ows:Title>
  <ows:Abstract>
   A web-based catalogue service that implements the CSW-ebRIM profile of the OGC Catalogue 2.0 specification, and the EO Extension Package
  </ows:Abstract>
  <ows:Keyword><ows:Keyword>registry</ows:Keyword></ows:Keyword>
  <ows:Keyword><ows:Keyword>catalogue</ows:Keyword></ows:Keyword>
  <ows:Keyword><ows:Keyword>ebRIM</ows:Keyword></ows:Keyword>
  <ows:Keyword><ows:Keyword>earth observation</ows:Keyword></ows:Keyword>
 </ows:ServiceIdentification>
 <ows:ServiceProvider>
  <ows:ProviderName>Ionic Software s.a.</ows:ProviderName>
  <ows:ServiceContact>
   <ows:IndividualName>Renato Primavera</ows:IndividualName>
   <ows:PositionName>RedSpider Catalog Support</ows:PositionName>
   <ows:ContactInfo>
    <ows:Phone>
     <ows:Voice>+32 4 364 03 64</ows:Voice>
     <ows:Facsimile>+32 4 253 47 37</ows:Facsimile>
    </ows:Phone>
    <ows:Address>
     <ows:DeliveryPoint>Rue de Wallonie, 18</ows:DeliveryPoint>
     <ows:City>Grace-Hollogne</ows:City>
     <ows:AdministrativeArea>Liege</ows:AdministrativeArea>
     <ows:Country>Belgium</ows:Country>
     <ows:ElectronicMailAddress>renato.primavera@ionicsoft.com</ows:ElectronicMailAddress>
    </ows:Address>
    <ows:HoursOfService>09:00-18:00 CEST</ows:HoursOfService>
    <ows:ContactInstructions>Please use email for all inquiries</ows:ContactInstructions>
   </ows:ContactInfo>
   <ows:Role>pointOfContact</ows:Role>
  </ows:ServiceContact>
 </ows:ServiceProvider>
 <ows:OperationsMetadata>
  <ows:Operation name="GetCapabilities">
   <ows:DCP>
    <ows:HTTP>
    </ows:HTTP>
   </ows:DCP>
   <ows:Parameter name="sections"/>
   <ows:Value>ServiceIdentification</ows:Value>
   <ows:Value>ServiceProvider</ows:Value>
   <ows:Value>OperationsMetadata</ows:Value>
   <ows:Value>Filter_Capabilities</ows:Value>
  </ows:Operation>
 </ows:OperationsMetadata>
</wrs:Capabilities>
```
<ows:Value>ServiceProperties</ows:Value>
</ows:Parameter>
</ows:Operation>
<ows:Operation name="GetRecords">
<ows:DCP>
<ows:HTTP>
</ows:HTTP>
</ows:DCP>
<ows:Parameter name="resultType">
<ows:Value>hits</ows:Value>
<ows:Value>results</ows:Value>
<ows:Value>validate</ows:Value>
</ows:Parameter>
<ows:Parameter name="outputFormat">
<ows:Value>application/xml</ows:Value>
<ows:Value>text/xml</ows:Value>
</ows:Parameter>
<ows:Parameter name="outputSchema">
<ows:Value>http://www.opengis.net/cat/csw</ows:Value>
</ows:Parameter>
<ows:Parameter name="startPosition">
<ows:DefaultValue>1</ows:DefaultValue>
</ows:Parameter>
<ows:Parameter name="maxRecords">
<ows:DefaultValue>10</ows:DefaultValue>
</ows:Parameter>
<ows:Parameter name="TypeNames">
<ows:Value>rim:RegistryObject</ows:Value>
<ows:Value>rim:Association</ows:Value>
<ows:Value>rim:Classification</ows:Value>
<ows:Value>rim:ClassificationNode</ows:Value>
<ows:Value>rim:ClassificationScheme</ows:Value>
</ows:Parameter>
<ows:Parameter name="ElementName"/>
<ows:Parameter name="ElementSetName">
<ows:Value>brief</ows:Value>
<ows:Value>summary</ows:Value>
<ows:Value>full</ows:Value>
</ows:Parameter>
<ows:Parameter name="CONSTRAINTLANGUAGE">
<ows:Value>FILTER</ows:Value>
</ows:Parameter>
<ows:Parameter name="constraint"/>
<ows:Parameter name="SortBy"/>
</ows:Operation>
<ows:Operation name="GetRecordById">
<ows:DCP>
<ows:HTTP>
</ows:HTTP>
</ows:DCP>
<ows:Parameter name="Id">
<ows:Value />
</ows:Parameter>
<ows:Parameter name="outputFormat">
<ows:Value>application/xml</ows:Value>
<ows:Value>text/xml</ows:Value>
</ows:Parameter>
<ows:Parameter name="outputSchema">
<ows:Value>http://www.opengis.net/cat/csw</ows:Value>
</ows:Parameter>
<ows:Parameter name="ElementSetName">
<ows:Value>brief</ows:Value>
<ows:Value>summary</ows:Value>
<ows:Value>full</ows:Value>
</ows:Parameter>
</ows:Operation>
<ows:Operation name="DescribeRecord">
<ows:DCP>
<ows:HTTP>
</ows:HTTP>
</ows:DCP>
<ows:Parameter name="TypeNames">
<ows:Value>rim:RegistryObject</ows:Value>
<ows:Value>rim:Association</ows:Value>
<ows:Value>rim:Classification</ows:Value>
<ows:Value>rim:ClassificationNode</ows:Value>
<ows:Value>rim:ClassificationScheme</ows:Value>
</ows:Parameter>
<ows:Parameter name="ElementName"/>
<ows:Parameter name="ElementSetName">
<ows:Value>brief</ows:Value>
<ows:Value>summary</ows:Value>
<ows:Value>full</ows:Value>
</ows:Parameter>
<ows:Parameter name="CONSTRAINTLANGUAGE">
<ows:Value>FILTER</ows:Value>
</ows:Parameter>
<ows:Parameter name="constraint"/>
<ows:Parameter name="SortBy"/>
</ows:Operation>
<ows:Operation name="GetRecordById"/>
<ogc:ComparisonOperators>
  <ogc:ComparisonOperator>NotEqualTo</ogc:ComparisonOperator>
  <ogc:ComparisonOperator>Like</ogc:ComparisonOperator>
  <ogc:ComparisonOperator>Between</ogc:ComparisonOperator>
  <ogc:ComparisonOperator>NullCheck</ogc:ComparisonOperator>
</ogc:ComparisonOperators>

<ogc:ArithmeticOperators>
  <ogc:SimpleArithmetic />
</ogc:ArithmeticOperators>

<wrs:ServiceProperties>
  <wrs:property name="http://www.opengis.net/cat/wrs/properties/extension-packages">
  </wrs:property>
  <wrs:property name="http://www.opengis.net/cat/wrs/properties/harvest-protocols">
    <wrs:value>http</wrs:value>
  </wrs:property>
  <wrs:property name="http://www.opengis.net/cat/wrs/properties/query-languages">
    <wrs:value>http://www.opengis.net/ogc</wrs:value>
    <wrs:value>http://www.w3.org/TR/xpath</wrs:value>
  </wrs:property>
  <wrs:property name="http://www.opengis.net/cat/wrs/properties/mime-types">
    <wrs:value>application/xml</wrs:value>
    <wrs:value>text/xml</wrs:value>
  </wrs:property>
  <wrs:property name="http://www.opengis.net/cat/wrs/properties/temporal-ref-systems">
  </wrs:property>
  <wrs:property name="http://www.opengis.net/cat/wrs/properties/spatial-ref-systems">
  </wrs:property>
</wrs:ServiceProperties>

  xlink:title="Available service endpoints (WSDL 2.0)"
  xlink:role="http://www.w3.org/2005/08/wsdl"/>
</wrs:Capabilities>
Annex F

SOAP Action

If SOAP 1.1 is used, the expected SOAP Actions are:

- http://www.opengis.net/cat/csw/2.0.2/requests#GetCapabilities
- http://www.opengis.net/cat/csw/2.0.2/requests#DescribeRecord
- http://www.opengis.net/cat/csw/2.0.2/requests#GetRepositoryItem
- http://www.opengis.net/cat/csw/2.0.2/requests#GetRecords
- http://www.opengis.net/cat/csw/2.0.2/requests#GetRecordsById
- http://www.opengis.net/cat/csw/2.0.2/requests#Harvest

You have below a request/response sample with the complete SOAP information.

GetRecords request:

```
POST /daliproxy/wrs/DALIPROXYLAZY HTTP/1.0
Content-Type: text/xml; charset=utf-8
Accept: application/soap+xml, application/dime, multipart/related, text/*
User-Agent: Axis/#axisVersion#
Host: dev.ionicsoft.com
Pragma: no-cache
SOAPAction: "http://www.opengis.net/cat/csw/2.0.2/requests#GetRecords"
Content-Length: 4121
Connection: close

 xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <soapenv:Body>
    <csw:GetRecords xmlns:csw="http://www.opengis.net/cat/csw/2.0.2" xmlns:ogc="http://www.opengis.net/ogc"
      <csw:Query typeNames="rim:ExtrinsicObject  rim:ExtrinsicObject_ACQPLAT  rim:Association">
        <csw:ElementSetName typeNames="rim:ExtrinsicObject">full</csw:ElementSetName>
        <csw:Constraint version="1.1.0">
          <ogc:Filter>
            <ogc:And>
              <ogc:PropertyIsEqualTo>
                <ogc:PropertyName>/rim:ExtrinsicObject/@objectType</ogc:PropertyName>
              </ogc:PropertyIsEqualTo>
              <ogc:PropertyIsGreaterThanOrEqualTo>
                <ogc:Literal>2007-01-01T00:00:00.000</ogc:Literal>
              </ogc:PropertyIsGreaterThanOrEqualTo>
              <ogc:PropertyIsEqualTo>
                <ogc:PropertyName>/rim:ExtrinsicObject/@id</ogc:PropertyName>
                <ogc:PropertyName>$ACQPLAT/@id</ogc:PropertyName>
              </ogc:PropertyIsEqualTo>
              <ogc:PropertyIsEqualTo>
                <ogc:PropertyName>/rim:Association/@associationType</ogc:PropertyName>
              </ogc:PropertyIsEqualTo>
              <ogc:PropertyIsEqualTo>
                <ogc:PropertyName>/rim:Association/@sourceObject</ogc:PropertyName>
                <ogc:PropertyName>/rim:ExtrinsicObject/@id</ogc:PropertyName>
              </ogc:PropertyIsEqualTo>
              <ogc:PropertyIsEqualTo>
                <ogc:PropertyName>/rim:Association/@targetObject</ogc:PropertyName>
                <ogc:PropertyName>$ACQPLAT/@id</ogc:PropertyName>
              </ogc:PropertyIsEqualTo>
            </ogc:And>
          </ogc:Filter>
        </csw:Constraint>
      </csw:GetRecords>
    </soapenv:Body>
  </soapenv:Envelope>
```

GetRecords response:

```
 xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <soapenv:Body>
    <csw:GetRecordsResponse xmlns:csw="http://www.opengis.net/cat/csw/2.0.2">
      <csw:GetRecordsResult>
        <csw:GetRecordsResponseHeader/>
        <csw:GetRecordsResultBody>
          <csw:GetRecordsResponseBody>
            <csw:GetRecordsResponseMessage/>
          </csw:GetRecordsResponseBody>
        </csw:GetRecordsResultBody>
      </csw:GetRecordsResponse>
    </soapenv:Body>
  </soapenv:Envelope>
```
GetRecordResponse:

HTTP/1.0 200 OK
Date: Tue, 13 May 2008 14:55:12 GMT
Server: Oracle-Application-Server-10g/10.1.2.0.0 Oracle-HTTP-Server
Content-Length: 138564
Cache-Control: private
Content-Type: text/xml; charset=utf-8
X-Cache: MISS from havp-hlt.spb.spacebel.be
Connection: close

<?xml version="1.0" encoding="UTF-8"?>
<csw:GetRecordsResponse xmlns:csw="http://www.opengis.net/cat/csw/2.0.2"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsi:schemaLocation="http://www.opengis.net/cat/wrs/1.0:DOCUME~1sdeDesktoptemp/csw-ebrim/src/main/resources/xsd/wrs.xsd">
  <csw:SearchStatus/>
      <rim:Slot name="urn:ogc:def:ebRIM-Slot:OGC-06-131:imageQualityDegradation" slotType="double">
        <rim:ValueList>
          <rim:Value>75.0</rim:Value>
        </rim:ValueList>
      </rim:Slot>
      <rim:Slot name="urn:ogc:def:ebRIM-Slot:OGC-06-131:centerOf" slotType="geometry">
        <wrs:ValueList xmlns:wrs="http://www.opengis.net/cat/wrs/1.0">
          <wrs:AnyValue xmlns:gml="http://www.opengis.net/gml">
            <gml:Point srsName="EPSG:4326">
              <gml:pos>147.89204939003056 -15.015514612197876</gml:pos>
            </gml:Point>
          </wrs:AnyValue>
        </wrs:ValueList>
      </rim:Slot>
      <rim:Slot name="urn:ogc:def:ebRIM-Slot:OGC-06-131:productType" slotType="string">
        <rim:ValueList>
          <rim:Value>Scene</rim:Value>
        </rim:ValueList>
      </rim:Slot>
      <rim:Slot name="urn:ogc:def:ebRIM-Slot:OGC-06-131:beginPosition" slotType="dateTime">
        <rim:ValueList>
          <rim:Value>2007-01-10T00:16:31Z</rim:Value>
        </rim:ValueList>
      </rim:Slot>
      <rim:Slot name="urn:ogc:def:ebRIM-Slot:OGC-06-131:doi" slotType="string">
        <rim:ValueList>
        </rim:ValueList>
      </rim:Slot>
      <rim:Slot name="urn:ogc:def:ebRIM-Slot:OGC-06-131:lastOrbitNumber" slotType="int">
        <rim:ValueList>
          <rim:Value>235</rim:Value>
        </rim:ValueList>
      </rim:Slot>
      <rim:Slot name="urn:ogc:def:ebRIM-Slot:OGC-06-131:multいExtentOf" slotType="geometry">
        <wrs:ValueList xmlns:wrs="http://www.opengis.net/cat/wrs/1.0">
          <wrs:AnyValue xmlns:gml="http://www.opengis.net/gml">
            <gml:Polygon srsName="EPSG:4326">
              <gml:exterior>
                <gml:LinearRing srsName="EPSG:4326">
                  <gml:pos>147.49 -15.22700023651123</gml:pos>
                  <gml:pos>148.159215.340299600323242</gml:pos>
                  <gml:pos>148.2935882414475 -14.803518295288806</gml:pos>
                  <gml:pos>147.62540931867474 14.691240310668945</gml:pos>
                  <gml:pos>147.49 -15.22700023651123</gml:pos>
                </gml:LinearRing>
              </gml:exterior>
            </gml:Polygon>
          </wrs:AnyValue>
        </wrs:ValueList>
      </rim:Slot>
      <rim:Slot name="urn:ogc:def:ebRIM-Slot:OGC-06-131:endPosition" slotType="dateTime">
        <rim:ValueList>
          <rim:Value>2007-01-10T00:16:31Z</rim:Value>
        </rim:ValueList>
      </rim:Slot>
      <rim:Slot name="urn:ogc:def:ebRIM-Slot:OGC-06-131:alongTrackPointingAngle" slotType="double">
        <rim:ValueList>
          <rim:Value>-25.784143</rim:Value>
        </rim:ValueList>
      </rim:Slot>
      <rim:Slot name="urn:ogc:def:ebRIM-Slot:OGC-06-131:acquisitionType" slotType="string">
        <rim:ValueList>
          <rim:Value></rim:Value>
        </rim:ValueList>
      </rim:Slot>
    </rim:ExtrinsicObject>
  </csw:SearchResults>
</csw:GetRecordsResponse>
Annex G
(informative)

Document Change History

G.1 Changes with the 0.1.5 Version

1. Introduce the Annex F, Document Change History, to keep track of all changes made between document revisions.

2. Align document dependency in §3 (Normative References) to OGC 06-080r2 v0.1.4r5 (OGC™ GML Application Schema for EO Products).

3. Align document dependency in §3 (Normative References) to OGC 07-006r1 (OGC™ Catalogue Services Specification 2.0.2 (Corrigendum 2 Release)).

4. Replace Ionic Software references by Leica Geosystems Geospatial Imaging.

5. Add EOP and OPT abbreviated terms at §5.1.

6. Replace all occurrences of ‘hma’ prefix by ‘eop’ in XPath, samples, mapping tables and diagrams. This is due to a change in the document OGC 06-080r2 v0.1.4r5.

7. Replace all occurrences of ‘ohr’ prefix by ‘opt’ in XPath, samples, mapping tables and diagrams. This is due to a change in the document OGC 06-080r2 v0.1.4r5.


9. Add Slots for storing vendor specific information in the ebRIM structure (on the EOProduct Object). See mapping in Table #3.

10. Specify value of the SOAPAction HTTP Header Information in §8.1

11. Replace Slot ‘extentOf’ by ‘multiExtentOf’ in EOProduct mapping table (Table #3), to store the ‘multiExtentOf’ property added in EarthObservation object in OGC 06-080r2 v0.1.4r5.

12. Align samples in §8 to CSW 2.0.2 Specification (namespace, parameters)

G.2 Changes with the 0.1.6 Version

1. Added section 9 Implementation Guidance. Change made by R.Smíllie, Spacebel 29/11/07
2. Update reference from 06-080 document to 06-080r3 v 0.9.1

3. Transform slot names as full URI as stated in [07-110r2] document

G.3 Changes with the 0.1.7 Version

1. Extract acquisitionDate attribute for EOP product type

2. Extract processingInformation attributes (compositeType, method, methodVersion, processorName, processorVersion, processingLevel, nativeProductFormat) for EOP product type

3. Extract ascendingNodeDate, startTimeFromAscendingNode, completionTimeFromAscendingNode, ascendingNodeLongitude, orbitDuration, incidenceAngle for EOP product type

4. Extract incidenceAngleVariation for SAR product type

5. Add full sample for ebRIM brief, summary, full view coming from DALI

6. Add sample for ebRIM request usage with alias (§7.2.4 & §7.2.6)