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# Health informatics — Messages and communication — Web access reference manifest

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# Health informatics — Messages and communication — Web access reference manifest

*Informatique de santé — Messages et communication — Manifeste de référence d'accès à Internet*

Reference number
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# Foreword

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ISO 10159 was prepared by Technical Committee ISO/TC 215, *Health informatics*.

# Introduction

Web access technology is increasingly being used to enable clinicians to share clinical documents, including the results of healthcare procedures such as diagnostic imaging procedures, which can reference image data objects. This can be supported by means of one or more document and data object repositories which enable clinical documents, and any data objects that they reference, to be made available to authorized clinicians who are subject to the same governance rules regarding access to such clinical documents and referenced data objects. A clinician might wish to make clinical documents available to other clinicians whose systems have access to the servers to which his or her system has access.

Several different use cases exist regarding the way in which a clinical document, in the form of e.g. a web page, can be made available by a source clinician to clinicians within a target computational domain in such a way that any objects referenced by the clinical document can be retrieved and presented to the target clinicians. Different use cases exist, depending on whether or not the target clinicians reside in the same computational domain as the clinician who wishes to share documents, which determines whether or not the target clinicians have access to the same servers as the source clinician. The following are some examples.

a) The clinicians work in the same computational domain.

   The source clinician makes the document available to the target domain clinician by making a pointer to the clinical document available to them. The systems used by the target clinicians can display the clinical document text content and any referenced data objects since they have access to the same servers as the source clinician.

b) The target domain clinicians work in another computational domain with indirect access to the originating computational domain servers by means of agreed mechanisms.

   The clinician in the originating computational domain makes the document available to the target clinicians by means of a pointer to the clinical document. The system used by the target clinician can display the clinical document text content and the referenced objects since it has indirect access to the servers referenced by the pointers within the document by agreed means.

c) The target clinicians work in another computational domain within which no access to the originating computational domain servers has yet been implemented.

   In this case, the clinical document can be made available to the target clinicians so that the data objects and clinical document text can be displayed in similar ways to those available in the originating computational domain only by sending copies of the clinical document and referenced objects to the target computational domain where they are stored in target computational domain servers.

   Since the pointers in the clinical document point to servers that are not accessible in the target computational domain, the system that receives the copy files in the target computational domain will be unable to display the referenced files unless some appropriate provisions are made.

   There are two possibilities:

   1) the pointers in the clinical document are changed to point to the appropriate servers in the target computational domain;

   2) the clinical document cannot be changed since it has been digitally signed and requires that a mechanism be implemented to enable the pointers to be changed in real time, i.e. some mechanism to detect pointers that will fail and replace them with the appropriate pointers for use in the target computational domain.

The provisions of this International Standard provide a logical data structure that can support a solution in the case of c) 2) above, in which the original document and the referenced information objects stored in files are sent to the target computational domain together with a manifest of referenced information objects. This manifest consists of a table with one row per referenced object, which includes columns for certain key information as follows:

— the URI as it appears in the original document;

— the Globally Unique Identifier of the information object to be used in the source computational domain (see 3.1.5);

— the Globally Unique Identifier of the information object to be used in the target computational domain;

— the name of the information object;

— the name of the file that contains the information object;

— a security text string containing references to security policies for the control of access to the document, as agreed by the communicating parties;

— a checksum of the content of the file;

— the URI to be used in the source computational domain;

— the URI to be used in the target computational domain, when known;

— a patient identifier to be used in the target computational domain.

Applications in the target computational domain could work in such a way that the URIs within the document are changed from that in the original document to the appropriate value before being sent on to the network. This can be done by looking up the URI value in column 7 of the manifest found in the row having a column 1 URI value equal to the one stored in the original document. Those URIs in documents that have been created in the target computational domain do not have entries in a manifest and are sent unchanged. This functionality could be incorporated within the server application. The standard provisions can be used to enable sharing of documents that are referenced by an IHE XDS Document Registry without the need for further provisions, since referenced data objects are retrieved directly from the server.

The method of using the information in the manifest to overcome the problem of broken links in a particular situation is outside the scope of this International Standard. It is important that institutions adapt their procedures in the way which is most appropriate for them to manage the sharing of documents and information objects referenced by them between different computational domains. The maintenance of the locally stored copies of manifest content could be enabled through the use of the demographics information contained in the header section of the manifest.

This International Standard presumes that the enabling governance agreements and mechanisms to allow sharing of manifests (and their embedded URIs) have already been established. The methods described here are simply for the purpose of ensuring that “packages” of related documents can be copied to a target destination and the original URIs in the referencing document can be redirected to the target URIs in the target computational domain.

It should be understood that the original URIs are not used in the target domain. The source domain will, of course, not fill in the target items of the manifest. It should also be understood that the transformation of the source domain URIs to the target domain URIs does not necessarily require the target URIs be stored in the manifest. It is anticipated that the manifest could constitute a source of traceability for the transformation of the URI references from source to target. If the target URIs are recorded in the manifest after the transformation, then the content of the manifest can be used to assist in addressing any problems of access or presentation that arise during use in the target domain. In this case, the manifest is not a temporary object, but something retained for these purposes and the recording of the destination URIs is helpful. It is also the case that a method for handling the translation of URIs could depend on a persistent manifest. It is necessary to support

the case that it is not possible to amend the original referencing document, e.g. if it has been digitally signed. Should the target organization have other methods for traceability of the transformation, then of course the destination manifest need not persist.

This International Standard expresses a logical data structure.

INTERNATIONAL STANDARD ISO 10159:2011(E)

# Health informatics — Messages and communication — Web access reference manifest

## 1 Scope

This International Standard specifies the format of a manifest of web access reference pointers, information object identifiers, information object filenames and associated information required by a target IT system. This enables local web access to the referenced information objects when a package containing the referencing document, the manifest and the objects (stored in files) is sent from a source clinical domain to a target clinical domain in which the server references are different from those in the source clinical domain.

The following topics are outside the scope of this International Standard:

— technologies used for data storage and communication;

— support for the traceability of the transformation of the URI references from source to target in the case of sending of files received by a target IT system to another clinical domain.

## 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 18232, *Health informatics — Messages and communication — Format of length limited globally unique string identifiers*

## 3 Terms, definitions and abbreviations

For the purposes of this document, the following terms, definitions and abbreviations apply.

### 3.1 Definitions

**3.1.1**
**information object**
well-defined piece of information, definition, or specification which requires a name in order to identify its use in communication

NOTE Adapted from ISO/IEC 8824-1.

**3.1.2**
**object identifier**
value, distinguishable from all other such values, which is associated with an information object

NOTE Adapted from ISO/IEC 8824-1.

**3.1.3**
**data object identifier**
sequence of integer components, constructed as specified in ISO/IEC 8824-1, which has a root sequence of components issued by a national standards body and a sequence of following integer components whose uniqueness is guaranteed by the organization which defined it

NOTE The root sequence of components is guaranteed to be globally unique by that national body registered as specified by ISO/IEC 9834-8.

**3.1.4**
**unique identifier**
identifier which is different from any other such identifier within a given namespace

**3.1.5**
**globally unique identifier**
identifier that is different from any other such identifier in any clinical domain namespace

**3.1.6**
**globally unique string identifier**
alphanumeric string with a maximum length of 64 characters, which is different from any other alphanumeric string that has been or will be exchanged according to the provisions of this International Standard

**3.1.7**
**computational domain**
a domain within which all IT systems can access the same set of servers

### 3.2 Abbreviated terms

GUSI Globally Unique String Identifier, as specified in ISO 18232

URI A string of characters used to identify a resource on the Internet

## 4 Manifest logical data format

### 4.1 Manifest header

#### 4.1.1 Identification information

The following information shall be included within the header section of the manifest in order to uniquely identify the document source, and the subject of care:

— document source organisation identification;

— document repository identification;

— subject of care identification.

#### 4.1.2 Demographic characteristics

The following information may be included within the header section of the manifest in order to facilitate the correct identification of the subject of care in the event that the sender and recipient of a document do not use the same identifier:

— family name;

— given name;

— date of birth;

— place of birth;

— home address as free text;

— post code;

— country;

— other relevant information.

### 4.2 Manifest data items

The entry in the manifest for each referenced data object shall include the following data:

— the URI as it appears in the document created in the source organisation;

— the URI used in the destination organisation;

— the GUSI of the target information object created in the source organisation;

— the GUSI of the target information object created in the destination organisation, if such exists;

— the name of the target information object;

— the name of the file which contains the target information object;

— the checksum of the file content;

— a globally unique patient identifier allocated by the recipient system in the target computational domain to be used for local information management;

— the security text string containing references to policies for the control of access as used in the document originating computational domain, represented as a coding scheme designator and a code meaning;

— the security text string containing references to policies for the control of access as used in the document target computational domain, represented as a coding scheme designator and a code meaning.

See Annex A for an example use of the manifest entries. See Annex D for a representation of a spreadsheet and XML example.

# Annex A
(informative)

# Example use of manifest values

The procedures for use of the manifest entries shall be agreed by the communicating parties before export of information.

**Table A.1 — Example use of manifest values**

| | Manifest entry | General use | Objects referenced within an IHE XDS Registry |
|---|---|---|---|
| 1 | The URI as it appears in the document created in the source computational domain | | |
| 2 | The URI to be used in the destination computational domain | Value provided by the recipient application that stored the object in the target computational domain | Provided by an application that is packaged with an XDS Repository actor |
| 3 | A GUSI of the target information object created in the source computational domain | May already exist or may be created by the application that exports the files (perhaps better to say “already existing or created by the application that exports the information object”) | Good practice is to use the OID allocated by the original document source as recorded in the registry |
| 4 | A GUSI of the target information object created in the destination computational domain | Good practice is to use item 3. However, it might be that a target computational domain uses a different format allowed by ISO 18232 than that used within the target computational domain, in which case a new GUSI should be created by the recipient application | Good practice is to use the OID allocated by the original document source as recorded in the registry |
| 5 | The Security text string containing references to policies for the control of access rights as used in the source computational domain | This property is to be used to represent one or more references to policies or term lists that are used by the source systems to negotiate access control permissions | Good practice is to use the code as recorded in the registry |
| 6 | The Security text string containing references to policies for the control of access rights as used in the target computational domain | This property is to be used to represent one or more references to policies or term lists that are used by the destination systems to negotiate access control permissions based on the content of item 5 above | Mapping from item 5 as specified in the agreement between the two computational domains |
| 7 | The name of the target information object | | |
| 8 | The name of the file which contains the target information object | | |
| 9 | The checksum of the file content | Can be used as a check on file integrity | May be as recorded in the source computational domain registry, if such exists |
| 10 | Globally unique patient identifier | Allocated by the target system on receipt of the first manifest for the patient to support a master manifest management or local registry | Could be the XDS patient identifier, if available. Can be used to manage the maintenance of multiple manifests for a number of patients |

# Annex B
(informative)

# General files import

The following is a suggested method of using the content of the manifests.

The recipient application first determines whether the patient is known through the receipt of a previous manifest for him or her. If not, a Globally Unique String Identifier is created (see item 3 in Annex A).

The target computational domain application then performs the following for each document in a received set:

a) it stores the document in a local archive;

b) it performs a query to determine the URI of the document in the target computational domain;

c) it enters the target URI value in the manifest;

d) it submits the manifest to an application that adds the entry to the local grand manifest containing an entry for all URI value that needs to amended.

An application in the target computational domain intercepts URIs and amends those which include a URI contained in any manifest entry by replacing the original URI with the URI in the target computational domain.

# Annex C
(informative)

# IHE XDS files import

Support for the export of files that are referenced within an XDS Document Registry in the source computational domain is the same as that for files that are not referenced in an IHE-XDS Registry. However, the referenced files should be stored in a repository which can be accessed by the application that displays the clinical document, as was the case in the source computational domain.

— The fact that a document containing URIs and the associated mark-up documents has been copied from another computational domain (in other words XDS CA) does not apply as there is no need to reference back to the source computational domain.

— Before the copied document is placed in the XDS repository, the redirection of the URIs to the target URI address using the WARM methodology and manifest should be done.

# Annex D
(informative)

# Manifest item representation

## D.1 Spreadsheet representation

The logical data structure defined in this International Standard can be represented entirely by means of text strings. These can be easily represented in a spreadsheet where each column corresponds to one manifest data entry and each row to the entries for one data object. The data can be conveniently exchanged using a csv file within which the data items are separated by tab characters.

## D.2 XML representation example

Some implementation may wish to use XML representation. The following is an incomplete example.

```
<?xml version="1.0" encoding="UTF-8"?>
<Warm xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
   <!-WARM Manifest Header Section-->
   <WARM_Manifest_Header>
      <Source_Institution>
         <InstitutionNameAddr>Radiology Department, The Remote Hospital,
Oldtown</InstitutionNameAddr>
         <SourceClinicalDomain>
            <CodingSchemeDesignator>UKAFC1</CodingSchemeDesignator>
            <CodeValue>908.4</CodeValue>
            <CodeMeaning>Humber</CodeMeaning>
         </SourceClinicalDomain>
      <SourcePatientID>H7638290</SourcePatientID>
      <PatientDetails>
         <name>
            <family>Brown</family>
            <given>Nicholas</given>
         </name>
         <birthDate value="20/04/1964"/>
         <Place_of_birth>London</Place_of_birth
         <addr>
         <address line 1>Flat 2</address line 1>
            <address line 2>121 Best Street</address line 2>
            <Town>London</Town>
            <postalCode>NW3 8XZ</postalCode>
            <country>United Kingdom</country>
         </addr>
      </PatientDetails>
   </WARM_Manifest_Header>
   <!-WARM Manifest Entries Section-->
   <WARM_manifest_Item_1>
      <Source_http_request=" http://www.Humber.Archive/H7638290/apimage.jpg" />
      <Target_http_request=" http://www.Server.B/H7638290/apimage.jpg">
      <SourceGUSI value="1.3.2.80.36724539.54276"/>
      <TargetGUSI value="1.3.2.80.36724539.54276"/>
      <SourceSecurityString value=”S102 X667”/>
      <TartgetSecurityString value=”102 x667”/>
      <DataObjectName value="AP Image"/>
```

```
        <DataObjectFileName value="apimage.jpg"/>
        <DataOjectHash value="108a9765"/>
        <TargetPatientID value="187364"/>
    </WARM_manifest_Item_1>
    <WARM_manifest_Item_2>
        <Source_http_request=" http://www.Humber.Archive/H7638290/llimage.jpg" />
        <Target_http_request=" http://www.Server.B/H7638290/llimage.jpg">
        <SourceGUSI value="1.3.2.80.36724539.54277"/>
        <TargetGUSI value="1.3.2.80.36724539.54277"/>
        <SourceSecurityString value=”S102 X667”/>
        <TartgetSecurityString value=”102 x667”/>
        <DataObjectName value="Left Lat Image"/>
        <DataObjectFileName value="llimage.jpg"/>
        <DataOjectHash value="108a9776"/>
        <TargetPatientID value="187364"/>
    </WARM_manifest_Item_2>
</Warm>
```

# Bibliography

[1] ISO/IEC 646, *Information technology — ISO 7-bit coded character set for information interchange*

[2] ISO/IEC 8824-1, *Information technology — Abstract Syntax Notation One (ASN.1): Specification of basic notation*

[3] ISO/IEC 9834-8, *Information technology — Open Systems Interconnection — Procedures for the operation of OSI Registration Authorities: Generation and registration of Universally Unique Identifiers (UUIDs) and their use as ASN.1 Object Identifier components*

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