

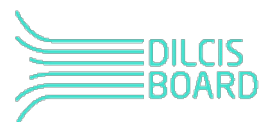
E-ARK DIP

Specification for Dissemination Information Packages



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Executive Summary

This is the extension of the E-ARK CSIP profile for creation of an E-ARK DIP. The profile describes the Dissemination Information Package (DIP) specification and the implementation of METS for packaging OAIS conformant Information Packages. The profile is accompanied by a text document explaining the details of use of this profile. This will enable repository interoperability and assist in the management of the preservation of digital content.

Preface

I. Aim of the Specification

This document is one of several related specifications which aim to provide a common set of usage descriptions of international standards for packaging digital information for archiving purposes. These specifications are based on common, international standards for transmitting, describing and preserving digital data. They also utilise the Reference Model for an Open Archival Information System (OAIS), which has Information Packages as its foundation. Familiarity with the core functional entities of OAIS is a prerequisite for understanding the specifications.

The specifications are designed to help data creators, software developers, and digital archives to tackle the challenge of short-, medium- and long-term data management and reuse in a sustainable, authentic, cost-efficient, manageable and interoperable way. A visualisation of the current specification network can be seen here:

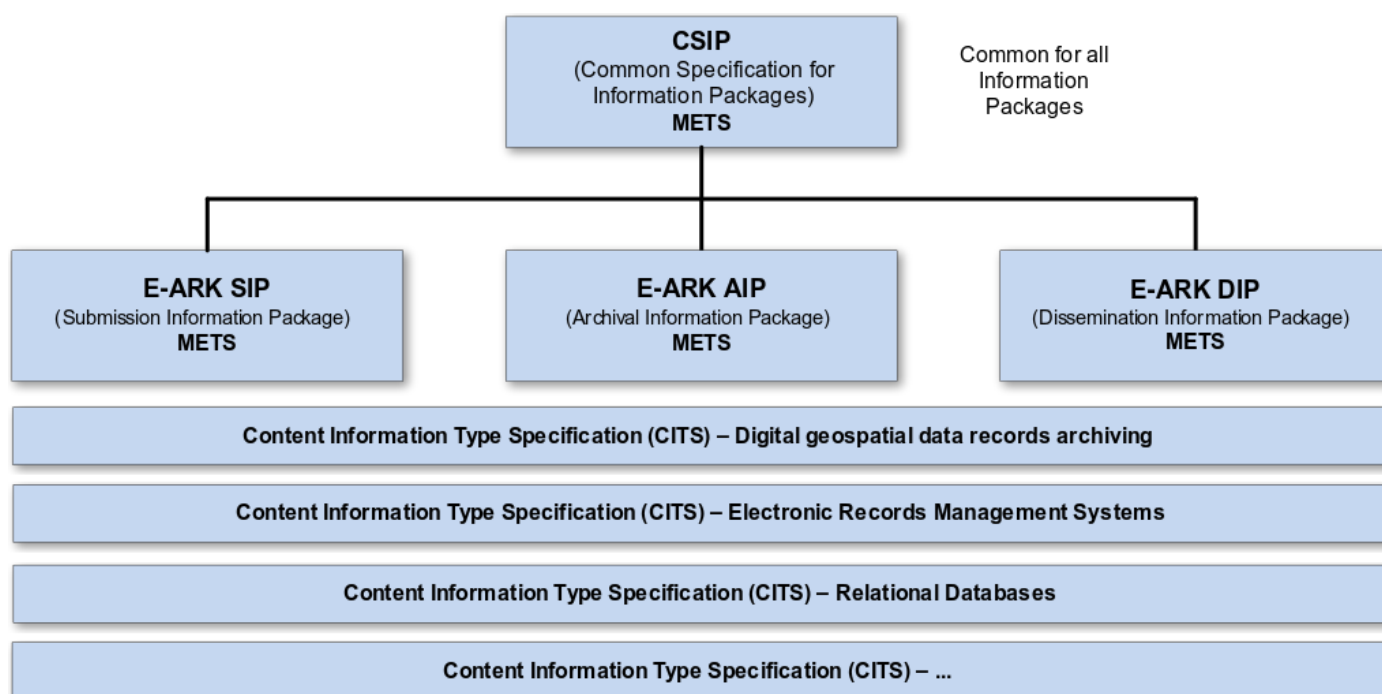


Figure I: Diagram showing E-ARK specification dependency hierarchy. Note that the image only shows a selection of the published CITS and isn't an exhaustive list.

Overview of the E-ARK Specifications

Common Specification for Information Packages (E-ARK CSIP)

This document introduces the concept of a Common Specification for Information Packages (CSIP). The main purposes of CSIP are to:

- Establish a common understanding of the requirements which need to be met to achieve interoperability of Information Packages.
- Establish a common base for the development of more specific Information Package definitions and tools within the digital preservation community.
- Propose the details of an XML-based implementation of the requirements using, to the largest possible extent, standards which are widely used in international digital preservation.

Ultimately the goal of the Common Specification is to reach a level of interoperability between all Information Packages so that tools implementing the Common Specification can be adopted by institutions without the need for further modifications or adaptations.

Specification for Submission Information Packages (E-ARK SIP)

The main aims of this specification are to:

- Define a general structure for a Submission Information Package format suitable for a wide variety of archival scenarios, such as document and image collections, databases or geospatial data.
- Enhance interoperability between Producers and Archives.
- Recommend best practices regarding the structure, content and metadata of Submission Information Packages.

Specification for Archival Information Packages (E-ARK AIP)

The main aims of this specification are to:

- Define a generic structure of the AIP format suitable for a wide variety of data types, such as document and image collections, archival records, databases or geospatial data.
- Recommend a set of metadata related to the structural and the preservation aspects of the AIP as implemented by the eArchiving Reference Implementation (eArkweb).
- Ensure the format is suitable to store large quantities of data.

Specification for Dissemination Information Packages (E-ARK DIP)

The main aims of this specification are to:

- Define a generic structure of the DIP format suitable for a wide variety of archival records, such as document and image collections, databases or geographical data.
- Recommend a set of metadata related to the structural and access aspects of the DIP.

Content Information Type Specifications (E-ARK CITS)

The main aim of a Content Information Type Specification (CITS) is to:

- Define, in technical terms, how data and metadata must be formatted and placed within a CSIP Information Package to achieve interoperability in exchanging specific Content Information.

The number of possible Content Information Type Specifications is unlimited. For a list of existing Content Information Type Specifications see the DILCIS Board webpage (DILCIS Board, <http://dilcis.eu/>).

II. Organisational Support

This specification is maintained by the Digital Information LifeCycle Interoperability Standards Board (DILCIS Board, <http://dilcis.eu/>). The role of the DILCIS Board is to enhance and maintain the draft specifications developed in the European Archival Records and Knowledge Preservation Project (E-ARK project, <http://eak-project.com/>), which concluded in January 2017. The Board consists of eight members, but no restriction is placed on the number of participants taking part in the work. All Board documents and specifications are stored in GitHub (<https://github.com/DILCISBoard/>), while published versions are made available on the Board webpage. The DILCIS Board have been responsible for providing the core specifications to the Connecting Europe Facility eArchiving Building Block <https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/eArchiving/>.

III. Authors & Revision History

A full list of contributors to this specification, as well as the revision history, can be found in the Postface material.

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1 Introduction

1.1 Definition of a DIP

The OAIS reference model defines a DIP as:

An Information Package, derived from one or more AIPs, and sent by Archives to the Consumer in response to a request to the OAIS.

The definition of an E-ARK DIP is that it corresponds to a CSIP which is ready to be processed by its designated Access Software; if it is not suited for processing and rendering by its designated Access Software, it is not (yet) a DIP. This is a

very generic, but handy, definition. To be more specific, an E-ARK DIP is:

- an IP which is sent (or is ready to be sent) to the user in an Access environment;
- supported by tools, i.e. can be rendered by Access Software.

First of all, the DIP looks like the AIP: It replicates the structure of the AIP from which it is derived. It also inherits metadata as well as the intellectual entities of the AIP. An E-ARK AIP may in its entirety therefore also be a E-ARK DIP, however in most cases it is necessary to convert from an AIP to a DIP. The DIP allows for example for the inclusion of new DIP representation formats, which are more user-friendly than the AIP formats that are intended for long-term preservation purposes. It also allows for the updating of the metadata as well as for the addition of new metadata elements. Representation Information, which is required for rendering and understanding the intellectual content, might also be added, and as a direct consequence, there may be a need for new folders and files, for example within the “Documentation” folder.

2 Structure

The folder structure of an E-ARK DIP must comply with the requirements for the folder structure for a CSIP, see Folder structure of the CSIP.

The CSIP folder structure and its requirements is visualised in the figure below:



Figure 1: IP Folder Structure

- Blue boxes represent folders

- Yellow boxes represent files.
- Boxes with full lines represent mandatory files/folders
- Boxes with dotted lines represent optional files/folders.

As can be seen from the figure - the requirements for the folder structure for a CSIP is at a bare minimum and makes it possible to have several extra optional folders and files in a CSIP (see boxes with dotted lines). The first thing to be said about the E-ARK DIP structure in regard to CSIP structure is that an E-ARK DIP will always consist of some of those files and folders that are optional in the CSIP minimum structure. There must be data to disseminate. Since the definition of an E-ARK DIP is that it corresponds to a CSIP which is ready to be processed by its designated Access Software, this leaves the question as to which data in the CSIP should be chosen to be encompassed in the E-ARK DIP.

It is possible that an AIP in its current state and in its entirety can be delivered to a Consumer as is and still be considered an E-ARK DIP. That E-ARK DIP can contain the submission representation, and one or more preservation representations. Often, however, the OAIS is interested in leaving out irrelevant data and metadata and only present the Consumer with the data and metadata that the Consumer is interested in. This could be isolated to the content in one single representation in an E-ARK AIP, or maybe only a portion of a single representation in an E-ARK AIP. Maybe even only one specific file. The point here is that a plethora of different E-ARK DIPs can be created out of an E-ARK AIP or several E-ARK AIPs.

3 Content Information Types

Content Information is “A set of information that is the original target of preservation or that includes part or all of that information. It is an Information Object composed of its Content Data Object and its Representation Information” according to the OAIS Reference Model.

A Content Information Type can therefore be understood as a category of Content Information, for example relational databases, scientific data, electronic records management systems, digitised maps, etc..

According to the Common Specification for Information Package it is possible to create specifications for Content Information Types. It is within these specifications that requirements and descriptions related to the specific Content Information Type is described. The DIP specification can not describe how each Content Information Type should be disseminated and therefore the DIP specification sets out requirements on how Content Information Type specifications should handle DIP requirements.

- A Content Information Type specification should have a section which sole focus is on describing DIP requirements and/or recommendations
 - The DIP section should describe how to read/edit access rights
 - The DIP section should describe how to register access software
 - The DIP section could mention and list relevant access software for the Content Information Type

4 Metadata

The DIP metadata is based upon the existing CSIP, E-ARK SIP and E-ARK AIP specifications. The metadata descriptions provided in this document cover the three core metadata categories:

- structural (see METS)
- preservation (see PREMIS)
- descriptive (see EAD)

It must be stated that the CSIP allows for and makes a distinction between preservation metadata and descriptive metadata (or Descriptive Information according to OAIS). One of the challenges when dividing metadata between preservation metadata and descriptive metadata is that the current metadata standards do not operate with the same distinction. Access rights information can for example both be stored in EAD (descriptive metadata) and in PREMIS (preservation metadata) or in METS. This leaves the question - where should this access and dissemination information be registered? This E-ARK DIP specification describes two ways of using EAD and PREMIS for registering Access Rights and Access Software. These are possible ways and not yet recommendations.

4.1 METS

METS (Metadata Encoding and Transmission Standard) is a standard for encoding descriptive, administrative, and structural metadata expressed using the XML Schema Language. The use of METS is mandatory if it must comply with CSIP. See CSIP for the general use of METS in information packages.

The differences between a METS instance for an E-ARK DIP vs an E-ARK AIP are small. Actually, most of the metadata differences between an AIP and a DIP are in the descriptive metadata or preservation metadata such as EAD and PREMIS.

Below is a broad overview of the METS file.

Elements	Values	Comments
mets		
metsHdr		
agent		software or archivist creating the DIP
dmdSec		
mdRef	<i>EAD</i>	information about descriptive metadata files (e.g EAD)
amdSec		
mdRef	<i>PREMIS</i>	information about preservation metadata files (e.g PREMIS)
fileSec		

Elements	Values	Comments
fileGrp	<i>Common Specification root</i>	
fileGrp	<i>metadata</i>	
fileGrp	<i>representations</i>	normally only one repr. in the DIP
fileGrp	<i>schemas</i>	
fileGrp	<i>documentation</i>	
structMap		
div	<i>metadata</i>	
div	<i>representations</i>	mets pointer to mets file for the repr.
div	<i>schemas</i>	
div	<i>documentation</i>	

In the following the major differences between an XML instance for METS for an E-ARK DIP vs an E-ARK AIP are listed.

4.1.1 Node level: mets root

ID	Name, Location & Description	Card & Level
DIP1	Package Identifier <i>mets/@OBJID</i> Note that the value of the <i>mets/@OBJID</i> attribute for the DIP is expected to be different from the SIP and AIP to reflect the creation of a new package.	1..1 MUST
DIP2	METS Profile <i>mets/@PROFILE</i> The value is set to “https://eardip.dilcis.eu/profile/E-ARK-DIP.xml”.	1..1 MUST

Example: METS root element illustrating the use of a custom `csip:@OTHERCONTENTINFORMATIONTYPE` attribute value when the correct content type value does not exist in the vocabulary. The `csip:@CONTENTINFORMATIONTYPE` attribute value is set to OTHER.

```
<mets:mets xmlns:mets="http://www.loc.gov/METS/" xmlns:csip="https://DILCIS.eu/XML/METS/CSIPExtensionMETS" xmlns:sip="https://DILCIS.eu/XML/METS/SIPExtensionMETS"
```

```

xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xlink="http://www.w3.org/1999/xlink" OBJID="uuid-4422c185-5407-4918-83b1-7abfa77de182" LABEL="Sample E-ARK DIP Information Package" TYPE="Datasets" csip:CONTENTINFORMATIONTYPE="OTHER" csip:OTHERCONTENTINFORMATIONTYPE="Own defined content information type" PROFILE="https://earkdip.dilcis.eu/profile/E-ARK-DIP.xml" xsi:schemaLocation="http://www.loc.gov/METS/ http://www.loc.gov/standards/mets/mets.xsd http://www.w3.org/1999/xlink http://www.loc.gov/standards/mets/xlink.xsd https://DILCIS.eu/XML/METS/CSIPExtensionMETS https://earkcsip.dilcis.eu/schema/DILCISExtensionMETS.xsd https://DILCIS.eu/XML/METS/SIPExtensionMETS https://earksip.dilcis.eu/schema/DILCISExtensionSIPMETS.xsd">
</mets:mets>

```

Example: METS root element showing use of `csip:@OTHERTYPE` attribute when an appropriate package content category value is not available in the vocabulary. The `@TYPE` attribute value is set to OTHER.

```

<mets:mets xmlns:mets="http://www.loc.gov/METS/" xmlns:csip="https://DILCIS.eu/XML/METS/CSIPExtensionMETS" xmlns:sip="https://DILCIS.eu/XML/METS/SIPExtensionMETS" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xlink="http://www.w3.org/1999/xlink" OBJID="uuid-4422c185-5407-4918-83b1-7abfa77de182" LABEL="Sample E-ARK DIP Information Package" TYPE="OTHER" csip:OTHERTYPE="Patterns" PROFILE="https://earkdip.dilcis.eu/profile/E-ARK-DIP.xml" xsi:schemaLocation="http://www.loc.gov/METS/ http://www.loc.gov/standards/mets/mets.xsd http://www.w3.org/1999/xlink http://www.loc.gov/standards/mets/xlink.xsd https://dilcis.eu/XML/METS/CSIPExtensionMETS https://earkcsip.dilcis.eu/schema/DILCISExtensionMETS.xsd https://DILCIS.eu/XML/METS/SIPExtensionMETS https://earksip.dilcis.eu/schema/DILCISExtensionSIPMETS.xsd">
</mets:mets>

```

4.1.2 Node level: metsHdr

ID	Name, Location & Description	Card & Level
DIP3	OAIS Package type information <code>metsHdr[@csip:OAISPACKAGETYPE='DIP']</code> The in CSIP added attribute <code>@csip:OAISPACKAGETYPE</code> is used with the value "DIP".	1..1 MUST

Example: METS agent example of the mandatory agent

```

<mets:metsHdr CREATEDATE="2018-04-24T14:37:49.602+01:00" LASTMODDATE="2018-04-24T14
:37:49.602+01:00" RECORDSTATUS="NEW" csip:OAISPACKAGETYPE="DIP">
  <mets:agent ROLE="CREATOR" TYPE="OTHER" OTHERTYPE="SOFTWARE">
    <mets:name>
      RODA-in
    </mets:name>
    <mets:note csip:NOTETYPE="SOFTWARE VERSION">
      2.1.0-beta.7
    </mets:note>
  </mets:agent>
</mets:metsHdr>

```

4.1.3 Node level: dmdSec

ID	Name, Location & Description	Card & Level
DIP4	Status of the descriptive metadata <i>dmdSec/@STATUS</i> Indicates the status of the package using a fixed vocabulary. The status SHOULD in a DIP be set to "CURRENT".	0..1 SHOULD

Example: METS example of referencing the descriptive metadata which is described with an EAD document

```

<mets:dmdSec ID="dmdExmpl.ead" CREATED="2018-04-24T14:37:49.609+01:00" STATUS="CURRENT
">
  <mets:mdRef LOCTYPE="URL" MDTYPE="EAD" xlink:type="simple" xlink:href="metadata/
  descriptive/ead2002.xml" MIMETYPE="application/xml" SIZE="903" CREATED="
  2018-04-24T14:37:49.609+01:00" CHECKSUM="
  F24263BF09994749F335E1664DCE0086DB6DCA323FDB6996938BCD28EA9E8153" CHECKSUMTYPE="
  SHA-256">
  </mets:mdRef>
</mets:dmdSec>

```

4.1.4 Node level: amdSec

ID	Name, Location & Description	Card & Level
REF_CSIP_ Administrative metadata		N/A
N/A	The DIP amdSec element should comply with amdSec requirements in the CSIP profile.	SHOULD

4.1.5 Node level: fileSec

ID	Name, Location & Description	Card & Level
REF_CSIP_ File section		N/A
N/A	The DIP fileSec element should comply with fileSec requirements in the CSIP profile.	SHOULD

4.1.6 Node level: structMap

ID	Name, Location & Description	Card & Level
REF_CSIP_ Structural description of the package		N/A
N/A	The DIP structMap element should comply with structMap requirements in the CSIP profile.	SHOULD

4.2 PREMIS

PREMIS (Preservation Metadata: Implementation Strategies) is a standard that mainly caters for long-term preservation and technical usability, which for example is used to facilitate a range of preservation strategies including migration and emulation. From an Access perspective, PREMIS especially satisfies the requirements pertaining to the recording of Representation Information. It is practical to state in a formalised and consistent way how the Access Software should behave and where it should look when dealing with different pieces of information, such as which representation formats are included in the DIP.

4.2.1 Metadata regarding Representations and Access Software

In PREMIS, a representation is a “set of files, including structural metadata, needed for a complete and reasonable rendition of an Intellectual Entity.” See PREMIS Editorial Committee (2015). “PREMIS Data Dictionary for Preservation

Metadata”, p.8.

One of the core concepts in PREMIS is the above formulated definition of a representation, but it is also important to note that the CSIP structure also incorporates physical management of different representations. When implementing PREMIS in CSIPs one must therefore choose if there must exist PREMIS files at representation level or at root level only (see CSIP) and one must also choose how fine-grained each description should be.

To enable rendition, three pieces of information are needed in PREMIS: One identifying the representation to be rendered; one identifying the software to enable this; and one establishing a relationship between the two.

The descriptions below therefore show how to:

1. Describe which DIP representation format is contained in the DIP (description 1 below);
2. Describe which piece(s) of Access Software is/are needed to render a specific DIP representation format. Several pieces of software may indeed be needed (description 2 below);
3. Describe the relationship between the DIP representation format and its Access Software (description 3 below).

Description 1 - The description of DIP representation formats

In order to describe the specific DIP representation format the semantic component “1.4 significantProperties” is used. An example is:

```
<object xsi:type="representation">
  <objectIdentifier>
    <objectIdentifierType>filepath\</objectIdentifierType>
    <objectIdentifierValue>xlink:href=\"representations\\AVID.SA.18006.rep0\"</
objectIdentifierValue>
  </objectIdentifier>
  <significantProperties>
    <significantPropertiesType>DIP representation format\</significantPropertiesType
  >
    <significantPropertiesValue>SIARD2\</significantPropertiesValue>
  </significantProperties>
<!-- PREMIS file continues but further elements left out in this example-->
</object>
```

Note that the object type is “representation” and that the objectIdentifierType value is “filepath”, which according to the AIP specification is an IP scope value. The objectIdentifierValue is the file path to the representation folder or could be a file path to a file.

Description 2 - The description of Access Software

In PREMIS 3.0 a description of an environment has become an object itself, so that both non-environmental objects and environmental objects exist. Access Software is therefore an environmental object which per default is an intellectual entity. The semantic unit “1.9 environmentFunction” is conceived to describe the environment object(s) with different levels of granularity. It is suggested to use the vocabulary from Library of Congress. The semantic unit “1.10 environmentDesignation” is used for information identifying the environment by using human-readable language which can be expected to be understood outside of a digital repository.

See the example which follows this vocabulary:

```
<object xsi:type="intellectualEntity">
  <objectIdentifier>
    <objectIdentifierType>local</objectIdentifierType>
    <objectIdentifierValue>DBVTK</objectIdentifierValue>
  </objectIdentifier>
  <environmentFunction>
    <environmentFunctionType>software</environmentFunctionType>
    <environmentFunctionLevel>1</environmentFunctionLevel>
  </environmentFunction>
  <environmentFunction>
    <environmentFunctionType>software application</environmentFunctionType>
    <environmentFunctionLevel>2</environmentFunctionLevel>
  </environmentFunction>
  <environmentDesignation>
    <environmentName>Database Visualization Toolkit</environmentName>
    <environmentVersion>2.4.1</environmentVersion>
    <environmentDesignationNote>Lightweight web viewer for relational databases,
    specially if preserved in SIARD 2, that uses SOLR as a back-end, and allows
    browsing, search, and export. Documentation at github.com/eark-project/software/DBVTK</environmentDesignationNote>
  </environmentDesignation>
</object>
```

Description 3 - The description of the relation between the representations and the Access Software

In order to establish a connection between the DIP representation format to be rendered and the Access Software to render it, it is necessary to use the semantic unit “1.13 relationship”. The relationship element can bind both non-environmental objects together with environmental objects and it can bind environmental objects together with other environmental objects. The following example shows how the DIP representation format can be related to the Access Software:

```

<object xsi:type="representation">
  <objectIdentifier>
    <objectIdentifierType>filepath</objectIdentifierType>
    <objectIdentifierValue>xlink:href="representations\AVID.SA.18006.rep0"</
objectIdentifierValue>
  </objectIdentifier>
  <significantProperties>
    <significantPropertiesType>DIP representation format</significantPropertiesType>
    <significantPropertiesValue>SIARD2</significantPropertiesValue>
  </significantProperties>
  <!-- The following is the relation between the software and the DIP representation
  -->
  <relationship>
    <relationshipType>dependency</relationshipType>
    <relationshipSubType>requires</relationshipSubType>
    <relatedObjectIdentifier>
      <relatedObjectIdentifierType>local</relatedObjectIdentifierType>
      <relatedObjectIdentifierValue>DBVTK</relatedObjectIdentifierValue>
    </relatedObjectIdentifier>
    <relatedEnvironmentPurpose>render</relatedEnvironmentPurpose>
  </relationship>
</object>

```

As can be seen above the nature of the relationship, <relationshipType> is used (value, e.g. “dependency”); intimately linked to this is also the indication of a <relationshipSubType>, e.g. “requires”.

In order to identify the Access Software, which is used to render the representation, the <relatedObjectIdentifier> is employed; and the <relatedEnvironmentPurpose> gives us a hint about what the purpose is (here: to “render”).

Since it is not always possible to render the DIP representation formats with one piece of Access Software, it can be necessary to model software dependencies and sequences between several pieces of software in PREMIS.

4.3 Descriptive metadata - e.g. EAD

Descriptive metadata are used to describe the intellectual contents of archival holdings, and they support finding and understanding individual information packages. The E-ARK DIP allows for the inclusion of any kind of descriptive metadata. The E-ARK project reached the conclusion that EAD was one of the most used. See the full report D3.1 E-ARK Report on Available Best Practices. A common E-ARK EAD guideline is yet to be developed. But for information purposes and since the previous DIP specification described a way to register Access Rights Information the text is given here:

4.3.1 Access restrictions

OAIS states: > Access Rights Information: The information that identifies the access restrictions pertaining > to the Content Information, including the legal framework, licensing terms, and access control. > It contains the access and distribution conditions stated within the Submission Agreement, > related to both preservation (by the OAIS) and final usage (by the Consumer). > It also includes the specifications for the application of rights enforcement measures.

The E-ARK DIP specification does not require that access rights are stored in a specific way since different metadata standards can be applied differently to different Content Information Types. See Content Information Types. Since it is possible to have different metadata information in the metadata folder it is recommended to systematically control where access rights metadata are stored. For example access rights metadata can be stored in both EAD and in PREMIS.

The <accessrestrict> tag is “An element for information about conditions that affect the availability of the materials being described.” See EAD3. The Access Rights Information that concerns the end-user has to be available in EAD - not in PREMIS - and <accessrestrict> is used for this purpose. The reasons being: It should be possible to find the Access Rights Information in one place and one place only, namely in the descriptive metadata, which, per default, are the metadata displayed in the Access Software (Finding Aids and different viewers). EAD supports the description of potentially very complex hierarchical levels of an IP and can therefore if necessary differentiate access restrictions all the way down to the individual file level. Descriptive metadata are very often added upon Ingest and Finding Aids can thus immediately be populated with this kind of information. The <p> tag in <accessrestrict> is repeatable and can be used in the following way:

EAD example of <accessrestrict>

```
<accessrestrict>
  <p>Restricted</p>
  <p>75</p>
  <p>...</p>
</accessrestrict>
```

If the value of the first <p> is “Restricted” or "" (empty - which also means that it is restricted) the tool will look for a second <p> which specifies the restriction period. “Unrestricted” means that the IP is immediately accessible. The second <p> can contain any text, for example <p>This IP is available 20 years from November 14 2002</p>. Note that the EAD3 schema validates even without the <head> tag inside <accessrestrict>. For more complex scenarios, it is possible to use <chronlist> as follows:

EAD example of <chronlist>

```
<accessrestrict>
  <chronlist>
```

```

<chronitem>
  <daterange>
    <fromdate>01.01.2016</fromdate>
    <todate>01.01.2041</todate>
  </daterange>
  <event>
    <list>
      <item>type of the restriction (e.g. personal data)</item>
      <item>duration of the restriction in years (e.g. 25 years)</item>
      <item>source of the restriction (e.g. Public access law AvTS 7)</item>
      <item>additional description of the access restriction (e.g. The content can be
        made public if personal data is removed from the DIP)</item>
    </list>
  </event>
</chronitem>
</chronlist>
</accessrestrict>

```

5 Bibliography

1. Karin Bredenberg, Björn Skog, Anders Bo Nielsen, Kathrine Hougaard Edsen Johansen, Alex Thirifays, Sven Schlarb, Andrew Wilson, et al. 2018. Common Specification for Information Packages (Csip). ERCIM News. 2.0.0-DRAFT ed. Digital Information LifeCycle Interoperability Standard Board (DILCIS Board). <http://earkcsip.dilcis.eu/>
2. OAIS. 2012. Reference Model for an Open Archival Information System. CCSDS 650.0-M-2 (Magenta Book). CCSDS - Consultative Committee for Space Data Systems. <http://public.ccsds.org/publications/archive/650x0b1.pdf>.
3. PREMIS. 2017. PREMIS Data Dictionary for Preservation Metadata, Version 3.0. The Library of Congress. <https://www.loc.gov/standards/premis/v3/index.html>.

6 Appendices

6.1 Appendix A: E-ARK Information Package METS Example

6.1.1 Example 1: Example of a whole METS document describing an dissemination information package with no representations.

```

<mets:mets xmlns:mets="http://www.loc.gov/METS/" xmlns:csip="https://DILCIS.eu/XML/METS/CSIPExtensionMETS" xmlns:sip="https://DILCIS.eu/XML/METS/SIPExtensionMETS"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xlink="http://www.w3.

```

```

org/1999/xlink" OBJID="uuid-4422c185-5407-4918-83b1-7abfa77de182" LABEL="Accounting
records of 2017" TYPE="OTHER" csip:OTHERTYPE="Accounting" PROFILE="https://eardip
.dilcis.eu/profile/E-ARK-DIP.xml" xsi:schemaLocation="http://www.loc.gov/METS/ http
://www.loc.gov/standards/mets/mets.xsd http://www.w3.org/1999/xlink http://www.loc.
gov/standards/mets/xlink.xsd https://DILCIS.eu/XML/METS/CSIPExtensionMETS https://
eardcsip.dilcis.eu/schema/DILCISExtensionMETS.xsd https://DILCIS.eu/XML/METS/
SIPExtensionMETS https://eardsip.dilcis.eu/schema/DILCISExtensionSIPMETS.xsd">
<mets:metsHdr CREATEDATE="2018-04-24T14:37:49.602+01:00" LASTMODDATE="2018-04-24T14
:37:49.602+01:00" RECORDSTATUS="NEW" csip:OAISPACKAGETYPE="SIP">
  <mets:agent ROLE="CREATOR" TYPE="OTHER" OTHERTYPE="SOFTWARE">
    <mets:name>
      RODA-in
    </mets:name>
    <mets:note csip:NOTETYPE="SOFTWARE VERSION">
      2.1.0-beta.7
    </mets:note>
  </mets:agent>
</mets:metsHdr>
<mets:dmdSec ID="appndx1.dmd.ead" CREATED="2018-04-24T14:37:49.609+01:00" STATUS="
CURRENT">
  <mets:mdRef LOCTYPE="URL" MDTYPE="EAD" MDTYPEVERSION="2002" xlink:type="simple"
xlink:href="metadata/descriptive/ead2002.xml" SIZE="903" CREATED="2018-04-24T14
:37:49.609+01:00" CHECKSUM="
F24263BF09994749F335E1664DCE0086DB6DCA323FDB6996938BCD28EA9E8153" CHECKSUMTYPE=
"SHA-256">
  </mets:mdRef>
</mets:dmdSec>
<mets:amdSec>
  <mets:digiprovMD ID="appndx1.digiprov.premis" CREATED="2018-04-24T14
:37:52.783+01:00">
    <mets:mdRef LOCTYPE="URL" xlink:type="simple" xlink:href="metadata/preservation/
premis1.xml" MDTYPE="PREMIS" MDTYPEVERSION="3.0" MIMETYPE="text/xml" SIZE="
1211" CREATED="2018-04-24T14:37:52.783+01:00" CHECKSUM="8
aa278038dbad54bbf142e7d72b493e2598a94946ea1304dc82a79c6b4bac3d5" CHECKSUMTYPE
="SHA-256" LABEL="premis1.xml">
    </mets:mdRef>
  </mets:digiprovMD>
  <mets:digiprovMD ID="appndx1.digiprov.premis2" CREATED="2018-04-24T14
:47:52.783+01:00">
    <mets:mdRef LOCTYPE="URL" xlink:type="simple" xlink:href="metadata/preservation/
premis2.xml" MDTYPE="PREMIS" MDTYPEVERSION="3.0" MIMETYPE="text/xml" SIZE="
2854" CREATED="2018-04-24T14:37:52.783+01:00" CHECKSUM="
d1dfa585dcc9d87268069dc58d5e47956434ec3db4087a75a3885d287f15126f"

```

```
    CHECKSUMTYPE="SHA-256" LABEL="premis2.xml">
  </mets:mdRef>
</mets:digiprovMD>
</mets:amdSec>
<mets:fileSec ID="appndx1.filesec">
  <mets:fileGrp ID="appndx1.filegrp.doc" USE="Documentation">
    <mets:file ID="appndx1.file.docx" MIMETYPE="application/vnd.openxmlformats-
      officedocument.wordprocessingml.document" SIZE="2554366" CREATED="2012-08-15
      T12:08:15.432+01:00" CHECKSUM="91
      B7A2C0A1614AA8F3DAF11DB4A1C981F14BAA25E6A0336F715B7C513E7A1557" CHECKSUMTYPE=
      "SHA-256" sip:FILEFORMATNAME="Microsoft Word for Windows" sip:
      FILEFORMATVERSION="2007 onwards" sip:FORMATREGISTRY="PRONOM" sip:
      FORMATREGISTRYKEY="fmt/412">
      <mets:FLocat LOCTYPE="URL" xlink:type="simple" xlink:href="documentation/File.
        docx">
    </mets:FLocat>
  </mets:file>
  <mets:file ID="appndx1.file.docx2" MIMETYPE="application/vnd.openxmlformats-
      officedocument.wordprocessingml.document" SIZE="2554366" CREATED="2012-08-15
      T12:08:15.432+01:00" CHECKSUM="91
      B7A2C0A1614AA8F3DAF11DB4A1C981F14BAA25E6A0336F715B7C513E7A1557" CHECKSUMTYPE=
      "SHA-256" sip:FILEFORMATNAME="Microsoft Word for Windows" sip:
      FILEFORMATVERSION="2007 onwards" sip:FORMATREGISTRY="PRONOM" sip:
      FORMATREGISTRYKEY="fmt/412">
      <mets:FLocat LOCTYPE="URL" xlink:type="simple" xlink:href="documentation/File2
        .docx">
    </mets:FLocat>
  </mets:file>
</mets:fileGrp>
<mets:fileGrp ID="appndx1.filegrp.schm" USE="Schemas">
  <mets:file ID="appndx1.file.ead.xsd" MIMETYPE="application/xml" SIZE="123917"
    CREATED="2018-04-24T14:37:49.617+01:00" CHECKSUM="0
    BF9E16ADE296EF277C7B8E5D249D300F1E1EB59F2DCBD89644B676D66F72DCC" CHECKSUMTYPE
    ="SHA-256" sip:FILEFORMATNAME="XML Schema Definition" sip:FORMATREGISTRY="
    PRONOM" sip:FORMATREGISTRYKEY="x-fmt/280">
      <mets:FLocat LOCTYPE="URL" xlink:type="simple" xlink:href="schemas/ead2002.xsd
        ">
    </mets:FLocat>
  </mets:file>
</mets:fileGrp>
<mets:fileGrp ID="appndx1.filegrp.reps" USE="Representations/Submission/Data" csip
  :CONTENTINFORMATIONTYPE="SIARDDK">
  <mets:file ID="appndx1.file.siard" MIMETYPE="application/xml" SIZE="1338744"
```

```

    CREATED="2018-04-24T14:37:49.617+01:00" CHECKSUM="7176
    A627870CFA3854468EC43C5A56F9BD8B30B50A983B8162BF56298A707667" CHECKSUMTYPE="
    SHA-256" ADMID="appndx1.digiprov.premis2 appndx1.digiprov.premis" sip:
    FILEFORMATNAME="Extensible Markup Language" sip:FILEFORMATVERSION="1.0" sip:
    FORMATREGISTRY="PRONOM" sip:FORMATREGISTRYKEY="fmt/101">
    <mets:FLocat LOCTYPE="URL" xlink:type="simple" xlink:href="representations/
    submission/data/SIARD.xml">
    </mets:FLocat>
  </mets:file>
</mets:fileGrp>
</mets:fileSec>
<mets:structMap ID="appndx1.structmap" TYPE="PHYSICAL" LABEL="CSIP">
  <mets:div ID="appndx1.div.struct" LABEL="uuid-4422c185-5407-4918-83b1-7abfa77de182"
  >
    <mets:div ID="appndx1.div.md" LABEL="Metadata" ADMID="appndx1.digiprov.premis
    appndx1.digiprov.premis2" DMDID="appndx1.dmd.ead">
    </mets:div>
    <mets:div ID="appndx1.div.doc" LABEL="Documentation">
      <mets:fptr FILEID="appndx1.filegrp.doc">
      </mets:fptr>
    </mets:div>
    <mets:div ID="appndx1.div.schm" LABEL="Schemas">
      <mets:fptr FILEID="appndx1.filegrp.schm">
      </mets:fptr>
    </mets:div>
    <mets:div ID="appndx1.div.reps" LABEL="Representations">
      <mets:fptr FILEID="appndx1.filegrp.reps">
      </mets:fptr>
    </mets:div>
  </mets:div>
</mets:structMap>
</mets:mets>

```

6.2 Appendix B: External Schema

6.2.1 E-ARK SIP METS Extension

Location: <http://earksip.dilcis.eu/schema/DILCISExtensionSIPMETS.xsd>

Context: XML-schema for the attributes added by SIP and reused in the DIP

Note: An extension schema with the added attributes for use in this profile. The schema is used with a namespace prefix of sip.

6.3 Appendix C: External Vocabularies

6.3.1 OAIS Package type

Maintained By: DILCIS Board

Location: <http://earkcsip.dilcis.eu/schema/CSIPVocabularyOAISPackageType.xml>

Context: Values for `@csip:OAISPACKAGETYPE`

Note: Describes the OAIS type the package belongs to in the OAIS reference model.

6.3.2 dmdSec status

Maintained By: DILCIS Board

Location: <http://earkcsip.dilcis.eu/schema/CSIPVocabularyStatus.xml>

Context: Values for `dmdSec/@STATUS`

Note: Describes the status of the descriptive metadata section (dmdSec) which is supported by the profile.

6.4 Appendix D: E-ARK DIP Metadata Requirements

6.4.1 E-ARK DIP METS Profile Requirements

ID	Name, Location & Description	Card & Level
DIP1	<p>Package Identifier</p> <p><code>mets/@OBJID</code></p> <p>Note that the value of the <code>mets/@OBJID</code> attribute for the DIP is expected to be different from the SIP and AIP to reflect the creation of a new package.</p>	1..1 MUST
DIP2	<p>METS Profile</p> <p><code>mets/@PROFILE</code></p> <p>The value is set to “https://earkdip.dilcis.eu/profile/E-ARK-DIP.xml”.</p>	1..1 MUST
DIP3	<p>OAIS Package type information</p> <p><code>metsHdr[@csip:OAISPACKAGETYPE='DIP']</code></p> <p>The in CSIP added attribute <code>@csip:OAISPACKAGETYPE</code> is used with the value “DIP”.</p>	1..1 MUST
DIP4	<p>Status of the descriptive metadata</p> <p><code>dmdSec/@STATUS</code></p> <p>Indicates the status of the package using a fixed vocabulary. The status SHOULD in a DIP be set to “CURRENT”.</p>	0..1 SHOULD

ID	Name, Location & Description	Card & Level
REF_CSIP_Administrative metadata	N/A The DIP amdSec element should comply with amdSec requirements in the CSIP profile.	N/A SHOULD
REF_CSIP_File section	N/A The DIP fileSec element should comply with fileSec requirements in the CSIP profile.	N/A SHOULD
REF_CSIP_Structural description of the package	N/A The DIP structMap element should comply with structMap requirements in the CSIP profile.	N/A SHOULD
REF_METS_structLink	N/A Section not defined or used in CSIP or DIP, additional own uses may occur. Information regarding the structural links is found in the METS Primer	N/A MAY
REF_METS_behaviorSec	N/A Section not defined or used in CSIP or DIP, additional own uses may occur. Information regarding the behavior section is found in the METS Primer	N/A MAY

7 Introduction

7.1 Definition of a DIP

The OAIS reference model defines a DIP as:

An Information Package, derived from one or more AIPs, and sent by Archives to the Consumer in response to a request to the OAIS.

The definition of an E-ARK DIP is that it corresponds to a CSIP which is ready to be processed by its designated Access Software; if it is not suited for processing and rendering by its designated Access Software, it is not (yet) a DIP. This is a very generic, but handy, definition. To be more specific, an E-ARK DIP is:

- an IP which is sent (or is ready to be sent) to the user in an Access environment;
- supported by tools, i.e. can be rendered by Access Software.

First of all, the DIP looks like the AIP: It replicates the structure of the AIP from which it is derived. It also inherits

metadata as well as the intellectual entities of the AIP. An E-ARK AIP may in its entirety therefore also be a E-ARK DIP, however in most cases it is necessary to convert from an AIP to a DIP. The DIP allows for example for the inclusion of new DIP representation formats, which are more user-friendly than the AIP formats that are intended for long-term preservation purposes. It also allows for the updating of the metadata as well as for the addition of new metadata elements. Representation Information, which is required for rendering and understanding the intellectual content, might also be added, and as a direct consequence, there may be a need for new folders and files, for example within the “Documentation” folder.

8 Structure

The folder structure of an E-ARK DIP must comply with the requirements for the folder structure for a CSIP, see Folder structure of the CSIP.

The CSIP folder structure and its requirements is visualised in the figure below:



Figure 2: IP Folder Structure

- Blue boxes represent folders
- Yellow boxes represent files.
- Boxes with full lines represent mandatory files/folders
- Boxes with dotted lines represent optional files/folders.

As can be seen from the figure - the requirements for the folder structure for a CSIP is at a bare minimum and makes it

possible to have several extra optional folders and files in a CSIP (see boxes with dotted lines). The first thing to be said about the E-ARK DIP structure in regard to CSIP structure is that an E-ARK DIP will always consist of some of those files and folders that are optional in the CSIP minimum structure. There must be data to disseminate. Since the definition of an E-ARK DIP is that it corresponds to a CSIP which is ready to be processed by its designated Access Software, this leaves the question as to which data in the CSIP should be chosen to be encompassed in the E-ARK DIP.

It is possible that an AIP in its current state and in its entirety can be delivered to a Consumer as is and still be considered an E-ARK DIP. That E-ARK DIP can contain the submission representation, and one or more preservation representations. Often, however, the OAIS is interested in leaving out irrelevant data and metadata and only present the Consumer with the data and metadata that the Consumer is interested in. This could be isolated to the content in one single representation in an E-ARK AIP, or maybe only a portion of a single representation in an E-ARK AIP. Maybe even only one specific file. The point here is that a plethora of different E-ARK DIPs can be created out of an E-ARK AIP or several E-ARK AIPs.

9 Content Information Types

Content Information is “A set of information that is the original target of preservation or that includes part or all of that information. It is an Information Object composed of its Content Data Object and its Representation Information” according to the OAIS Reference Model.

A Content Information Type can therefore be understood as a category of Content Information, for example relational databases, scientific data, electronic records management systems, digitised maps, etc..

According to the Common Specification for Information Package it is possible to create specifications for Content Information Types. It is within these specifications that requirements and descriptions related to the specific Content Information Type is described. The DIP specification can not describe how each Content Information Type should be disseminated and therefore the DIP specification sets out requirements on how Content Information Type specifications should handle DIP requirements.

- A Content Information Type specification should have a section which sole focus is on describing DIP requirements and/or recommendations
 - The DIP section should describe how to read/edit access rights
 - The DIP section should describe how to register access software
 - The DIP section could mention and list relevant access software for the Content Information Type

10 Metadata

The DIP metadata is based upon the existing CSIP, E-ARK SIP and E-ARK AIP specifications. The metadata descriptions provided in this document cover the three core metadata categories:

- structural (see METS)
- preservation (see PREMIS)
- descriptive (see EAD)

It must be stated that the CSIP allows for and makes a distinction between preservation metadata and descriptive metadata (or Descriptive Information according to OAIS). One of the challenges when dividing metadata between preservation metadata and descriptive metadata is that the current metadata standards do not operate with the same distinction. Access rights information can for example both be stored in EAD (descriptive metadata) and in PREMIS (preservation metadata) or in METS. This leaves the question - where should this access and dissemination information be registered? This E-ARK DIP specification describes two ways of using EAD and PREMIS for registering Access Rights and Access Software. These are possible ways and not yet recommendations.

10.1 METS

METS (Metadata Encoding and Transmission Standard) is a standard for encoding descriptive, administrative, and structural metadata expressed using the XML Schema Language. The use of METS is mandatory if it must comply with CSIP. See CSIP for the general use of METS in information packages.

The differences between a METS instance for an E-ARK DIP vs an E-ARK AIP are small. Actually, most of the metadata differences between an AIP and a DIP are in the descriptive metadata or preservation metadata such as EAD and PREMIS.

Below is a broad overview of the METS file.

Elements	Values	Comments
mets		
metsHdr		
agent		software or archivist creating the DIP
dmdSec		
mdRef	<i>EAD</i>	information about descriptive metadata files (e.g EAD)
amdSec		
mdRef	<i>PREMIS</i>	information about preservation metadata files (e.g PREMIS)
fileSec		
fileGrp	<i>Common Specification root</i>	
fileGrp	<i>metadata</i>	
fileGrp	<i>representations</i>	normally only one repr. in the DIP

Elements	Values	Comments
	fileGrp <i>schemas</i>	
	fileGrp <i>documentation</i>	
structMap		
div	<i>metadata</i>	
div	<i>representations</i>	mets pointer to mets file for the repr.
div	<i>schemas</i>	
div	<i>documentation</i>	

In the following the major differences between an XML instance for METS for an E-ARK DIP vs an E-ARK AIP are listed.

10.1.1 Node level: mets root

ID	Name, Location & Description	Card & Level
DIP1	Package Identifier <i>mets/@OBJID</i> Note that the value of the <i>mets/@OBJID</i> attribute for the DIP is expected to be different from the SIP and AIP to reflect the creation of a new package.	1..1 MUST
DIP2	METS Profile <i>mets/@PROFILE</i> The value is set to "https://eardip.dilcis.eu/profile/E-ARK-DIP.xml".	1..1 MUST

Example: METS root element illustrating the use of a custom *csip:@OTHERCONTENTINFORMATIONTYPE* attribute value when the correct content type value does not exist in the vocabulary. The *csip:@CONTENTINFORMATIONTYPE* attribute value is set to OTHER.

```
<mets:mets xmlns:mets="http://www.loc.gov/METS/" xmlns:csip="https://DILCIS.eu/XML/METS/CSIPExtensionMETS" xmlns:sip="https://DILCIS.eu/XML/METS/SIPExtensionMETS" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xlink="http://www.w3.org/1999/xlink" OBJID="uuid-4422c185-5407-4918-83b1-7abfa77de182" LABEL="Sample E-ARK DIP Information Package" TYPE="Datasets" csip:CONTENTINFORMATIONTYPE="OTHER" csip:OTHERCONTENTINFORMATIONTYPE="Own defined content information type" PROFILE="
```

```

https://earkdip.dilcis.eu/profile/E-ARK-DIP.xml" xsi:schemaLocation="http://www.loc.gov/METS/ http://www.loc.gov/standards/mets/mets.xsd http://www.w3.org/1999/xlink http://www.loc.gov/standards/mets/xlink.xsd https://DILCIS.eu/XML/METS/CSIPEXtensionMETS https://earkcsip.dilcis.eu/schema/DILCISEXtensionMETS.xsd https://DILCIS.eu/XML/METS/SIPEXtensionMETS https://earksip.dilcis.eu/schema/DILCISEXtensionSIPMETS.xsd">
</mets:mets>

```

Example: METS root element showing use of `csip:@OTHERTYPE` attribute when an appropriate package content category value is not available in the vocabulary. The `@TYPE` attribute value is set to OTHER.

```

<mets:mets xmlns:mets="http://www.loc.gov/METS/" xmlns:csip="https://DILCIS.eu/XML/METS/CSIPEXtensionMETS" xmlns:sip="https://DILCIS.eu/XML/METS/SIPEXtensionMETS" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xlink="http://www.w3.org/1999/xlink" OBJID="uid-4422c185-5407-4918-83b1-7abfa77de182" LABEL="Sample E-ARK DIP Information Package" TYPE="OTHER" csip:OTHERTYPE="Patterns" PROFILE="https://earkdip.dilcis.eu/profile/E-ARK-DIP.xml" xsi:schemaLocation="http://www.loc.gov/METS/ http://www.loc.gov/standards/mets/mets.xsd http://www.w3.org/1999/xlink http://www.loc.gov/standards/mets/xlink.xsd https://dilcis.eu/XML/METS/CSIPEXtensionMETS https://earkcsip.dilcis.eu/schema/DILCISEXtensionMETS.xsd https://DILCIS.eu/XML/METS/SIPEXtensionMETS https://earksip.dilcis.eu/schema/DILCISEXtensionSIPMETS.xsd">
</mets:mets>

```

10.1.2 Node level: metsHdr

ID	Name, Location & Description	Card & Level
DIP3	OAIS Package type information <code>metsHdr[@csip:OAISPACKAGETYPE='DIP']</code> The in CSIP added attribute <code>@csip:OAISPACKAGETYPE</code> is used with the value "DIP".	1..1 MUST

Example: METS agent example of the mandatory agent

```

<mets:metsHdr CREATEDATE="2018-04-24T14:37:49.602+01:00" LASTMODDATE="2018-04-24T14:37:49.602+01:00" RECORDSTATUS="NEW" csip:OAISPACKAGETYPE="DIP">

```

```

<mets:agent ROLE="CREATOR" TYPE="OTHER" OTHERTYPE="SOFTWARE">
  <mets:name>
    RODA-in
  </mets:name>
  <mets:note csip:NOTETYPE="SOFTWARE VERSION">
    2.1.0-beta.7
  </mets:note>
</mets:agent>
</mets:metsHdr>

```

10.1.3 Node level: dmdSec

ID	Name, Location & Description	Card & Level
DIP4	Status of the descriptive metadata dmdSec/@STATUS Indicates the status of the package using a fixed vocabulary. The status SHOULD in a DIP be set to "CURRENT".	0..1 SHOULD

Example: METS example of referencing the descriptive metadata which is described with an EAD document

```

<mets:dmdSec ID="dmdExmpl.ead" CREATED="2018-04-24T14:37:49.609+01:00" STATUS="CURRENT">
  <mets:mdRef LOCTYPE="URL" MDTYPE="EAD" xlink:type="simple" xlink:href="metadata/descriptive/ead2002.xml" MIMETYPE="application/xml" SIZE="903" CREATED="2018-04-24T14:37:49.609+01:00" CHECKSUM="F24263BF09994749F335E1664DCE0086DB6DCA323FDB69969338BCD28EA9E8153" CHECKSUMTYPE="SHA-256">
  </mets:mdRef>
</mets:dmdSec>

```

10.1.4 Node level: amdSec

ID	Name, Location & Description	Card & Level
REF_CSIP_	Administrative metadata N/A The DIP amdSec element should comply with amdSec requirements in the CSIP profile.	N/A SHOULD

10.1.5 Node level: fileSec

ID	Name, Location & Description	Card & Level
REF_CSIP_	File section N/A The DIP fileSec element should comply with fileSec requirements in the CSIP profile.	N/A SHOULD

10.1.6 Node level: structMap

ID	Name, Location & Description	Card & Level
REF_CSIP_	Structural description of the package N/A The DIP structMap element should comply with structMap requirements in the CSIP profile.	N/A SHOULD

10.2 PREMIS

PREMIS (Preservation Metadata: Implementation Strategies) is a standard that mainly caters for long-term preservation and technical usability, which for example is used to facilitate a range of preservation strategies including migration and emulation. From an Access perspective, PREMIS especially satisfies the requirements pertaining to the recording of Representation Information. It is practical to state in a formalised and consistent way how the Access Software should behave and where it should look when dealing with different pieces of information, such as which representation formats are included in the DIP.

10.2.1 Metadata regarding Representations and Access Software

In PREMIS, a representation is a “set of files, including structural metadata, needed for a complete and reasonable rendition of an Intellectual Entity.” See PREMIS Editorial Committee (2015). “PREMIS Data Dictionary for Preservation

Metadata”, p.8.

One of the core concepts in PREMIS is the above formulated definition of a representation, but it is also important to note that the CSIP structure also incorporates physical management of different representations. When implementing PREMIS in CSIPs one must therefore choose if there must exist PREMIS files at representation level or at root level only (see CSIP) and one must also choose how fine-grained each description should be.

To enable rendition, three pieces of information are needed in PREMIS: One identifying the representation to be rendered; one identifying the software to enable this; and one establishing a relationship between the two.

The descriptions below therefore show how to:

1. Describe which DIP representation format is contained in the DIP (description 1 below);
2. Describe which piece(s) of Access Software is/are needed to render a specific DIP representation format. Several pieces of software may indeed be needed (description 2 below);
3. Describe the relationship between the DIP representation format and its Access Software (description 3 below).

Description 1 - The description of DIP representation formats

In order to describe the specific DIP representation format the semantic component “1.4 significantProperties” is used. An example is:

```
<object xsi:type="representation">
  <objectIdentifier>
    <objectIdentifierType>filepath\</objectIdentifierType>
    <objectIdentifierValue>xlink:href=\"representations\\AVID.SA.18006.rep0\"</
objectIdentifierValue>
  </objectIdentifier>
  <significantProperties>
    <significantPropertiesType>DIP representation format\</significantPropertiesType
  >
    <significantPropertiesValue>SIARD2\</significantPropertiesValue>
  </significantProperties>
<!-- PREMIS file continues but further elements left out in this example-->
</object>
```

Note that the object type is “representation” and that the objectIdentifierType value is “filepath”, which according to the AIP specification is an IP scope value. The objectIdentifierValue is the file path to the representation folder or could be a file path to a file.

Description 2 - The description of Access Software

In PREMIS 3.0 a description of an environment has become an object itself, so that both non-environmental objects and environmental objects exist. Access Software is therefore an environmental object which per default is an intellectual entity. The semantic unit “1.9 environmentFunction” is conceived to describe the environment object(s) with different levels of granularity. It is suggested to use the vocabulary from Library of Congress. The semantic unit “1.10 environmentDesignation” is used for information identifying the environment by using human-readable language which can be expected to be understood outside of a digital repository.

See the example which follows this vocabulary:

```
<object xsi:type="intellectualEntity">
  <objectIdentifier>
    <objectIdentifierType>local</objectIdentifierType>
    <objectIdentifierValue>DBVTK</objectIdentifierValue>
  </objectIdentifier>
  <environmentFunction>
    <environmentFunctionType>software</environmentFunctionType>
    <environmentFunctionLevel>1</environmentFunctionLevel>
  </environmentFunction>
  <environmentFunction>
    <environmentFunctionType>software application</environmentFunctionType>
    <environmentFunctionLevel>2</environmentFunctionLevel>
  </environmentFunction>
  <environmentDesignation>
    <environmentName>Database Visualization Toolkit</environmentName>
    <environmentVersion>2.4.1</environmentVersion>
    <environmentDesignationNote>Lightweight web viewer for relational databases,
    specially if preserved in SIARD 2, that uses SOLR as a back-end, and allows
    browsing, search, and export. Documentation at github.com/eark-project/software/DBVTK</environmentDesignationNote>
  </environmentDesignation>
</object>
```

Description 3 - The description of the relation between the representations and the Access Software

In order to establish a connection between the DIP representation format to be rendered and the Access Software to render it, it is necessary to use the semantic unit “1.13 relationship”. The relationship element can bind both non-environmental objects together with environmental objects and it can bind environmental objects together with other environmental objects. The following example shows how the DIP representation format can be related to the Access Software:

```

<object xsi:type="representation">
  <objectIdentifier>
    <objectIdentifierType>filepath</objectIdentifierType>
    <objectIdentifierValue>xlink:href="representations\AVID.SA.18006.rep0"</
objectIdentifierValue>
  </objectIdentifier>
  <significantProperties>
    <significantPropertiesType>DIP representation format</significantPropertiesType>
    <significantPropertiesValue>SIARD2</significantPropertiesValue>
  </significantProperties>
  <!-- The following is the relation between the software and the DIP representation
  -->
  <relationship>
    <relationshipType>dependency</relationshipType>
    <relationshipSubType>requires</relationshipSubType>
    <relatedObjectIdentifier>
      <relatedObjectIdentifierType>local</relatedObjectIdentifierType>
      <relatedObjectIdentifierValue>DBVTK</relatedObjectIdentifierValue>
    </relatedObjectIdentifier>
    <relatedEnvironmentPurpose>render</relatedEnvironmentPurpose>
  </relationship>
</object>

```

As can be seen above the nature of the relationship, <relationshipType> is used (value, e.g. “dependency”); intimately linked to this is also the indication of a <relationshipSubType>, e.g. “requires”.

In order to identify the Access Software, which is used to render the representation, the <relatedObjectIdentifier> is employed; and the <relatedEnvironmentPurpose> gives us a hint about what the purpose is (here: to “render”).

Since it is not always possible to render the DIP representation formats with one piece of Access Software, it can be necessary to model software dependencies and sequences between several pieces of software in PREMIS.

10.3 Descriptive metadata - e.g. EAD

Descriptive metadata are used to describe the intellectual contents of archival holdings, and they support finding and understanding individual information packages. The E-ARK DIP allows for the inclusion of any kind of descriptive metadata. The E-ARK project reached the conclusion that EAD was one of the most used. See the full report D3.1 E-ARK Report on Available Best Practices. A common E-ARK EAD guideline is yet to be developed. But for information purposes and since the previous DIP specification described a way to register Access Rights Information the text is given here:

10.3.1 Access restrictions

OAIS states: > Access Rights Information: The information that identifies the access restrictions pertaining > to the Content Information, including the legal framework, licensing terms, and access control. > It contains the access and distribution conditions stated within the Submission Agreement, > related to both preservation (by the OAIS) and final usage (by the Consumer). > It also includes the specifications for the application of rights enforcement measures.

The E-ARK DIP specification does not require that access rights are stored in a specific way since different metadata standards can be applied differently to different Content Information Types. See Content Information Types. Since it is possible to have different metadata information in the metadata folder it is recommended to systematically control where access rights metadata are stored. For example access rights metadata can be stored in both EAD and in PREMIS.

The <accessrestrict> tag is “An element for information about conditions that affect the availability of the materials being described.” See EAD3. The Access Rights Information that concerns the end-user has to be available in EAD - not in PREMIS - and <accessrestrict> is used for this purpose. The reasons being: It should be possible to find the Access Rights Information in one place and one place only, namely in the descriptive metadata, which, per default, are the metadata displayed in the Access Software (Finding Aids and different viewers). EAD supports the description of potentially very complex hierarchical levels of an IP and can therefore if necessary differentiate access restrictions all the way down to the individual file level. Descriptive metadata are very often added upon Ingest and Finding Aids can thus immediately be populated with this kind of information. The <p> tag in <accessrestrict> is repeatable and can be used in the following way:

EAD example of <accessrestrict>

```
<accessrestrict>
  <p>Restricted</p>
  <p>75</p>
  <p>...</p>
</accessrestrict>
```

If the value of the first <p> is “Restricted” or "" (empty - which also means that it is restricted) the tool will look for a second <p> which specifies the restriction period. “Unrestricted” means that the IP is immediately accessible. The second <p> can contain any text, for example <p>This IP is available 20 years from November 14 2002</p>. Note that the EAD3 schema validates even without the <head> tag inside <accessrestrict>. For more complex scenarios, it is possible to use <chronlist> as follows:

EAD example of <chronlist>

```
<accessrestrict>
  <chronlist>
```

```

<chronitem>
  <daterange>
    <fromdate>01.01.2016</fromdate>
    <todate>01.01.2041</todate>
  </daterange>
  <event>
    <list>
      <item>type of the restriction (e.g. personal data)</item>
      <item>duration of the restriction in years (e.g. 25 years)</item>
      <item>source of the restriction (e.g. Public access law AvTS 7)</item>
      <item>additional description of the access restriction (e.g. The content can be
        made public if personal data is removed from the DIP)</item>
    </list>
  </event>
</chronitem>
</chronlist>
</accessrestrict>

```

11 Bibliography

1. Karin Bredenberg, Björn Skog, Anders Bo Nielsen, Kathrine Hougaard Edsen Johansen, Alex Thirifays, Sven Schlarb, Andrew Wilson, et al. 2018. Common Specification for Information Packages (Csip). ERCIM News. 2.0.0-DRAFT ed. Digital Information LifeCycle Interoperability Standard Board (DILCIS Board). <http://earkcsip.dilcis.eu/>
2. OAIS. 2012. Reference Model for an Open Archival Information System. CCSDS 650.0-M-2 (Magenta Book). CCSDS - Consultative Committee for Space Data Systems. <http://public.ccsds.org/publications/archive/650x0b1.pdf>.
3. PREMIS. 2017. PREMIS Data Dictionary for Preservation Metadata, Version 3.0. The Library of Congress. <https://www.loc.gov/standards/premis/v3/index.html>.

12 Appendices

12.1 Appendix A: E-ARK Information Package METS Example

12.1.1 Example 1: Example of a whole METS document describing an dissemination information package with no representations.

```

<mets:mets xmlns:mets="http://www.loc.gov/METS/" xmlns:csip="https://DILCIS.eu/XML/METS/CSIPExtensionMETS" xmlns:sip="https://DILCIS.eu/XML/METS/SIPExtensionMETS"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xlink="http://www.w3.

```

```

org/1999/xlink" OBJID="uuid-4422c185-5407-4918-83b1-7abfa77de182" LABEL="Accounting
records of 2017" TYPE="OTHER" csip:OTHERTYPE="Accounting" PROFILE="https://eardip
.dilcis.eu/profile/E-ARK-DIP.xml" xsi:schemaLocation="http://www.loc.gov/METS/ http
://www.loc.gov/standards/mets/mets.xsd http://www.w3.org/1999/xlink http://www.loc.
gov/standards/mets/xlink.xsd https://DILCIS.eu/XML/METS/CSIPExtensionMETS https://
eardcsip.dilcis.eu/schema/DILCISExtensionMETS.xsd https://DILCIS.eu/XML/METS/
SIPExtensionMETS https://eardsip.dilcis.eu/schema/DILCISExtensionSIPMETS.xsd">
<mets:metsHdr CREATEDATE="2018-04-24T14:37:49.602+01:00" LASTMODDATE="2018-04-24T14
:37:49.602+01:00" RECORDSTATUS="NEW" csip:OAISPACKAGETYPE="SIP">
  <mets:agent ROLE="CREATOR" TYPE="OTHER" OTHERTYPE="SOFTWARE">
    <mets:name>
      RODA-in
    </mets:name>
    <mets:note csip:NOTETYPE="SOFTWARE VERSION">
      2.1.0-beta.7
    </mets:note>
  </mets:agent>
</mets:metsHdr>
<mets:dmdSec ID="appndx1.dmd.ead" CREATED="2018-04-24T14:37:49.609+01:00" STATUS="
CURRENT">
  <mets:mdRef LOCTYPE="URL" MDTYPE="EAD" MDTYPEVERSION="2002" xlink:type="simple"
xlink:href="metadata/descriptive/ead2002.xml" SIZE="903" CREATED="2018-04-24T14
:37:49.609+01:00" CHECKSUM="
F24263BF09994749F335E1664DCE0086DB6DCA323FDB6996938BCD28EA9E8153" CHECKSUMTYPE=
"SHA-256">
  </mets:mdRef>
</mets:dmdSec>
<mets:amdSec>
  <mets:digiprovMD ID="appndx1.digiprov.premis" CREATED="2018-04-24T14
:37:52.783+01:00">
    <mets:mdRef LOCTYPE="URL" xlink:type="simple" xlink:href="metadata/preservation/
premis1.xml" MDTYPE="PREMIS" MDTYPEVERSION="3.0" MIMETYPE="text/xml" SIZE="
1211" CREATED="2018-04-24T14:37:52.783+01:00" CHECKSUM="8
aa278038dbad54bbf142e7d72b493e2598a94946ea1304dc82a79c6b4bac3d5" CHECKSUMTYPE
="SHA-256" LABEL="premis1.xml">
    </mets:mdRef>
  </mets:digiprovMD>
  <mets:digiprovMD ID="appndx1.digiprov.premis2" CREATED="2018-04-24T14
:47:52.783+01:00">
    <mets:mdRef LOCTYPE="URL" xlink:type="simple" xlink:href="metadata/preservation/
premis2.xml" MDTYPE="PREMIS" MDTYPEVERSION="3.0" MIMETYPE="text/xml" SIZE="
2854" CREATED="2018-04-24T14:37:52.783+01:00" CHECKSUM="
d1dfa585dcc9d87268069dc58d5e47956434ec3db4087a75a3885d287f15126f"

```

```

    CHECKSUMTYPE="SHA-256" LABEL="premis2.xml">
  </mets:mdRef>
</mets:digiprovMD>
</mets:amdSec>
<mets:fileSec ID="appndx1.filesec">
  <mets:fileGrp ID="appndx1.filegrp.doc" USE="Documentation">
    <mets:file ID="appndx1.file.docx" MIMETYPE="application/vnd.openxmlformats-
      officedocument.wordprocessingml.document" SIZE="2554366" CREATED="2012-08-15
      T12:08:15.432+01:00" CHECKSUM="91
      B7A2C0A1614AA8F3DAF11DB4A1C981F14BAA25E6A0336F715B7C513E7A1557" CHECKSUMTYPE=
      "SHA-256" sip:FILEFORMATNAME="Microsoft Word for Windows" sip:
      FILEFORMATVERSION="2007 onwards" sip:FORMATREGISTRY="PRONOM" sip:
      FORMATREGISTRYKEY="fmt/412">
    <mets:FLocat LOCTYPE="URL" xlink:type="simple" xlink:href="documentation/File.
      docx">
    </mets:FLocat>
  </mets:file>
  <mets:file ID="appndx1.file.docx2" MIMETYPE="application/vnd.openxmlformats-
      officedocument.wordprocessingml.document" SIZE="2554366" CREATED="2012-08-15
      T12:08:15.432+01:00" CHECKSUM="91
      B7A2C0A1614AA8F3DAF11DB4A1C981F14BAA25E6A0336F715B7C513E7A1557" CHECKSUMTYPE=
      "SHA-256" sip:FILEFORMATNAME="Microsoft Word for Windows" sip:
      FILEFORMATVERSION="2007 onwards" sip:FORMATREGISTRY="PRONOM" sip:
      FORMATREGISTRYKEY="fmt/412">
    <mets:FLocat LOCTYPE="URL" xlink:type="simple" xlink:href="documentation/File2
      .docx">
    </mets:FLocat>
  </mets:file>
</mets:fileGrp>
<mets:fileGrp ID="appndx1.filegrp.schm" USE="Schemas">
  <mets:file ID="appndx1.file.ead.xsd" MIMETYPE="application/xml" SIZE="123917"
    CREATED="2018-04-24T14:37:49.617+01:00" CHECKSUM="0
    BF9E16ADE296EF277C7B8E5D249D300F1E1EB59F2DCBD89644B676D66F72DCC" CHECKSUMTYPE
    ="SHA-256" sip:FILEFORMATNAME="XML Schema Definition" sip:FORMATREGISTRY="
    PRONOM" sip:FORMATREGISTRYKEY="x-fmt/280">
  <mets:FLocat LOCTYPE="URL" xlink:type="simple" xlink:href="schemas/ead2002.xsd
    ">
  </mets:FLocat>
</mets:file>
</mets:fileGrp>
<mets:fileGrp ID="appndx1.filegrp.reps" USE="Representations/Submission/Data" csip
  :CONTENTINFORMATIONTYPE="SIARDDK">
  <mets:file ID="appndx1.file.siard" MIMETYPE="application/xml" SIZE="1338744"

```

```

    CREATED="2018-04-24T14:37:49.617+01:00" CHECKSUM="7176
    A627870CFA3854468EC43C5A56F9BD8B30B50A983B8162BF56298A707667" CHECKSUMTYPE="
    SHA-256" ADMID="appndx1.digiprov.premis2 appndx1.digiprov.premis" sip:
    FILEFORMATNAME="Extensible Markup Language" sip:FILEFORMATVERSION="1.0" sip:
    FORMATREGISTRY="PRONOM" sip:FORMATREGISTRYKEY="fmt/101">
    <mets:FLocat LOCTYPE="URL" xlink:type="simple" xlink:href="representations/
    submission/data/SIARD.xml">
    </mets:FLocat>
  </mets:file>
</mets:fileGrp>
</mets:fileSec>
<mets:structMap ID="appndx1.structmap" TYPE="PHYSICAL" LABEL="CSIP">
  <mets:div ID="appndx1.div.struct" LABEL="uuid-4422c185-5407-4918-83b1-7abfa77de182"
  >
    <mets:div ID="appndx1.div.md" LABEL="Metadata" ADMID="appndx1.digiprov.premis
    appndx1.digiprov.premis2" DMDID="appndx1.dmd.ead">
    </mets:div>
    <mets:div ID="appndx1.div.doc" LABEL="Documentation">
      <mets:fptr FILEID="appndx1.filegrp.doc">
      </mets:fptr>
    </mets:div>
    <mets:div ID="appndx1.div.schm" LABEL="Schemas">
      <mets:fptr FILEID="appndx1.filegrp.schm">
      </mets:fptr>
    </mets:div>
    <mets:div ID="appndx1.div.reps" LABEL="Representations">
      <mets:fptr FILEID="appndx1.filegrp.reps">
      </mets:fptr>
    </mets:div>
  </mets:div>
</mets:structMap>
</mets:mets>

```

12.2 Appendix B: External Schema

12.2.1 E-ARK SIP METS Extension

Location: <http://earksip.dilcis.eu/schema/DILCISExtensionSIPMETS.xsd>

Context: XML-schema for the attributes added by SIP and reused in the DIP

Note: An extension schema with the added attributes for use in this profile. The schema is used with a namespace prefix of sip.

12.3 Appendix C: External Vocabularies

12.3.1 OAIS Package type

Maintained By: DILCIS Board

Location: <http://earkcsip.dilcis.eu/schema/CSIPVocabularyOAISPackageType.xml>

Context: Values for `@csip:OAISPACKAGETYPE`

Note: Describes the OAIS type the package belongs to in the OAIS reference model.

12.3.2 dmdSec status

Maintained By: DILCIS Board

Location: <http://earkcsip.dilcis.eu/schema/CSIPVocabularyStatus.xml>

Context: Values for `dmdSec/@STATUS`

Note: Describes the status of the descriptive metadata section (dmdSec) which is supported by the profile.

12.4 Appendix D: E-ARK DIP Metadata Requirements

12.4.1 E-ARK DIP METS Profile Requirements

ID	Name, Location & Description	Card & Level
DIP1	<p>Package Identifier</p> <p><code> mets/@OBJID </code></p> <p>Note that the value of the <code> mets/@OBJID </code> attribute for the DIP is expected to be different from the SIP and AIP to reflect the creation of a new package.</p>	<p>1..1</p> <p>MUST</p>
DIP2	<p>METS Profile</p> <p><code> mets/@PROFILE </code></p> <p>The value is set to “https://earkdip.dilcis.eu/profile/E-ARK-DIP.xml”.</p>	<p>1..1</p> <p>MUST</p>
DIP3	<p>OAIS Package type information</p> <p><code> metsHdr[@csip:OAISPACKAGETYPE='DIP'] </code></p> <p>The in CSIP added attribute <code>@csip:OAISPACKAGETYPE</code> is used with the value “DIP”.</p>	<p>1..1</p> <p>MUST</p>
DIP4	<p>Status of the descriptive metadata</p> <p><code> dmdSec/@STATUS </code></p> <p>Indicates the status of the package using a fixed vocabulary. The status SHOULD in a DIP be set to “CURRENT”.</p>	<p>0..1</p> <p>SHOULD</p>

ID	Name, Location & Description	Card & Level
REF_CSIP_	Administrative metadata N/A The DIP amdSec element should comply with amdSec requirements in the CSIP profile.	N/A SHOULD
REF_CSIP_	File section N/A The DIP fileSec element should comply with fileSec requirements in the CSIP profile.	N/A SHOULD
REF_CSIP_	Structural description of the package N/A The DIP structMap element should comply with structMap requirements in the CSIP profile.	N/A SHOULD
REF_METS_	structLink N/A Section not defined or used in CSIP or DIP, additional own uses may occur. Information regarding the structural links is found in the METS Primer	N/A MAY
REF_METS_	behaviorSec N/A Section not defined or used in CSIP or DIP, additional own uses may occur. Information regarding the behavior section is found in the METS Primer	N/A MAY

Postface

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II. Revision History

Revision No.	Date	Authors(s)	Organisation	Description
2.0-DRAFT	20.12.2018	Phillip Tømmerholt Anders Bo Nielsen	DNA	Review version
2.0-RC	20.03.2019	Phillip Tømmerholt Anders Bo Nielsen	DNA	Corrected typos
2.0-RC2	26.04.2019	Phillip Tømmerholt Anders Bo Nielsen	DNA	Corrected typos
2.0.0	27.05.2019	Phillip Tømmerholt Anders Bo Nielsen	DNA	Align with CSIP
2.0.1	09.09.2019	Carl Wilson Karin Bredenberg	OPF SNA	Layout and PDF Generation
2.0.2	28.10.2019	Karin Bredenberg	SYD	Fixed schema paths.
2.0.4	12.06.2020	Carl Wilson Karin Bredenberg	OPF SYD	Examples fixed and site branding.
2.1.0	15.10.2021	Carl Wilson Karin Bredenberg	OPF SYD	Implementation of the latest publication changes.
2.2.0	15.10.2021	Carl Wilson Karin Bredenberg	OPF SYD	Version updates and publication changes.

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Since the scope of the E-ARK 2014-2017 DIP specification was linked to a reference implementation, specific Content Information Types, and product development with pilot actions it was a 100 pages long document. The scope of this E-ARK DIP Specification is not the same, the document has been shortened heavily and therefore we currently only have two authors credited. This does not mean that the current authors are the only ones behind this specification. We rely heavily on the work previously done.

The authors of this specification would like to thank all national archives, tool developers and other stakeholders who provided valuable knowledge about their requirements for information packages and feedback to this and previous versions of the specification.

IV Contact & Feedback

The E-ARK DIP specification is maintained by the Digital Information LifeCycle Interoperability Standard Board (DILCIS Board). For further information about the DILCIS Board or feedback on the current document please consult the website <http://www.dilcis.eu/> or <https://github.com/dilcisboard> or contact us at info@dilcis.eu.