Report API specification

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Revision History

Version	Status	Author	Date	Changes
0.1	Draft	Rui Castro	2012-06-19	
0.2	Draft	Rui Castro, Miguel Ferreira, Frank Asseg, Petar Petrov	2012-07-02	Incorporated comments and suggestions from partners. Added PREMIS as the event schema.
0.3	Draft	Rui Castro	2012-08-23	Added section about metadata formats and two new related appendices.
0.3.1	Draft	Rui Castro	2012-09-12	Incorporated comments from Frank Asseg and Matthias Hahn. Updated section about metadata formats to support OAI_DC. Added reference to PREMIS object in event table and changed Outcome parameter type to String to comply with PREMIS eventOutcome.
0.4	Draft	Rui Castro	2012-09-18	Incorporated comments from Kresimir Duretec and Luís Faria.
1.0	Final	Rui Castro	2012-10-10	Final review and cleanup.

Table of Contents

1 Introduction

The Preservation Watch Component (Scout) is expected to monitor repositories and store information about the contents and the actions of the repository.

In Preservation Watch terminology, the repositories are sources of information and for each source the Scout must have a source adaptor that knows how to collect the information from the source and adapt that information to fit the Watch internal knowledge base.

Given that every repository has its own internal information structure and naming schemes, Watch would have to implement a specific source adaptor for each repository. To simplify integration between the repositories and Scout it was decided to split the functionality into 2 components:

- A Report API specification that every repository should implement and that provides a unified interface that enables watch to retrieve of information about events that take place at the repository level.
- A repository source adaptor (on the Scout side) that connects to the Report API, retrieves event information and performs all the normalization operations necessary to adapt the information to the internal Watch knowledge base.

Scout is interested in monitoring repositories, especially in what concerns the interaction between the repository and its users. Thus the data exposed by the Report API is modelled as events.

This document will specify the events exposed by the Report API in Section 2 and the API methods that must be implemented by repositories in Section 3.

2 Events

OAIS reference model structures a digital preservation repository in macro components, namely: Ingest, Management, Preservation Planning, Data Management, Archival Storage and Access. Two of these are internal (Data Management and Archival Storage) and the other four usually have interactions with users. The interactions between repository components and users are the events that the Report API will expose via the Report API.

The events that can be reported by repositories (and that will be supported by Scout) are presented in Table 1. Each event is characterized through the following characteristics:

- A OAIS functional unit, that correspond to the OAIS macro component to which the event is related to,
- An Event type, that is the name of the event and distinguishes from all other events, and
- Event parameters with respective data types, which serve to further characterize the event.

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OAIS unit	Event type	Description	Parameters	Parameter Type
Ingest	IngestStarted	Ingest started	SIP ID [1,1]	String
	IngestFinished	Ingest finished	SIP ID [1,1]	String
			Outcome [1,1]	Boolean
			Representation ID [1,∞]	String
Access	ViewDMD	View descriptive metadata	DMD ID [1,1]	String
	ViewRepresentation	View representation	Representation ID [1,1]	String
	DownloadRepresentation	Download a representation	Representation ID [1,1]	String
Plan	PlanExecuted	Plan executed on an Object[1]	Plan ID [1,1]	String
			Object ID [1,∞]	String
			Outcome[2] [1,1]	String

Table 1: Event details

Besides the information presented in the Table 1, the repository must expose more information related to each event, like the moment at which the event occurred and who was the responsible for triggering the event. Basically for each event, a repository must be able to respond to three questions:

1. Who triggered the event?
2. When did the event occur?
3. What are the details of the event?

Events will have three main attributes that will answer the previous questions:

- **Agent** - will contain information about who triggered the event. Table 2 shows all the sub attributes of Agent.

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[1] Object refers to any type of PREMIS [1] Object (Representation, File or Bitstream). More details about PREMIS object model are provided in Section 2.1.

[2] Should contain the value of PREMIS Event eventOutcome field (Semantic unit 2.5.1 eventOutcome of PREMIS Data Dictionary [1]).

- **Date/time** - will contain the date and time at which the event happened and eventually the duration of the event.
- **Details** - will contain additional information about what happened. Table 1 shows all the sub attributes that can be used to characterize the details of an event. Besides the information presented in Table 1, more details can be retrieved for each object involved in the event. For instance, for event IngestFinished, the details about the ingested representations could be retrieved together with the event. This functionality, however, may produce event records with lots of information making the retrieval process slow and the inefficient. In section 3.2 this functionality will be described in detail together with workarounds to avoid the aforementioned problem.

Agent detail attributes			Type	Description
User [0,1]	Role [1,1]		String	The role of the user in the repository.
	Language [0,1]		String - RFC 1766	The language of the user.
Endpoint [1,1]	IP hash [1,1]		String	IP address hash
	Network hash [0,1]		String	Network address hash
	Session ID [0,1]		String	HTTP session identifier
	Geo IP [0,1]	Country code [0,1]	String	ISO 3166-1[3] alpha-2[4] code
		Country name [0,1]	String	ISO 3166-2[5] country names
		Region name [0,1]	String	ISO 3166-2 region name
		City name [0,1]	String	City name
		Zip code [0,1]	String	Zip code
		Latitude [0,1]	Decimal	Latitude[6] geographic coordinate

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[3] http://www.iso.org/iso/home/standards/country_codes.htm

[4] http://en.wikipedia.org/wiki/ISO_3166-1_alpha-2

[5] http://en.wikipedia.org/wiki/ISO_3166-2

[6] http://en.wikipedia.org/wiki/Latitude

		Longitude [0,1]	Decimal	Longitude[7] geographic coordinate
		Time zone	String	Time zone part of ISO 8601[8]
User agent[9] [1,1]		User agent ID [1,1]	String	User agent identifier (e.g. browser User-Agent)
		Language [0,∞]	String - RFC 1766	Supported languages of user agent
	Plugin [0,∞]	Name [1,1]	String	User-Agent plugin name
		Version [1,1]	String	User-Agent plugin version
	OS [0,1]		String	Operating system identifier
	Device [0,1]	Screen height [1,1]	Integer	User device screen height
		Screen width [1,1]	Integer	User device screen width
		Colorspace [1,1]	String	User device screen colorspace

Table 2: Agent details

Events exposed through the Report API will be encoded in XML following the PREMIS schema.

2.1 PREMIS Schema

PREMIS data dictionary defines five entities types: Intellectual Entities, Objects, Events, Rights and Agents that can relate to each other as depicted in Figure 1.

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[7] http://en.wikipedia.org/wiki/Longitude

[8] http://en.wikipedia.org/wiki/ISO_8601

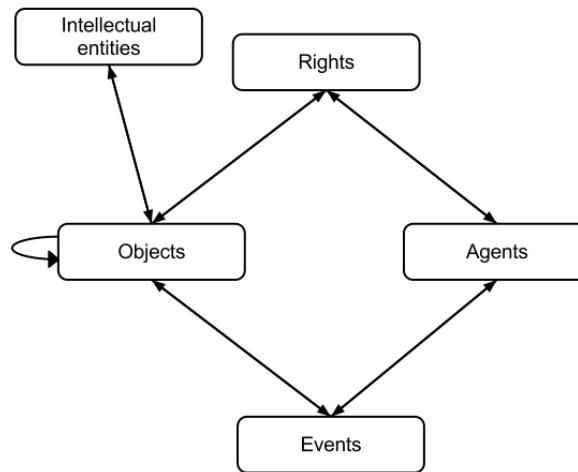[9] http://en.wikipedia.org/wiki/User_agent

Figure 1: PREMIS data model

PREMIS defines an Event as "an action that involves or impacts at least one Object or Agent associated with or known by the preservation repository"[1] and an Agent as "person, organization, or software program/system associated with Events in the life of an Object..."[1].

A PREMIS Event can be used to record the information about the event itself and the event parameters, responding to questions "What?" and "When?".

```xml
<event xmlns="info:lc/xmlns/premis-v2" version="2.2"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="info:lc/xmlns/premis-v2
http://www.loc.gov/standards/premis/v2/premis.xsd">
    <eventIdentifier>
        <eventIdentifierType>Event ID</eventIdentifierType>
        <eventIdentifierValue>event:2</eventIdentifierValue>
    </eventIdentifier>
    <eventType>IngestFinished</eventType>
    <eventDateTime>2012-06-18T18:40:00Z</eventDateTime>
    <eventOutcomeInformation>
        <eventOutcome>success</eventOutcome>
    </eventOutcomeInformation>
    <linkingAgentIdentifier>
        <linkingAgentIdentifierType>User ID</linkingAgentIdentifierType>
        <linkingAgentIdentifierValue>rcastro</linkingAgentIdentifierValue>
    </linkingAgentIdentifier>
    <linkingObjectIdentifier>
        <linkingObjectIdentifierType>SIP ID</linkingObjectIdentifierType>
        <linkingObjectIdentifierValue>sip:1</linkingObjectIdentifierValue>
    </linkingObjectIdentifier>
    <linkingObjectIdentifier>
        <linkingObjectIdentifierType>Rep ID</linkingObjectIdentifierType>
        <linkingObjectIdentifierValue>rep:1</linkingObjectIdentifierValue>
    </linkingObjectIdentifier>
    <linkingObjectIdentifier>
        <linkingObjectIdentifierType>Rep ID</linkingObjectIdentifierType>
        <linkingObjectIdentifierValue>rep:2</linkingObjectIdentifierValue>
    </linkingObjectIdentifier>
</event>
```

A PREMIS Agent can be used to record information about the user who triggered the event, answering the question "Who?". Since the PREMIS Agent element doesn't contain many details besides the identification, name and type, the `agentExtension` element can be used to include as many details as needed using an external schema. The complete schema for agent details can be found in Appendix 4.1.

```xml
<agent xmlns="info:lc/xmlns/premis-v2" version="2.2"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="info:lc/xmlns/premis-v2
http://www.loc.gov/standards/premis/v2/premis.xsd">
    <agentIdentifier>
        <agentIdentifierType>User ID</agentIdentifierType>
        <agentIdentifierValue>rcastro</agentIdentifierValue>
    </agentIdentifier>
    <agentName>Rui Castro</agentName>
    <agentType>Person</agentType>
    <agentExtension>
        <agentDetails xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
            xmlns="http://scape-project.eu/repository/agentDetails"
            xsi:schemaLocation="http://scape-project.eu/repository/agentDetails
agentDetails.xsd">
            <user>
                <role>Administrator</role>
                <role>Producer</role>
                <language>pt</language>
            </user>
            <endpoint>
                <ipHash>1234567890</ipHash>
                <networkHash>193.137.23.0/24</networkHash>
                <sessionID>session1234567890</sessionID>
                <geoIP>
                    <countryCode>PT</countryCode>
                    <countryName>PORTUGAL</countryName>
                    <regionName>LISBOA</regionName>
                    <cityName>LISBON</cityName>
                    <zipCode>-</zipCode>
                    <latitude>38.7167</latitude>
                    <longitude>-9.13333</longitude>
                    <timeZone>+01:00</timeZone>
                </geoIP>
            </endpoint>
            <userAgent>
                <userAgentID>Mozilla/5.0 (Windows NT 6.1; WOW64) AppleWebKit/536.5
(KHTML, like
                Gecko) Chrome/19.0.1084.56 Safari/536.5</userAgentID>
                <languages>
                    <language>pt</language>
                    <language>en</language>
                </languages>
                <plugins>
                    <plugin>
                        <name>Flash</name>
                        <version>11,3,300,257</version>
                    </plugin>
                    <plugin>
                        <name>Java</name>
                        <version>6.0.310.5</version>
                    </plugin>
                </plugins>
                <os>Windows 7 SP1 64 bit</os>
                <device>
                    <screenHeight>1920</screenHeight>
                    <screenWidth>1080</screenWidth>
                    <colorspace>32bit</colorspace>
                </device>
            </userAgent>
        </agentDetails>
    </agentExtension>
</agent>
```

3   API

The methods used to expose events must allow a client to retrieve the list of all the events a repository is able to report, to retrieve a single event, to retrieve all events of a specified type and to retrieve all events that have occurred on a specified time interval. There's already a popular protocol in the archives community that provides all theses functionalities, OAI-PMH[10].

OAI-PMH protocol was created to allow repositories to expose their metadata to other parties. It establishes the protocol between two entities, the Repository[11] and the Harvester[12].

The Repository is the holder of Items[13] identified by a Unique Identifier[14] and each Item may have more than one metadata Record[15] associated with it. Each Record in a Repository may be associated with several Sets[16].

"The Harvester is a client application that issues OAI-PMH requests"[17]. In SCAPE's context the Harvester will be Watch's repository source adaptor.

3.1   OAI-PMH restrictions

OAI-PMH is basically a protocol that allows a Harvester to retrieve metadata Records from a Provider. In Report API context a Record is an event and a Set is an event type. This allows the Harvesters to retrieve only a specific type of events using the selective harvesting feature[18] that allows the specification of parameter `set` in ListRecords and ListIdentifiers methods. Since an event can only have one type, a Record (Event) can only belong to one Set (Event type). This is a restriction that doesn't exist in OAI-PMH specification, but must be guaranteed by Report API implementers.

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[10] http://www.openarchives.org/OAI/openarchivesprotocol.html

[11] http://www.openarchives.org/OAI/openarchivesprotocol.html#Repository

[12] http://www.openarchives.org/OAI/openarchivesprotocol.html#harvester

[13] http://www.openarchives.org/OAI/openarchivesprotocol.html#Item

[14] http://www.openarchives.org/OAI/openarchivesprotocol.html#UniqueIdentifier

[15] http://www.openarchives.org/OAI/openarchivesprotocol.html#Record

[16] http://www.openarchives.org/OAI/openarchivesprotocol.html#Set

[17] http://www.openarchives.org/OAI/openarchivesprotocol.html#harvester

[18] http://www.openarchives.org/OAI/openarchivesprotocol.html#SelectiveHarvestingandSets

3.2 Metadata formats

"OAI-PMH supports the dissemination of records in multiple metadata formats from a repository"[19]. Using this feature, Report API can provide information about events with different levels of detail. To circumvent the problem of an event having too much associated information, thus making the retrieval process slow and inefficient, the Report API will establish two metadata formats; one consisting of minimal information, just the PREMIS event with the attributes presented in Table 1 and the agent information; and another consisting of the PREMIS event together with all the information associated with it.

OAI-PMH specification also states that for reasons of interoperability, repositories must disseminate Dublin Core[20]. To comply with the standard, Report API providers must disseminate events in Dublin Core metadata format.

To accomplish this implementers must guarantee the following:

1. The method ListMetadataFormats, must return at least tree `<metadataFormat>` elements for the following metadata prefixes: **`oai_dc`**[21], **`premis-event-v2`**[22] and **`premis-full-v2`**[23]. A sample of a response to ListMetadataFormats methods is presented in appendix 4.2.

2. Methods GetRecord and ListRecords when provided with parameter `metadataPrefix` **`oai_dc`** must return Dublin Core metadata with, at least, the following elements `<identifier>`, `<type>` and `<date>`. When provided with parameter `metadataPrefix` **`premis-event-v2`** must return a PREMIS event inside de `<metadata>` element together with the PREMIS agent inside an `<about>` element. When the parameter `metadataPrefix` is **`premis-full-v2`**, besides returning a PREMIS event and agent, can also return PREMIS objects for representations, files or bitstreams inside repeatable `<about>` elements after the `<about>` element with the PREMIS agent. Appendices 4.5, 4.7 and 4.7 contain samples of responses to GetRecord method using `metadataPrefix` **`oai_dc`**, **`premis-event-v2`** and a **`premis-full-v2`**, respectively.

---

[19] http://www.openarchives.org/OAI/openarchivesprotocol.html#MetadataNamespaces

[20] http://www.openarchives.org/OAI/openarchivesprotocol.html#MetadataNamespaces

[21] Schema URL for oai_dc is http://www.openarchives.org/OAI/2.0/oai_dc.xsd

[22] Schema URL for premis-event-v2 is http://www.loc.gov/standards/premis/v2/premis.xsd

[23] Schema URL for premis-full-v2 is http://www.loc.gov/standards/premis/v2/premis.xsd

3.3 Authentication and authorization

OAI-PMH protocol doesn't define any authentication or authorization mechanism, but since the protocol it is HTTP based, Basic Authentication Scheme[24] can be used together with HTTPS to provide a secure authentication mechanism. For authorization, it's up to the Provider to implement any mechanism suitable, like maintaining a list of authorized users, check the identity of the requester and returning HTTP error code 401 (Unauthorized) or 403 (Forbidden) in cases where the user is not on the list of authorized users.

3.4 Methods

Bellow is the specification of all the methods in the API.

3.4.1 Identify

Retrieves information about the repository.

Path

/report

Method

HTTP/1.1 GET

Parameters

verb: **Identify** (mandatory)

Produces

XML according to OAI-PMH specification for **Identify** response[25].

3.4.2 ListMetadataFormats

List the metadata formats the repository is able disseminate.

Path

/report

Method

HTTP/1.1 GET

Parameters

verb: **ListMetadataFormats** (mandatory)

---

[24] http://tools.ietf.org/html/rfc1945#section-11.1

[25] http://www.openarchives.org/OAI/openarchivesprotocol.html#Identify

identifier: the identifier of the event

Produces

XML according to OAI-PMH specification for **ListMetadataFormats** response[26]. The response must contain at least metadata prefixes **oai_dc**, **premis-event-v2** and **premis-full-v2** as described in Section 3.2. A sample of a response can be found in Appendix 4.2.

3.4.3   ListSets

Retrieves all events types that the repository is able to provide.

Path

/report

Method

HTTP/1.1 GET

Parameters

verb: **ListSets** (mandatory)

Produces

XML according to OAI-PMH specification for **ListSets** response[27]. A sample of a response can be found in Appendix 4.3.

3.4.4   GetRecord

Retrieves a single event.

Path

/report

Method

HTTP/1.1 GET

Parameters

verb: **GetRecord** (mandatory)

metadataPrefix: the prefix of the metadata schema to return events metadata.

identifier: the event identifier

Produces

---

[26] http://www.openarchives.org/OAI/openarchivesprotocol.html#ListMetadataFormats

[27] http://www.openarchives.org/OAI/openarchivesprotocol.html#ListSets

XML according to OAI-PMH specification for **GetRecord** response[28].

3.4.5   ListIdentifiers

Retrieves a list of event identifiers.

Path

/report

Method

HTTP/1.1 GET

Parameters

verb: **ListIdentifiers** (mandatory)

from: the earliest date/time of events

until: the latest date/time of events

set: the type of events to retrieve.

Produces

XML according to OAI-PMH specification for **ListIdentifiers** response[29].

3.4.6   ListIdentifiers (resume)

Resumes a previous call to ListIdentifiers (3.4.5).

Path

/report

Method

HTTP/1.1 GET

Parameters

verb: **ListIdentifiers** (mandatory)

resumptionToken: the resumption token provided in last call result.

Produces

XML according to OAI-PMH specification for **ListIdentifiers** response[30].

---

[28] http://www.openarchives.org/OAI/openarchivesprotocol.html#GetRecord

[29] http://www.openarchives.org/OAI/openarchivesprotocol.html#ListIdentifiers

[30] http://www.openarchives.org/OAI/openarchivesprotocol.html#ListIdentifiers

3.4.7 ListRecords

Retrieves a list of events.

Path

/report

Method

HTTP/1.1 GET

Parameters

verb: **ListRecords** (mandatory)

from: the earliest date/time of events

until: the latest date/time of events

set: the type of events to retrieve.

Produces

XML according to OAI-PMH specification for **ListRecords** response[31]. A sample of a response can be found in Appendix 4.4.

3.4.8 ListRecords (resume)

Resumes a previous call to ListRecords (3.4.7).

Path

/report

Method

HTTP/1.1 GET

Parameters

verb: **ListRecords** (mandatory)

resumptionToken: the resumption token provided in last call result.

Produces

XML according to OAI-PMH specification for **ListRecords** response[32].

---

[31] http://www.openarchives.org/OAI/openarchivesprotocol.html#ListRecords

[32] http://www.openarchives.org/OAI/openarchivesprotocol.html#ListRecords

4   Appendices

4.1   Agent details schema

```xml
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" elementFormDefault="qualified"
  targetNamespace="http://scape-project.eu/repository/agentDetails"
  xmlns="http://scape-project.eu/repository/agentDetails">

  <xs:element name="agentDetails" type="AgentDetails"/>

  <xs:complexType name="AgentDetails">
    <xs:sequence>
      <xs:element name="user" type="User" minOccurs="0"/>
      <xs:element name="endpoint" type="Endpoint"/>
      <xs:element name="userAgent" type="UserAgent" minOccurs="0"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="User">
    <xs:sequence>
      <xs:element name="role" type="xs:string" minOccurs="1" maxOccurs="unbounded"/>
      <xs:element name="language" type="Language" minOccurs="0"/>
    </xs:sequence>
  </xs:complexType>

  <xs:complexType name="Endpoint">
    <xs:sequence>
      <xs:element name="ipHash" type="xs:string"/>
      <xs:element name="networkHash" type="xs:string" minOccurs="0"/>
      <xs:element name="sessionID" type="xs:string" minOccurs="0"/>
      <xs:element name="geoIP" type="GeoIP" minOccurs="0"/>
    </xs:sequence>
  </xs:complexType>

  <xs:complexType name="GeoIP">
    <xs:sequence>
      <xs:element name="countryCode" type="xs:string" minOccurs="0"/>
      <xs:element name="countryName" type="xs:string" minOccurs="0"/>
      <xs:element name="regionName" type="xs:string" minOccurs="0"/>
      <xs:element name="cityName" type="xs:string" minOccurs="0"/>
      <xs:element name="zipCode" type="xs:string" minOccurs="0"/>
      <xs:element name="latitude" type="xs:string" minOccurs="0"/>
      <xs:element name="longitude" type="xs:string" minOccurs="0"/>
      <xs:element name="timeZone" type="xs:string" minOccurs="0"/>
    </xs:sequence>
  </xs:complexType>

  <xs:complexType name="UserAgent">
    <xs:sequence>
      <xs:element name="userAgentID" type="xs:string"/>
      <xs:element name="languages" type="Languages" minOccurs="0"/>
      <xs:element name="plugins" type="Plugins" minOccurs="0"/>
      <xs:element name="os" type="xs:string" minOccurs="0"/>
      <xs:element name="device" type="Device" minOccurs="0"/>
    </xs:sequence>
  </xs:complexType>

  <xs:complexType name="Languages">
    <xs:sequence>
```

```xml
          <xs:element name="language" type="Language" maxOccurs="unbounded"/>
      </xs:sequence>
   </xs:complexType>

   <xs:simpleType name="Language">
     <xs:annotation>
       <xs:documentation>RFC 1766 language code (http://www.ietf.org/rfc/rfc1766.txt). Pattern
taken
           from http://books.xmlschemata.org/relaxng/ch19-77191.html</xs:documentation>
     </xs:annotation>
     <xs:restriction base="xs:language">
       <xs:pattern value="([a-zA-Z]{2}|[iI]-[a-zA-Z]+|[xX]-[a-zA-Z]{1,8})(-[a-zA-Z]{1,8})*"/>
     </xs:restriction>
   </xs:simpleType>

   <xs:complexType name="Plugins">
     <xs:sequence>
       <xs:element name="plugin" type="Plugin" maxOccurs="unbounded"/>
     </xs:sequence>
   </xs:complexType>

   <xs:complexType name="Plugin">
     <xs:sequence>
       <xs:element name="name" type="xs:string"/>
       <xs:element name="version" type="xs:string"/>
     </xs:sequence>
   </xs:complexType>

   <xs:complexType name="Device">
     <xs:sequence>
       <xs:element name="screenHeight" type="xs:integer"/>
       <xs:element name="screenWidth" type="xs:integer"/>
       <xs:element name="colorspace" type="xs:string"/>
     </xs:sequence>
   </xs:complexType>

</xs:schema>
```

4.2   ListMetadataFormats response sample

```xml
<OAI-PMH xmlns="http://www.openarchives.org/OAI/2.0/"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://www.openarchives.org/OAI/2.0/
http://www.openarchives.org/OAI/2.0/OAI-PMH.xsd">
    <responseDate>2012-06-28T16:07:00</responseDate>
    <request verb="ListMetadataFormats">http://repository.scape-project.eu/oai</request>
    <ListMetadataFormats>
        <metadataFormat>
            <metadataPrefix>oai_dc</metadataPrefix>
            <schema>http://www.openarchives.org/OAI/2.0/oai_dc.xsd</schema>
            <metadataNamespace>http://www.openarchives.org/OAI/2.0/oai_dc/</metadataNamespace>
        </metadataFormat>
        <metadataFormat>
            <metadataPrefix>premis-event-v2</metadataPrefix>
            <schema>http://www.loc.gov/standards/premis/v2/premis.xsd</schema>
            <metadataNamespace>info:lc/xmlns/premis-v2</metadataNamespace>
        </metadataFormat>
        <metadataFormat>
            <metadataPrefix>premis-full-v2</metadataPrefix>
```

```
            <schema>http://www.loc.gov/standards/premis/v2/premis.xsd</schema>
            <metadataNamespace>info:lc/xmlns/premis-v2</metadataNamespace>
        </metadataFormat>
    </ListMetadataFormats>
</OAI-PMH>
```

4.3   ListSets response sample

```
<OAI-PMH xmlns="http://www.openarchives.org/OAI/2.0/"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://www.openarchives.org/OAI/2.0/
http://www.openarchives.org/OAI/2.0/OAI-PMH.xsd">
    <responseDate>2012-06-28T16:07:00</responseDate>
    <request verb="ListSets">http://repository.scape-project.eu/oai</request>
    <ListSets>
        <set>
            <setSpec>IngestStarted</setSpec>
            <setName>Ingest started</setName>
        </set>
        <set>
            <setSpec>IngestFinished</setSpec>
            <setName>Ingest finished</setName>
        </set>
        <set>
            <setSpec>ViewDMD</setSpec>
            <setName>View descriptive metadata</setName>
        </set>
        <set>
            <setSpec>ViewRepresentation</setSpec>
            <setName>View representation</setName>
        </set>
        <set>
            <setSpec>DownloadRepresentation</setSpec>
            <setName>Download a representation</setName>
        </set>
        <set>
            <setSpec>PlanExecuted</setSpec>
            <setName>Plan executed on an object</setName>
        </set>
    </ListSets>
</OAI-PMH>
```

4.4   ListRecords response sample

```
<?xml version="1.0" encoding="UTF-8"?>
<OAI-PMH xmlns="http://www.openarchives.org/OAI/2.0/"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://www.openarchives.org/OAI/2.0/
http://www.openarchives.org/OAI/2.0/OAI-PMH.xsd">
    <responseDate>2012-06-28T16:07:00</responseDate>
    <request verb="ListRecords" metadataPrefix="premis-event-v2"
        >http://repository.scape-project.eu/oai</request>
    <ListRecords>
        <record>
            <header>
                <identifier>event:1</identifier>
                <datestamp>2012-06-18T18:30:00Z</datestamp>
            </header>
            <metadata>
                <event xmlns="info:lc/xmlns/premis-v2" version="2.2"
```

```xml
                    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
                    xsi:schemaLocation="info:lc/xmlns/premis-v2
http://www.loc.gov/standards/premis/v2/premis.xsd">
                    <eventIdentifier>
                        <eventIdentifierType>Event ID</eventIdentifierType>
                        <eventIdentifierValue>event:1</eventIdentifierValue>
                    </eventIdentifier>
                    <eventType>IngestStarted</eventType>
                    <eventDateTime>2012-06-18T18:30:00Z</eventDateTime>
                    <linkingAgentIdentifier>
                        <linkingAgentIdentifierType>User ID</linkingAgentIdentifierType>
                        <linkingAgentIdentifierValue>rcastro</linkingAgentIdentifierValue>
                    </linkingAgentIdentifier>
                    <linkingObjectIdentifier>
                        <linkingObjectIdentifierType>SIP ID</linkingObjectIdentifierType>
                        <linkingObjectIdentifierValue>sip:1</linkingObjectIdentifierValue>
                    </linkingObjectIdentifier>
                </event>
            </metadata>
            <about>
                <agent xmlns="info:lc/xmlns/premis-v2" version="2.2"
                    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
                    xsi:schemaLocation="info:lc/xmlns/premis-v2
http://www.loc.gov/standards/premis/v2/premis.xsd">
                    <agentIdentifier>
                        <agentIdentifierType>User ID</agentIdentifierType>
                        <agentIdentifierValue>rcastro</agentIdentifierValue>
                    </agentIdentifier>
                    <agentName>Rui Castro</agentName>
                    <agentType>Person</agentType>
                    <agentExtension>
                        <agentDetails xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
                            xmlns="http://scape-project.eu/repository/agentDetails"
                            xsi:schemaLocation="http://scape-
project.eu/repository/agentDetails agentDetails.xsd">
                            <user>
                                <role>Administrator</role>
                                <role>Producer</role>
                                <language>pt</language>
                            </user>
                            <endpoint>
                                <ipHash>1234567890</ipHash>
                                <networkHash>193.137.23.0/24</networkHash>
                                <sessionID>session1234567890</sessionID>
                                <geoIP>
                                    <countryCode>PT</countryCode>
                                    <countryName>PORTUGAL</countryName>
                                    <regionName>LISBOA</regionName>
                                    <cityName>LISBON</cityName>
                                    <zipCode>-</zipCode>
                                    <latitude>38.7167</latitude>
                                    <longitude>-9.13333</longitude>
                                    <timeZone>+01:00</timeZone>
                                </geoIP>
                            </endpoint>
                            <userAgent>
                                <userAgentID>Mozilla/5.0 (Windows NT 6.1; WOW64)
AppleWebKit/536.5 (KHTML, like
                                    Gecko) Chrome/19.0.1084.56 Safari/536.5</userAgentID>
                                <languages>
                                    <language>pt</language>
```

```xml
                            <language>en</language>
                        </languages>
                        <plugins>
                            <plugin>
                                <name>Flash</name>
                                <version>11,3,300,257</version>
                            </plugin>
                            <plugin>
                                <name>Java</name>
                                <version>6.0.310.5</version>
                            </plugin>
                        </plugins>
                        <os>Windows 7 SP1 64 bit</os>
                        <device>
                            <screenHeight>1920</screenHeight>
                            <screenWidth>1080</screenWidth>
                            <colorspace>32bit</colorspace>
                        </device>
                    </userAgent>
                </agentDetails>
            </agentExtension>
        </agent>
    </about>
</record>
<record>
    <header>
        <identifier>event:2</identifier>
        <datestamp>2012-06-18T18:40:00Z</datestamp>
    </header>
    <metadata>
        <event xmlns="info:lc/xmlns/premis-v2" version="2.2"
            xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
            xsi:schemaLocation="info:lc/xmlns/premis-v2
http://www.loc.gov/standards/premis/v2/premis.xsd">
            <eventIdentifier>
                <eventIdentifierType>Event ID</eventIdentifierType>
                <eventIdentifierValue>event:2</eventIdentifierValue>
            </eventIdentifier>
            <eventType>IngestFinished</eventType>
            <eventDateTime>2012-06-18T18:40:00Z</eventDateTime>
            <eventOutcomeInformation>
                <eventOutcome>success</eventOutcome>
            </eventOutcomeInformation>
            <linkingAgentIdentifier>
                <linkingAgentIdentifierType>User ID</linkingAgentIdentifierType>
                <linkingAgentIdentifierValue>rcastro</linkingAgentIdentifierValue>
            </linkingAgentIdentifier>
            <linkingObjectIdentifier>
                <linkingObjectIdentifierType>SIP ID</linkingObjectIdentifierType>
                <linkingObjectIdentifierValue>sip:1</linkingObjectIdentifierValue>
            </linkingObjectIdentifier>
            <linkingObjectIdentifier>
                <linkingObjectIdentifierType>Rep ID</linkingObjectIdentifierType>
                <linkingObjectIdentifierValue>rep:1</linkingObjectIdentifierValue>
            </linkingObjectIdentifier>
            <linkingObjectIdentifier>
                <linkingObjectIdentifierType>Rep ID</linkingObjectIdentifierType>
                <linkingObjectIdentifierValue>rep:2</linkingObjectIdentifierValue>
            </linkingObjectIdentifier>
        </event>
    </metadata>
```

```xml
<about>
    <agent xmlns="info:lc/xmlns/premis-v2" version="2.2"
        xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
        xsi:schemaLocation="info:lc/xmlns/premis-v2
http://www.loc.gov/standards/premis/v2/premis.xsd">
        <agentIdentifier>
            <agentIdentifierType>User ID</agentIdentifierType>
            <agentIdentifierValue>rcastro</agentIdentifierValue>
        </agentIdentifier>
        <agentName>Rui Castro</agentName>
        <agentType>Person</agentType>
        <agentExtension>
            <agentDetails xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
                xmlns="http://scape-project.eu/repository/agentDetails"
                xsi:schemaLocation="http://scape-
project.eu/repository/agentDetails agentDetails.xsd">
                <user>
                    <role>Administrator</role>
                    <role>Producer</role>
                    <language>pt</language>
                </user>
                <endpoint>
                    <ipHash>1234567890</ipHash>
                    <networkHash>193.137.23.0/24</networkHash>
                    <sessionID>session1234567890</sessionID>
                    <geoIP>
                        <countryCode>PT</countryCode>
                        <countryName>PORTUGAL</countryName>
                        <regionName>LISBOA</regionName>
                        <cityName>LISBON</cityName>
                        <zipCode>-</zipCode>
                        <latitude>38.7167</latitude>
                        <longitude>-9.13333</longitude>
                        <timeZone>+01:00</timeZone>
                    </geoIP>
                </endpoint>
                <userAgent>
                    <userAgentID>Mozilla/5.0 (Windows NT 6.1; WOW64)
AppleWebKit/536.5 (KHTML, like
                        Gecko) Chrome/19.0.1084.56 Safari/536.5</userAgentID>
                    <languages>
                        <language>pt</language>
                        <language>en</language>
                    </languages>
                    <plugins>
                        <plugin>
                            <name>Flash</name>
                            <version>11,3,300,257</version>
                        </plugin>
                        <plugin>
                            <name>Java</name>
                            <version>6.0.310.5</version>
                        </plugin>
                    </plugins>
                    <os>Windows 7 SP1 64 bit</os>
                    <device>
                        <screenHeight>1920</screenHeight>
                        <screenWidth>1080</screenWidth>
                        <colorspace>32bit</colorspace>
                    </device>
                </userAgent>
```

```xml
                    </agentDetails>
                </agentExtension>
            </agent>
        </about>
    </record>
    <record>
        <header>
            <identifier>event:3</identifier>
            <datestamp>2012-06-18T18:30:00Z</datestamp>
        </header>
        <metadata>
            <event xmlns="info:lc/xmlns/premis-v2" version="2.2"
                xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
                xsi:schemaLocation="info:lc/xmlns/premis-v2
http://www.loc.gov/standards/premis/v2/premis.xsd">
                <eventIdentifier>
                    <eventIdentifierType>Event ID</eventIdentifierType>
                    <eventIdentifierValue>event:3</eventIdentifierValue>
                </eventIdentifier>
                <eventType>ViewDMD</eventType>
                <eventDateTime>2012-06-18T18:30:00Z/2012-06-18T18:30:00Z</eventDateTime>
                <linkingAgentIdentifier>
                    <linkingAgentIdentifierType>User ID</linkingAgentIdentifierType>
                    <linkingAgentIdentifierValue>rcastro</linkingAgentIdentifierValue>
                </linkingAgentIdentifier>
                <linkingObjectIdentifier>
                    <linkingObjectIdentifierType>DMD ID</linkingObjectIdentifierType>
                    <linkingObjectIdentifierValue>dmd:1</linkingObjectIdentifierValue>
                </linkingObjectIdentifier>
            </event>
        </metadata>
        <about>
            <agent xmlns="info:lc/xmlns/premis-v2" version="2.2"
                xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
                xsi:schemaLocation="info:lc/xmlns/premis-v2
http://www.loc.gov/standards/premis/v2/premis.xsd">
                <agentIdentifier>
                    <agentIdentifierType>User ID</agentIdentifierType>
                    <agentIdentifierValue>rcastro</agentIdentifierValue>
                </agentIdentifier>
                <agentName>Rui Castro</agentName>
                <agentType>Person</agentType>
                <agentExtension>
                    <agentDetails xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
                        xmlns="http://scape-project.eu/repository/agentDetails"
                        xsi:schemaLocation="http://scape-
project.eu/repository/agentDetails agentDetails.xsd">
                        <user>
                            <role>Administrator</role>
                            <role>Producer</role>
                            <language>pt</language>
                        </user>
                        <endpoint>
                            <ipHash>1234567890</ipHash>
                            <networkHash>193.137.23.0/24</networkHash>
                            <sessionID>session1234567890</sessionID>
                            <geoIP>
                                <countryCode>PT</countryCode>
                                <countryName>PORTUGAL</countryName>
                                <regionName>LISBOA</regionName>
                                <cityName>LISBON</cityName>
```

```xml
                              <zipCode>-</zipCode>
                              <latitude>38.7167</latitude>
                              <longitude>-9.13333</longitude>
                              <timeZone>+01:00</timeZone>
                          </geoIP>
                      </endpoint>
                      <userAgent>
                          <userAgentID>Mozilla/5.0 (Windows NT 6.1; WOW64)
AppleWebKit/536.5 (KHTML, like
                              Gecko) Chrome/19.0.1084.56 Safari/536.5</userAgentID>
                          <languages>
                              <language>pt</language>
                              <language>en</language>
                          </languages>
                          <plugins>
                              <plugin>
                                  <name>Flash</name>
                                  <version>11,3,300,257</version>
                              </plugin>
                              <plugin>
                                  <name>Java</name>
                                  <version>6.0.310.5</version>
                              </plugin>
                          </plugins>
                          <os>Windows 7 SP1 64 bit</os>
                          <device>
                              <screenHeight>1920</screenHeight>
                              <screenWidth>1080</screenWidth>
                              <colorspace>32bit</colorspace>
                          </device>
                      </userAgent>
                  </agentDetails>
              </agentExtension>
          </agent>
      </about>
  </record>
  <resumptionToken>,,,3</resumptionToken>
  </ListRecords>
</OAI-PMH>
```

4.5 GetRecord with metadataPrefix='oai_dc' response sample

```xml
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<OAI-PMH xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns="http://www.openarchives.org/OAI/2.0/"
    xsi:schemaLocation="http://www.openarchives.org/OAI/2.0/
http://www.openarchives.org/OAI/2.0/OAI-PMH.xsd">
    <responseDate>2012-08-23T15:03:19.5186928+01:00</responseDate>
    <request verb="GetRecord" identifier="event:4" metadataPrefix="oai_dc"
        >http://repository.scape-project.eu/oai</request>
    <GetRecord>
        <record>
            <header>
                <identifier>event:4</identifier>
                <datestamp>2012-06-18T18:40:00Z</datestamp>
            </header>
            <metadata>
                <dc xmlns="http://www.openarchives.org/OAI/2.0/oai_dc/"
                    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
                    xsi:schemaLocation="http://www.openarchives.org/OAI/2.0/oai_dc
http://www.openarchives.org/OAI/2.0/oai_dc.xsd">
                    <identifier xmlns="http://purl.org/dc/elements/1.1/">event:4</identifier>
                    <type xmlns="http://purl.org/dc/elements/1.1/">IngestFinished</type>
                    <date xmlns="http://purl.org/dc/elements/1.1/">2012-06-18T18:40:00Z</date>
                </dc>
            </metadata>
        </record>
    </GetRecord>
</OAI-PMH>
```

4.6 GetRecord with metadataPrefix='premis-event-v2' response sample

```xml
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<OAI-PMH xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns="http://www.openarchives.org/OAI/2.0/"
    xsi:schemaLocation="http://www.openarchives.org/OAI/2.0/
http://www.openarchives.org/OAI/2.0/OAI-PMH.xsd">
    <responseDate>2012-08-23T15:03:19.5186928+01:00</responseDate>
    <request verb="GetRecord" identifier="event:4" metadataPrefix="premis-event-v2"
        >http://repository.scape-project.eu/oai</request>
    <GetRecord>
        <record>
            <header>
                <identifier>event:4</identifier>
                <datestamp>2012-06-18T18:40:00Z</datestamp>
            </header>
            <metadata>
                <event xmlns="info:lc/xmlns/premis-v2" version="2.2"
                    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
                    xsi:schemaLocation="info:lc/xmlns/premis-v2
http://www.loc.gov/standards/premis/v2/premis.xsd">
                    <eventIdentifier>
                        <eventIdentifierType>Event ID</eventIdentifierType>
                        <eventIdentifierValue>event:4</eventIdentifierValue>
                    </eventIdentifier>
                    <eventType>IngestFinished</eventType>
                    <eventDateTime>2012-06-18T18:40:00Z</eventDateTime>
                    <eventOutcomeInformation>
                        <eventOutcome>success</eventOutcome>
```

```xml
                        </eventOutcomeInformation>
                        <linkingAgentIdentifier>
                            <linkingAgentIdentifierType>User ID</linkingAgentIdentifierType>
                            <linkingAgentIdentifierValue>rcastro</linkingAgentIdentifierValue>
                        </linkingAgentIdentifier>
                        <linkingObjectIdentifier>
                            <linkingObjectIdentifierType>SIP ID</linkingObjectIdentifierType>
                            <linkingObjectIdentifierValue>sip:1</linkingObjectIdentifierValue>
                        </linkingObjectIdentifier>
                        <linkingObjectIdentifier>
                            <linkingObjectIdentifierType>Rep ID</linkingObjectIdentifierType>
                            <linkingObjectIdentifierValue>rep:1</linkingObjectIdentifierValue>
                        </linkingObjectIdentifier>
                </event>
            </metadata>
            <about>
                <agent xmlns="info:lc/xmlns/premis-v2" version="2.2"
                    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
                    xsi:schemaLocation="info:lc/xmlns/premis-v2
http://www.loc.gov/standards/premis/v2/premis.xsd">
                    <agentIdentifier>
                        <agentIdentifierType>User ID</agentIdentifierType>
                        <agentIdentifierValue>rcastro</agentIdentifierValue>
                    </agentIdentifier>
                    <agentName>Rui Castro</agentName>
                    <agentType>Person</agentType>
                    <agentExtension>
                        <agentDetails xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
                            xmlns="http://scape-project.eu/repository/agentDetails"
                            xsi:schemaLocation="http://scape-
project.eu/repository/agentDetails agentDetails.xsd">
                            <user>
                                <role>Administrator</role>
                                <role>Producer</role>
                                <language>pt</language>
                            </user>
                            <endpoint>
                                <ipHash>1234567890</ipHash>
                                <networkHash>193.137.23.0/24</networkHash>
                                <sessionID>session1234567890</sessionID>
                                <geoIP>
                                    <countryCode>PT</countryCode>
                                    <countryName>PORTUGAL</countryName>
                                    <regionName>LISBOA</regionName>
                                    <cityName>LISBON</cityName>
                                    <zipCode>-</zipCode>
                                    <latitude>38.7167</latitude>
                                    <longitude>-9.13333</longitude>
                                    <timeZone>+01:00</timeZone>
                                </geoIP>
                            </endpoint>
                            <userAgent>
                                <userAgentID>Mozilla/5.0 (Windows NT 6.1; WOW64)
AppleWebKit/536.5 (KHTML, like
                                    Gecko) Chrome/19.0.1084.56 Safari/536.5</userAgentID>
                                <languages>
                                    <language>pt</language>
                                    <language>en</language>
                                </languages>
                                <plugins>
                                    <plugin>
```

```xml
                <name>Flash</name>
                <version>11,3,300,257</version>
            </plugin>
            <plugin>
                <name>Java</name>
                <version>6.0.310.5</version>
            </plugin>
        </plugins>
        <os>Windows 7 SP1 64 bit</os>
        <device>
            <screenHeight>1920</screenHeight>
            <screenWidth>1080</screenWidth>
            <colorspace>32bit</colorspace>
        </device>
    </userAgent>
                </agentDetails>
            </agentExtension>
        </agent>
      </about>
    </record>
  </GetRecord>
</OAI-PMH>
```

4.7 GetRecord with metadataPrefix='premis-full-v2' response sample

```xml
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<OAI-PMH xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns="http://www.openarchives.org/OAI/2.0/"
    xsi:schemaLocation="http://www.openarchives.org/OAI/2.0/
http://www.openarchives.org/OAI/2.0/OAI-PMH.xsd">
    <responseDate>2012-08-23T15:03:19.5186928+01:00</responseDate>
    <request verb="GetRecord" identifier="event:4" metadataPrefix="premis-full-v2"
        >http://repository.scape-project.eu/oai</request>
    <GetRecord>
        <record>
            <header>
                <identifier>event:4</identifier>
                <datestamp>2012-06-18T18:40:00Z</datestamp>
            </header>
            <metadata>
                <event xmlns="info:lc/xmlns/premis-v2" version="2.2"
                    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
                    xsi:schemaLocation="info:lc/xmlns/premis-v2
http://www.loc.gov/standards/premis/v2/premis.xsd">
                    <eventIdentifier>
                        <eventIdentifierType>Event ID</eventIdentifierType>
                        <eventIdentifierValue>event:4</eventIdentifierValue>
                    </eventIdentifier>
                    <eventType>IngestFinished</eventType>
                    <eventDateTime>2012-06-18T18:40:00Z</eventDateTime>
                    <eventOutcomeInformation>
                        <eventOutcome>success</eventOutcome>
                    </eventOutcomeInformation>
                    <linkingAgentIdentifier>
                        <linkingAgentIdentifierType>User ID</linkingAgentIdentifierType>
                        <linkingAgentIdentifierValue>rcastro</linkingAgentIdentifierValue>
                    </linkingAgentIdentifier>
                    <linkingObjectIdentifier>
                        <linkingObjectIdentifierType>SIP ID</linkingObjectIdentifierType>
                        <linkingObjectIdentifierValue>sip:1</linkingObjectIdentifierValue>
                    </linkingObjectIdentifier>
                    <linkingObjectIdentifier>
                        <linkingObjectIdentifierType>Rep ID</linkingObjectIdentifierType>
                        <linkingObjectIdentifierValue>rep:1</linkingObjectIdentifierValue>
                    </linkingObjectIdentifier>
                </event>
            </metadata>
            <about>
                <agent xmlns="info:lc/xmlns/premis-v2" version="2.2"
                    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
                    xsi:schemaLocation="info:lc/xmlns/premis-v2
http://www.loc.gov/standards/premis/v2/premis.xsd">
                    <agentIdentifier>
                        <agentIdentifierType>User ID</agentIdentifierType>
                        <agentIdentifierValue>rcastro</agentIdentifierValue>
                    </agentIdentifier>
                    <agentName>Rui Castro</agentName>
                    <agentType>Person</agentType>
                    <agentExtension>
                        <agentDetails xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
                            xmlns="http://scape-project.eu/repository/agentDetails"
                            xsi:schemaLocation="http://scape-
project.eu/repository/agentDetails agentDetails.xsd">
                            <user>
                                <role>Administrator</role>
                                <role>Producer</role>
                                <language>pt</language>
                            </user>
                            <endpoint>
                                <ipHash>1234567890</ipHash>
                                <networkHash>193.137.23.0/24</networkHash>
                                <sessionID>session1234567890</sessionID>
```

```
                            <geoIP>
                                <countryCode>PT</countryCode>
                                <countryName>PORTUGAL</countryName>
                                <regionName>LISBOA</regionName>
                                <cityName>LISBON</cityName>
                                <zipCode>-</zipCode>
                                <latitude>38.7167</latitude>
                                <longitude>-9.13333</longitude>
                                <timeZone>+01:00</timeZone>
                            </geoIP>
                        </endpoint>
                        <userAgent>
                            <userAgentID>Mozilla/5.0 (Windows NT 6.1; WOW64)
AppleWebKit/536.5 (KHTML, like
                                Gecko) Chrome/19.0.1084.56 Safari/536.5</userAgentID>
                            <languages>
                                <language>pt</language>
                                <language>en</language>
                            </languages>
                            <plugins>
                                <plugin>
                                    <name>Flash</name>
                                    <version>11,3,300,257</version>
                                </plugin>
                                <plugin>
                                    <name>Java</name>
                                    <version>6.0.310.5</version>
                                </plugin>
                            </plugins>
                            <os>Windows 7 SP1 64 bit</os>
                            <device>
                                <screenHeight>1920</screenHeight>
                                <screenWidth>1080</screenWidth>
                                <colorspace>32bit</colorspace>
                            </device>
                        </userAgent>
                    </agentDetails>
                </agentExtension>
            </agent>
        </about>
        <about>
            <object xsi:type="representation" xmlns="info:lc/xmlns/premis-v2"
                xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
                <objectIdentifier>
                    <objectIdentifierType>Rep ID</objectIdentifierType>
                    <objectIdentifierValue>rep:1</objectIdentifierValue>
                </objectIdentifier>
                <preservationLevel>
                    <preservationLevelValue>full</preservationLevelValue>
                    <preservationLevelDateAssigned>2012-08-
02T11:29:14Z</preservationLevelDateAssigned>
                </preservationLevel>
                <relationship>
                    <relationshipType>structural</relationshipType>
                    <relationshipSubType>has root</relationshipSubType>
                    <relatedObjectIdentification>
                        <relatedObjectIdentifierType>File ID</relatedObjectIdentifierType>
                        <relatedObjectIdentifierValue>F0</relatedObjectIdentifierValue>
                        <relatedObjectSequence>0</relatedObjectSequence>
                    </relatedObjectIdentification>
                </relationship>
                <relationship>
                    <relationshipType>structural</relationshipType>
                    <relationshipSubType>has part</relationshipSubType>
                    <relatedObjectIdentification>
                        <relatedObjectIdentifierType>File ID</relatedObjectIdentifierType>
                        <relatedObjectIdentifierValue>F1</relatedObjectIdentifierValue>
                        <relatedObjectSequence>1</relatedObjectSequence>
                    </relatedObjectIdentification>
                </relationship>
```

```xml
                </object>
            </about>
            <about>
                <object xsi:type="file" xmlns="info:lc/xmlns/premis-v2"
                    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
                    <objectIdentifier>
                        <objectIdentifierType>File ID</objectIdentifierType>
                        <objectIdentifierValue>F0</objectIdentifierValue>
                    </objectIdentifier>
                    <preservationLevel>
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                            <messageDigestOriginator>RODA Core
Services</messageDigestOriginator>
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                                xsi:schemaLocation="http://hul.harvard.edu/ois/xml/ns/jhove
http://hul.harvard.edu/ois/xml/xsd/jhove/1.6/jhove.xsd"
                                name="JhoveUtility" release="1.0" date="2012-07-02"
                                xmlns="http://hul.harvard.edu/ois/xml/ns/jhove">
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                          </contentLocation>
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```xml
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<objectCharacteristicsExtension>
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http://hul.harvard.edu/ois/xml/xsd/jhove/1.6/jhove.xsd"
        name="JhoveUtility" release="1.0" date="2012-07-02"
        xmlns="http://hul.harvard.edu/ois/xml/ns/jhove">
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                <module>JPEG-hul</module>
            </sigMatch>
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                            </values>
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                        <property>
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type="NISOImageMetadata">

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http://www.loc.gov/standards/mix/mix20/mix20.xsd"

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                            <mix:ObjectIdentifier>

<mix:objectIdentifierType>JHOVE</mix:objectIdentifierType>
                            </mix:ObjectIdentifier>
                            <mix:byteOrder>big endian</mix:byteOrder>
                            <mix:Compression>

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                            </mix:BasicDigitalObjectInformation>
```

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```xml
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                                    </mix:BasicImageInformation>
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of
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```xml
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        </contentLocation>
      </storage>
    </object>
    </about>
  </record>
  </GetRecord>
</OAI-PMH>
```

5   Bibliography

[1]   PREMIS Editorial Committee, "Data Dictionary for Preservation Metadata: PREMIS version 2.1," Mar. 2011.