
Health informatics — Sharing of OID registry information

*Informatique de santé — Partage des informations de registre des
identifiants d'objets (OID)*





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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 215, *Health informatics*.

This second edition cancels and replaces the first edition (ISO/TS 13582:2013), of which it constitutes a minor revision.

Introduction

OID (Object Identifiers) are unique identifiers for any kind of objects. A globally unique identifier for each of these concepts will help to ensure international exchangeability of objects within different applications (e.g. healthcare information systems).

In the exchange of healthcare information, additional information about the object being identified is generally very beneficial but typically not contained in a transaction of data between systems. Such information (responsible organizations, a human readable name, a description of the object, etc.) is referred to as the OID metadata and is housed in an OID Registry.

Today, due to lack of standardization of the set of metadata (both content and structure), existing OID registries are not compatible.

Health informatics — Sharing of OID registry information

1 Scope

This Technical Specification specifies the mandatory and optional information to be recorded in any registry of OIDs, using an information model.

It specifies which parts of that information are to be regarded as public and which parts are to be subject to security and privacy requirements.

All registries support the recording of mandatory information, but the recording of any specific object identifier in one or more repositories is always optional. In some cases, security and privacy requirements are more stringent for e-health applications.

In detail, this Technical Specification:

- specifies an information model and a corresponding XML format for the export of the contents of an OID registry, suitable e.g. for import to a different OID registry;
- references common Use Cases for OID registries/repositories;
- references an Object Identifier Resolution System (ORS) which provides a look-up mechanism for information related to an object identifier, with guidance on the use of that facility.

2 Normative references

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

ISO 639-1, *Codes for the representation of names of languages — Part 1: Alpha-2 code*

ISO 3166, *Codes for the representation of names of countries — The International Organization for Standardization, 3rd edition, part 1 ISO 3166-1*

ISO 21090, *Health informatics — Harmonized data types for information interchange*

ISO/HL7 21731, *Health informatics — HL7 version 3 — Reference information model — Release 4*

ITU-T X.660 | ISO/IEC 9834-1, *Information technology — Open Systems Interconnection — Procedures for the operation of OSI Registration Authorities: General procedures and top arcs of the ASN.1 Object Identifier tree*

IETF RFC 3066, *Tags for the Identification of Languages*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 21090 and the following apply.

3.1.1

property

inherent state- or process-descriptive feature of a system including any pertinent to a component being determined or set of data elements (systems, component, kind-of-property) common to a set of particular properties

3.2 Abbreviated terms

The following abbreviated terms are used for the terms defined in this Technical Specification and its annexes.

HL7	Health Level Seven Inc
IETF	Internet Engineering Task Force
OID	Object Identifier
OMG	Object Management Group
W3C	World Wide Web Consortium
XML	Extensible Markup Language
ITU	International Telecommunication Union
IEC	International Electrotechnical Commission

4 Explanation of terms

4.1 OID registry and OID repository

An OID registry maintains a list of OIDs. Typically additional information (metadata, such as responsible organizations, a human readable name, a description of the object, and other information that is needed for any meaningful use of the object identified) associated with the OID is stored also. With that, a registry is then an OID repository at the same time.

Maintaining the list (and associated metadata) happens regardless whether it is an official register for allocations of new OIDs under a given OID arc, or just a copy of information from other registries.

Official OID registries/repositories responsible for allocations of new OIDs under a given OID arc are Registration Authorities.

4.2 Registration Authority (RA)

An RA is responsible for allocating child arcs to the OID that it manages (issuing authority). It ensures that an integer is used once among the subsequent arcs (child OIDs). As much as possible, it avoids the same identifier (beginning with a lowercase letter) being used for multiple sub-arcs. Such information is typically stored in the OID registry/repository but it is important to understand that an OID first needs to be officially allocated by an RA before it can be described in an OID repository

For each child OID, the RA also keeps a record of additional information (like the name of a contact person, postal address, telephone and fax numbers, email address, etc.) about the Responsible Authority for that child OID. A responsible authority for a child OID must formally become an RA for the child OID in order to allocate sub-arcs under it.

4.3 Responsible (Managing) Authority (MA)

An MA is used to indicate the person (if known) and organization who is currently in charge of managing the OID. Once a responsible authority is allocating sub-arcs and registering information on these sub-arcs, it also becomes the Registration Authority for these sub-arcs.

Discussion: simply managing an OID (for example, for a code system) is the task of a Responsible Authority MA. Potentially, a responsible authority may become a Registration Authority (RA) for a sub-arc if it allocates sub-arcs.

4.4 Submitting Authority (SA)

This information is optional and reflects the person or organization that submitted the original OID allocation request.

4.5 Current Registrant

In some OID registries, Current Registrants are stored. The Current Registrant is used to indicate the person (if known) who is currently in charge of managing the OID, allocating sub-arcs and registering information on these sub-arcs.

4.6 First Registrant

In some OID registries, First Registrants are stored. The First Registrant is used to indicate the very first person (if known) who was responsible for managing the OID and who created it in the first instance.

This Technical Specification strongly suggests distinguishing between:

- a *Registration Authority (RA)* (person, if known, and organization) who issued (=allocated the instance of) an OID and
- a *Submitting Authority (SA)* who submitted the OID allocation request (which may be the same instance).

In this sense, the First Registrant is the Registration Authority (RA).

4.7 First Registration Authority

The first Registration Authority of an OID is the very first person or company to whom the OID was allocated by the RA of the superior OID. According to Rec. ITU-T X.660 | ISO/IEC 9834-1, the first RA cannot be changed (if the responsibility is transferred to someone else, the information is recorded in the “Current Registration Authority” section, without changing the “First Registration Authority” section).

Discussion: this is the Registration Authority (RA) that allocated the OID.

4.8 Rec. ITU-T X.660 | ISO/IEC 9834-1

In ITU-T Recommendation X.660, the following definitions are given.

- *3.6.8 registration authority: An entity such as an organization, a standard or an automated facility that performs registration of one or more types of objects (see also International Registration Authority).*
- *3.6.2 administrative role (of a registration authority): Assigning and making available unambiguous names according to the Recommendation | International Standard defining the procedures for the authority.*
- *3.6.14 technical role (of a registration authority): Recording definitions of the objects to which names are assigned and verifying that these definitions are in accordance with the Recommendation | International Standard defining the form of the definition.*

This Technical Specification does not use administrative or technical roles.

5 Object identifiers in healthcare

5.1 General

OID (Object Identifiers) are unique identifiers for any kind of objects. They are defined in Rec. ITU-T X.660 | ISO/IEC 9834-1. This identification system for objects and concepts makes reliable electronic information exchange possible. Administration and Registration is regulated by a set of rules.

The precise designation of objects and concepts is a pre-requisite for the standardized exchange of information. A globally unique identifier for each of these concepts will help to ensure international exchangeability of objects within different applications (e.g. healthcare information systems). For example, OIDs are often used within HL7 messages and documents and Rec. ITU-T X.509 certificates to provide this unique identification.

In the exchange of healthcare information, especially between loosely coupled systems, additional information about the object being identified is generally very beneficial; this is information that is typically not contained in a transaction of data between systems but is reference information about the objects contained in the transaction. There is a minimal set of such information, such as Responsible Organizations, a human readable name, a description of the object, and other such information that is needed for any meaningful use of the objects identified. Since such information may not be locally available to a system examining the communicated objects, it makes sense to have such information available in a standardized form and accessible by using the OID to identify this information. Such information, referred to as the OID metadata, is the bulk of the information housed in an OID Registry.

Today, due to lack of standardization of the set of metadata (both content and structure), existing OID registries are not compatible. Contents, attributes, and rules of the assignment of OIDs of existing registries are incompatible and often dissimilar. Many registries still distribute OIDs in a form only suitable for direct text processing (like spreadsheets) that is error prone and hard to automate. There is a need to store and transfer collections of OIDs and also to keep some registries completely in sync, maintaining the contents and the structure of metadata of each of the registered OIDs, e.g. descriptions, comments, versions, links, relations, responsible organizations, and persons.

Data exchange can be facilitated by a standardized representation of a required minimum set of metadata as an XML structure together with the associated checks of underlying constraints and business rules. This XML structure for importing and exporting OIDs among different registries should be achieved for supporting eHealth applications. In addition, the failure to have a standard for the operations needed to coordinate and synchronize the contents of disparate OID registries leads to confusion and ambiguity for the community that uses eHealth information containing references to objects identified by OIDs.

There are currently at least hundreds of OID registries in active use throughout the world. These are sponsored and operated by disparate entities, ranging from national governments to individual companies or standards organizations, to individuals in a specialized area or industry. In many cases, more than one of these registries address the same industry segment, and have overlapping content, i.e. specific OIDs exist in both, or worse, different OIDs identifying the same object exist in both. This distributed set of disparate registries servicing a particular industry (specifically Healthcare IT) has led to awkward and error prone searching processes. To get information about existing OIDs, a search within all existing registries is needed, for example, to avoid duplicate assignment of multiple OIDs to one and the same concept. In order to standardize the activities to synchronize all existing OID registries and to ensure further interoperability, it is essential to have a defined exchange format and business rules for maintenance of the OID registries that must cooperate in a particular industry.

Some OID registries are operated by essential volunteer organizations, such as standard bodies/facilities. The burden of administrative tasks is such that multiple individuals, often in different geographical locations, need to participate to share the workload. Thus, in addition to distributed registry instances, administrative functions need to also be distributed, both on single and potentially across multiple registries. There is a need for the standardization of a minimum set of administrative access and operational functions such that developers of registries can deploy standard mechanisms to streamline and increase accuracy and productivity of these maintenance operations.

This Technical Specification describes a generic exchange format that will cover the minimal set of metadata and associated rules for OIDs of existing registries. It specifies principles and processes that should be explored/implemented by developers and data administrators of OID registries and their applicant bodies. The primary target group for this Technical Specification are those establishing OID registries and those (industry, government bodies) using the services maintained by such organizations.

5.2 Additional descriptions

In this Technical Specification, [Annex A](#) gives a description of possible sub trees reflecting OID categories for e-health related OIDs is given.

[Annex B](#) specifies the Use Cases of an OID registry/repository and an Object Identifier Resolution System (ORS) for e-health related OIDs based on restful Web Services.

[Annex C](#) references a W3C schema for the XML representation.

5.3 Related work

This work is related to discussions about OID in the work programme of ISO/TC 215, HL7 International, ISO/IEC JTC 1/SC 6, ITU-T SG 17 and other organizations dealing with OIDs and OID registries.

6 Approach

6.1 Requirements analysis

Following an extensive analysis of the currently available international OID registry for health care systems, a basic data set and a corresponding XML representation as an exchange format needed to be created for registering and exchanging OID-related data. To collect the very basic requirements for such a format an analysis of several registries, e.g. HL7 International registry at hl7.org and several European OID repositories (France Telecom-Orange, see <http://www.oid-info.com>, German OID registry at DIMDI, see <http://www.dimdi.de>) was performed so far in 2009 (see [Table 1](#)). The analysis included the contents, attributes, and even the rules of the assignment of OID.

Table 1 — Analysis of some data elements of different OID registries and repositories (analysis as of 2009)

DIMDI	France Telecom-Orange OID repository	HL7 International
DESCRIPTIONENGLISH	DESCRIPTION, INFORMATION	OBJECT_DESCRIPTION
DESCRIPTIONGERMAN		
ASN1NOTATION	ASN1-NOTATION	COMP_OID
MODIFICATIONDATE	MODIFICATION-DATE	
CREATIONDATE	CREATION-DATE	DATE_FINALIZED
APPLICATIONDATE		
TYPE		OID_TYPE
FAMILY	LAST-NAME	NAME
GIVEN	FIRST-NAME	NAME

Only a few of the registries specified an (XML-) exchange format. Due to lack of a common understanding of OID registry requirements, data fields needed to be mapped (manually) when OID information needed to be exchanged.

6.2 Preparatory work

This Technical Specification has been prepared by Technical Committee ISO/TC 215, in collaboration with HL7 International, ISO/IEC JTC 1/SC 6 and ITU-T SG 17.

The draft of this Technical Specification has had multiple public comment phases (started in April 2010) with the submission and reconciliation of about 80 comments and has undergone a proof-of-concept phase in OID registry/repository projects in several European countries.

7 Information model

7.1 General

In order to exchange OID and their metadata between different registries and applications, the following additional data items beyond the OID itself need to be taken into consideration (see also Recommendation ITU-T X.667 | ISO/IEC 9834-8, <http://www.itu.int/rec/T-REC-X.667/en>, and FAQs at oid-info, <http://www.oid-info.com/faq.htm#iri>):

- descriptions;
- status information;
- categorization;
- time information;
- comments;
- versions;
- links;
- relationships to other OIDs and external sources;
- registering and responsible organizations;
- associated persons.

An information model with all classes, attributes, and their properties aiming for a common understanding of the requirements of an OID registry/repository has been created (see [Figure 1](#)).

Additional remarks are as follows.

- The colours are taken from ISO/HL7 21731, the light green classes “Person” and “Organization” are exact copies of the definitions of the green classes “Person” and “Organization” to avoid repeating the class attributes. Boldface associations names reflect mandatory associations (see also [7.2.1](#)).
- A coded attribute may have a vocabulary binding denoted by the symbol “<=”, e.g. in the registration authority class *RegistrationAuthority*, the code is bound to use the vocabulary defined in value set/enumeration “RoleCodes”.

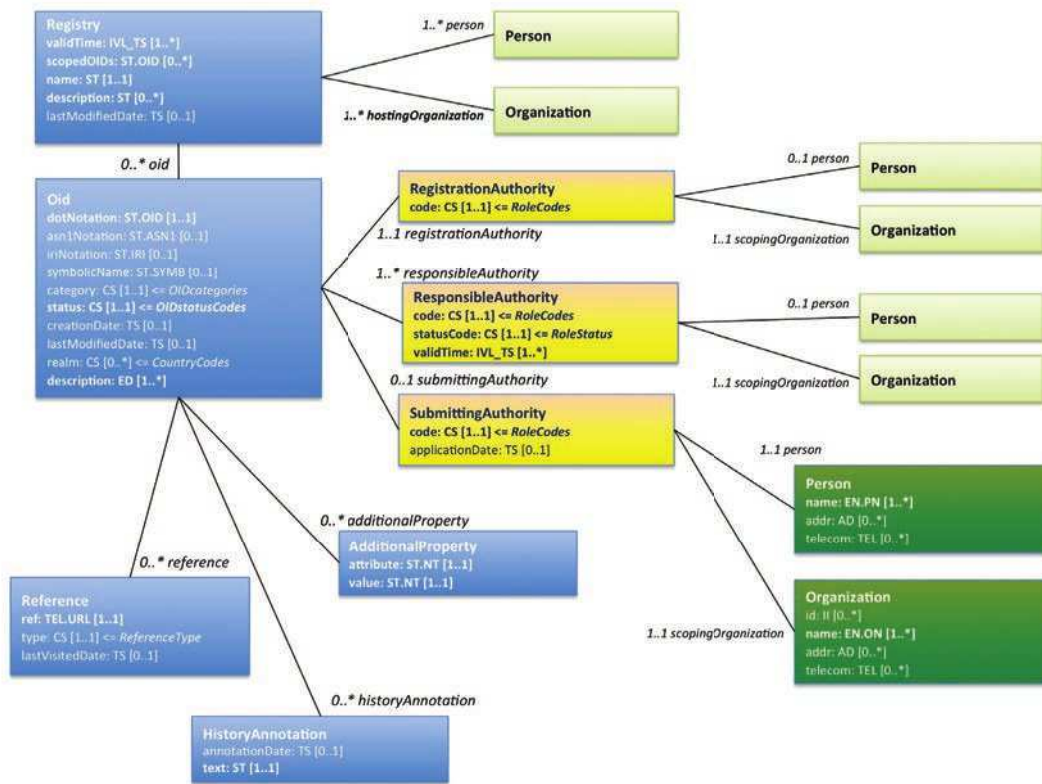


Figure 1 — Information model for OID registries and repositories

7.2 Agenda of tables and symbols

7.2.1 Class attribute and associated tables

The Class Attribute Tables (information model) make use of the following table headline:

Class Attribute	Description	DT	Card	Conf	Length
-----------------	-------------	----	------	------	--------

Class Attribute = class attribute name

Description = description (meaning) of the attribute

DT = datatype (or datatype flavour) conformant to the ISO 21090 datatypes,

Card = cardinality, e.g. 0..1 or 1..*

Conf = conformance, either

- *mandatory*, which means that the information SHALL be present in every instance of an extract of an OID registry/repository,
- *required*, which means that the information SHOULD be provided if there are no privacy reasons for masking that information, or
- *optional*, when information is optional.

Length = recommended length (as an implementation hint, e.g. for database string lengths).

In addition, the Association Tables (information model) make use of the following table headline:

Association	Description	Class	Card	Conf
-------------	-------------	-------	------	------

Association = the association name to the associated class

Class = the associated class name

7.2.2 Conformance statements

Some class attributes or associations may have additional constraints, denoted by a paragraph starting with “CONF” with an abbreviated identifier of that rule as a suffix (e.g. “rg-vt”) followed by the conformance statement.

EXAMPLE

CONF rg-vt: A validTime element SHALL be present and of datatype IVL_TS with at least the low child element populated.

7.3 XML exchange format

Data exchange can be facilitated by a standardized representation of the complete set of information as an XML structure together with the associated checks of underlying constraints and business rules. This XML structure for importing and exporting OID among different registries and other healthcare applications is dependent upon the availability of reliable information about OIDs.

The following subclauses summarize and explain classes and their attributes.

7.4 Registry

This is the basic information about the OID registry/repository hosting the OIDs (see [Figure 2](#)).

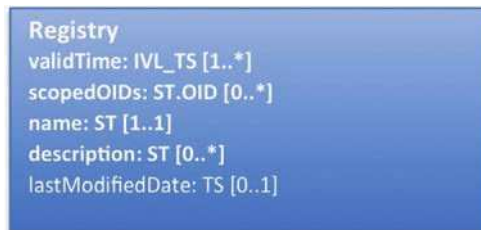


Figure 2 — Registry

7.4.1 Attributes

Class Attribute	Description	DT	Card	Conf	Length
validTime	validity time interval	IVL_TS	1..*	mandatory	-
scopedOIDs	List of scoped root OIDs	ST.OID	0..*	optional	64
name	Official name of the OID registry	ST	1..1	mandatory	64
description	Description of the OID registry, possible in multiple languages	ST	0..*	optional	-
lastModifiedDate	date of last modification	TS	0..1	optional	-

7.4.1.1 validTime

This is the validity time interval, i.e. the begin (and end) time when this registry is/was responsible for registering OIDs. This can be a list of intervals.

CONF rg-vt: A validTime element shall be present and of datatype IVL_TS with at least the low child element populated.

7.4.1.2 scopedOIDs

List of scoped root OIDs, i.e. the OIDs for which this OID registry is responsible for registration. OIDs listed here should be those under which this registry creates child OIDs, but this entry is only the top OID of the tree; more than one entry may be here if this registry creates OIDs under more than one disjoint root.

CONF rg-so: If the OID registry is responsible for issuing/registering a root OID, this OID should be listed in *scopedOIDs*.

7.4.1.3 name

Official name of the OID registry.

7.4.1.4 description

A description of the OID registry, possible in multiple languages.

CONF rg-ds: If at least one *description* element is present, one of the description's language codes shall be English ("en", "en-US", etc.).

7.4.1.5 lastModifiedDate

The *lastModifiedDate* is used to describe when information in the OID registry was last modified.

7.4.2 Associations

Association	Description	Class	Card	Conf
person	Contact person(s)	Person	1..*	required
hostingOrganization	Hosting organization(s)	Organization	1..*	mandatory
oid	List of OIDs	Oid	0..*	required

7.4.3 Example

```
<registry>
  <validTime>
    <low value="20100501"/>
  </validTime>
  <scopedOID value="1.2.3.4.5"/>
  <name value="The best OID registry ever"/>
  <description language="en-US" value="This is a test OID registry, although the best"/>
  <person> ... </person>
  <hostingOrganization> ... </hostingOrganization>
  <oid> ... </oid>
</registry>
```

7.5 Oid

This class contains the registered OID and the associated metadata (see [Figure 3](#)).



Figure 3 — OID

7.5.1 Attributes

Class Attribute	Description	DT	Card	Conf	Length
dotNotation	registered OID, dot notation	ST.OID	1..1	mandatory	128
asn1Notation	ASN.1 notation	ST.ASN1	0..1	optional	128
iriNotation	IRI notation	ST.IRI	0..1	optional	128
symbolicName	symbolic name	ST.SYMB	0..1	optional	128
category	OID category	CS	1..1	required	-
status	OID status	CS	1..1	mandatory	-
creationDate	date of creation	TS	0..1	optional	-
lastModifiedDate	date of last modification	TS	0..1	optional	-
realm	Countries	CS	0..*	optional	-
description	textual description	ED	1..*	mandatory	-

7.5.1.1 dotNotation

The OID in dot notation of SNMP or ASN.1/XER.

EXAMPLE 2.16.528

7.5.1.2 asn1Notation

The OID in ASN.1 notation with (optional) identifiers and numbers.

EXAMPLE {joint-iso-itu-t(2) country(16) nl(528)} {itu-t(0) recommendation(0) a(1)}

NOTE 1 The surrounding curly brackets can be omitted.

NOTE 2 This information is not necessarily entered by a human; this item maybe populated algorithmically.

7.5.1.3 iriNotation

The OID in Internationalized Resource Identifier (IRI) notation.

EXAMPLE oid:/Country/528

NOTE This information is not necessarily entered by a human; this item maybe populated algorithmically.

7.5.1.4 **symbolicName/Secondary arc identifier**

A symbolic short name, unique among the siblings of the arc of the OID.

The ISO rules on Secondary Arc Identifiers, as laid out in Rec. ITU-T | ISO/IEC 9834-1:2012, 6.2.2, apply:

- identifiers of an arc are required to commence with a lowercase letter and to contain only letters, digits, and hyphens;
- the last characters shall not be a hyphen;
- there shall be no two consecutive hyphens in the name.

EXAMPLE nl

7.5.1.5 **category**

The type/category of the OID; enumeration, values see enumeration *OIDcategories*.

There are actually two main types of OIDs: *leaves* (id of an object), and *nodes* representing an ontological branch.

The types of node OID may be

- a registration authority (RA), or
- a structure for the management of OIDs.

The proposal for sub categories of leaf OIDs are

- identifiers of an instance of an object (for example, an organization), and
- namespace identifiers (for example, code systems, value sets).

NOTE In addition, there are properties of OIDs that can reflect other business needs. These can be tags (simple text), other categorizations of the OID, coded or as text, “sub-types” of the OID. For further information, see *AdditionalProperty*.

7.5.1.6 **status**

Status of the OID. This is an enumeration, for values, see enumeration *OIDstatusCodes*.

7.5.1.7 **creationDate**

The *creationDate* is used to describe when the OID was first registered. It is not the date when the OID description is submitted to the OID repository. The *creationDate*, once set, never changes.

7.5.1.8 **lastModifiedDate**

The *lastModifiedDate* is used to describe when information about the OID was last modified.

7.5.1.9 **realm**

In some cases, OIDs may apply to a specific country/realm only, e.g. the namespace identifiers for the US Social Security Number (SSN) or the Dutch Citizen Service Number (BSN) or the codes system representing ICD-10 International Classification of Diseases 10th Revision for the use in Germany only (ICD10gm). This can be indicated by *realm*, which is either the code of country or “UV” for universal. For values, see code system *CountryCodes*.

7.5.1.10 description

This element contains a free text description of the OID (“what is the OID?”). The text typically contains an explanation but also can contain the following:

- explicit versioning aspects;
- licensing information;
- Intellectual Property rights information;
- trademarks.

This element is repeatable for each language.

The datatype ED allows for a thumbnail child element. A thumbnail may be populated describing a short description of the OID (sometimes referred to as *identifier name*).

EXAMPLE

```
<description language="en-US" value="this is text as a long description">
  <thumbnail value="short text"/>
</description>
```

NOTE datatype ED also reflects the aspect of language of the description (language code).

CONF oi-ds: There SHALL be one *description* instance with language code English (“en”, “en-US” etc.).

7.5.2 Associations

Association	Description	Class	Card	Conf
registrationAuthority	Registration Authority	RegistrationAuthority	1..1	required
responsibleAuthority	Responsible Authority	ResponsibleAuthority	1..*	required
submittingAuthority	Submitting Authority	SubmittingAuthority	0..1	optional
additionalProperty	Additional Properties	AdditionalProperty	0..*	optional
historyAnnotation	History Annotations	HistoryAnnotation	0..*	optional
reference	References	Reference	0..*	optional

7.6 RegistrationAuthority

This class represents the Registration Authority (RA). See [Figure 4](#).

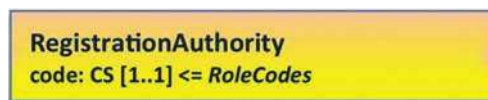


Figure 4 — Registration authority

7.6.1 Attributes

Class Attribute	Description	DT	Card	Conf	Length
code	Registration Authority role code	CS	1..1	mandatory	-

7.6.1.1 code

The code holds information about the role type of the Registration Authority (RA). Valid codes are listed in *RoleCodes* (see [8.6](#)).

7.6.2 Associations

Association	Description	Class	Card	Conf
scopingOrganization	Scoping organization	Organization	1..1	required
person	Contact person(s)	Person	0..1	optional

7.7 ResponsibleAuthority

This is a class representing the (managing) authority that is responsible for the object that is identified by the OID (not for the OID itself). See [Figure 5](#).

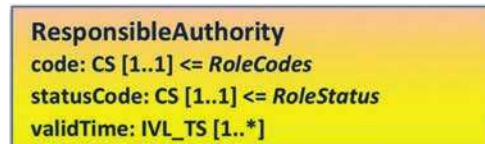


Figure 5 — Responsible authority

7.7.1 Attributes

Class Attribute	Description	DT	Card	Conf	Length
code	Responsible Authority role code	CS	1..1	mandatory	-
statusCode	status code	CS	1..1	mandatory	-
validTime	validity time	IVL_TS	1..*	mandatory	-

7.7.1.1 code

The code holds information about the role type of the Responsible Authority. Valid codes are listed in *RoleCodes* (see [8.6](#)).

7.7.1.2 statusCode

The statusCode holds information about the status of the Responsible Authority. Valid codes are listed in *RoleStatus* (see [8.7](#)).

7.7.1.3 validTime

This is an interval of time (start and ending date), representing the period when the Responsible Authority is/was responsible for the object that is identified by the OID. If the Responsible Authority is still responsible, only *validTime.low* is populated.

7.7.2 Associations

Association	Description	Class	Card	Conf
scopingOrganization	Scoping organization	Organization	1..1	required
person	Contact person(s)	Person	0..1	optional

7.8 SubmittingAuthority

This is a class representing the submitting authority that originally asked for a new OID (see [Figure 6](#)).

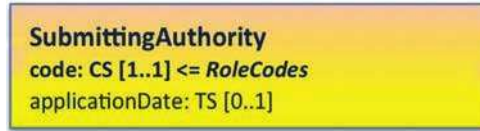


Figure 6 — Submitting authority

NOTE To avoid redundancy, the classes Organization and Person are shown with attributes here; at all other places only a “shadow” class of these two classes is shown.

7.8.1 Attributes

Class Attribute	Description	DT	Card	Conf	Length
code	Submitting Authority role code	CS	1..1	mandatory	-
applicationDate	date of application	TS	0..1	optional	-

7.8.1.1 code

The code holds information about the role type of the Submitting Authority. Valid codes are listed in *RoleCodes*.

7.8.1.2 applicationDate

Date of application (submission or certified submission) of the requested OID.

7.8.2 Associations

Association	Description	Class	Card	Conf
scopingOrganization	Scoping organization	Organization	1..1	required
person	Contact person(s)	Person	1..1	required

7.9 HistoryAnnotation

This class reflects historical annotations of the OID and records the changes of any data over time (see [Figure 7](#)).



Figure 7 — History annotation

7.9.1 Attributes

Class Attribute	Description	DT	Card	Conf	Length
annotationDate	date annotation was created	TS	0..1	required	-
text	annotation	ST	1..1	mandatory	-

NOTE datatype ED also reflects the aspect of language of the description (language code).

7.10 Reference

This class (see [Figure 8](#)) provides a link to the following:

- other data sources, code tables, value sets, descriptions, etc.; typically this is a URL and always points to an object with different semantics than the OID itself;
- other OIDs (within or outside this OID registry) in order to be able to express that an OID has been superseded/replaced or that there is a preferred OID.



Figure 8 — Reference

7.10.1 Attributes

Class Attribute	Description	DT	Card	Conf	Length
ref	reference URL	TEL.URL	1..1	mandatory	-
type	type of reference	CS	1..1	mandatory	-
lastVisitedDate	date URI last visited	TS	0..1	optional	

7.10.1.1 ref

The referenced URI.

7.10.1.2 type

The nature of the reference is coded in the *type* attribute, for vocabulary see *ReferenceType* (see [8.5](#)).

7.10.1.3 lastVisitedDate

Specifies the date the URI was last visited.

7.11 AdditionalProperty



Figure 9 — Additional properties

This class (see [Figure 9](#)) reflects additional properties of an OID that might be used to fit business rules that cannot (or should not) be standardized. This includes the following:

- additional categories;
- additional status information;
- tags, simple text;

— coded properties.

It is made of the following:

- attribute, describing the type of the additional property;
- value, the value of the additional property.

7.11.1 Attributes

Class Attribute	Description	DT	Card	Conf	Length
attribute	Additional property type	ST.NT	1..1	mandatory	-
value	Additional property value	ST.NT	1..1	mandatory	-

7.12 Person

A class to hold the properties of a person (see [Figure 10](#)).



Figure 10 — Person

7.12.1 Attributes

Class Attribute	Description	DT	Card	Conf	Length
name	person's name	EN.PN	1..*	mandatory	-
addr	person's address	AD	0..*	optional	-
telecom	person's telecommunication contact	TEL	0..*	optional	-

7.13 Organization

A class to hold the properties of an organization (see [Figure 11](#)).

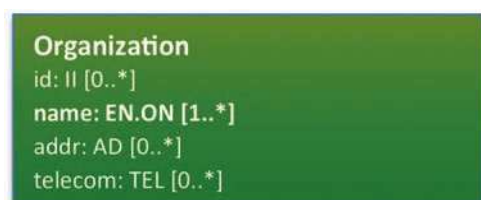


Figure 11 — Organization

7.13.1 Attributes

Class Attribute	Description	DT	Card	Conf	Length
id	id (OID) of the organization, or (non-OID) id of the organization, e.g. different kind of number (<i>Data Universal Numbering System number, Global Location Number, taxpayer identification numbers</i>)	II	0..*	optional	-
name	name of the organization	EN.ON	1..*	mandatory	-
addr	address of the organization	AD	0..*	optional	-
telecom	telecommunication contact of the organization	TEL	0..*	optional	-

7.13.1.1 id

The id of the organization, preferably an OID that populates the root property of datatype II of this class attribute.

EXAMPLE 1

```
<id root="1.2.3.4.5.6.7.8.9"/>
```

NOTE Some organizations that are referred to may not have an OID but may have a different kind of number (*Data Universal Numbering System number, Global Location Number, taxpayer identification numbers, etc.*). In this case, the data are provided either

- by populating both the extension (“number”) and the root (“namespace”) property, or
- by populating the extension property of datatype II omitting the root property and mentioning nullFlavor = “UNK”.

EXAMPLE 2

```
<id extension="40 12345 00000 9" root="1.3.88"/>
```

```
<id extension="16574jc9848" nullFlavor="UNK"/ >
```

7.13.1.2 name, addr, telecom

These class attributes are defined similar to those from the Person class, see above.

8 List of codes and enumerations

The following subclauses contain the lists of codes and enumerations used by this Technical Specification. In the Tables, “level” indicated the hierarchical level of the code, e.g. “NRA” in “OIDcategories” is a child code (specialization) of “N”.

8.1 CountryCodes

ISO 3166-1 alpha-2 letter country codes are used here. This list states the country names as given in ISO 3166-1 and the corresponding ISO 3166-1 alpha-2 code elements.

8.2 LanguageCodes

Reflects the Human Language. Language is specified conformant to RFC 3066 (Tags for the Identification of Languages). The format is

ss[-CC]

where ss is the language code drawn from ISO 639-1, and CC is the country code, conformant to ISO 3166-1 alpha-2.

EXAMPLE en-US

8.3 OIDcategories

This enumeration reflects the category of the OID (node, leaf) and possible sub categories.

Level	Code	Description
0	N	node
1	NRA	registration authority (RA)
1	NMN	structure for the management of OIDs
0	L	leaf
1	LIO	an instance of an object
1	LNS	a namespace identifier

Regarding NMN, it is not good practice, but it is known that some of these nodes in some registries also identify objects, which should not be the case.

8.4 OIDstatusCodes

This code reflects the status of the OID. Valid values are the following:

Level	Code	Description
0	pending	OID assignment pending
0	complete	assignment complete
0	retired	OID retired/withdrawn, i.e. it may no longer be used
0	deprecated	OID deprecated, i.e. it should no longer be used
0	unknown	status of the OID unknown

8.5 ReferenceType

The type of reference covers the following values:

Level	Code	Description
0	RPLC	replaced by OID
0	PREF	preferred OID
0	LINK	link access (to code and value set tables)
0	IDS	identification scheme documentation
0	OTH	other types of documentation

8.6 RoleCodes

This covers the kind of role of an authority. For any of the three authority classes mentioned in this Technical Specification valid values are the following:

Level	Code	Description
0	PRI	primary registering, responsible or submitting person or organization
0	SEC	secondary registering, responsible or submitting person or organization
0	OBO	on behalf of, i.e. the registering, responsible or submitting person or organization acts entirely on behalf of another entity
0	CON	contact entity, when stated either a playing person or organization shall be specified

8.7 RoleStatus

This covers the status of role. Valid values are the following:

Level	Code	Description
0	active	active
0	terminated	terminated

9 Datatypes

A subset of the ISO 21090 datatypes is used for the XML representation of data. In some cases, additional flavours or constraints are defined.

The following subclauses give examples and describe the restrictions/constraints on the generic specification.

9.1 Address AD

EXAMPLE

```
<addr use="HP">
  <part type="STR" value="Windsteiner Weg"/>
  <part type="BNR" value="54a"/>
  <part type="CNT" code="DEU" codeSystem="1.0.3166.1.2" value="D"/>
  <part type="ZIP" value="14165"/>
  <part type="CTY" value="Berlin"/>
</addr>
```

9.2 Coded simple value CS

A coded attribute with a simple value. The attribute is always bound to a specific code system mentioned in the clause about lists of code systems and enumerations.

EXAMPLE

```
<statusCode code="active"/>
```

9.3 Encapsulated data ED

In this specification, this is either plain text (media type "text/plain") or HTML (media type "text/html") only. A language code is required.

CONF ed-Ic: An element of datatype ED shall have a language code represented in language.

CONF ed-mt: An element of datatype ED shall have a mediaType of “text/plain” or “text/html”.

EXAMPLE

```
<text value="this is plain text" language="en-US" mediaType="text/plain"/>
<text value="dieses ist normaler Text" language="de-DE" mediaType="text/plain"/>
```

9.4 Entity name for a person EN.PN

EXAMPLE

```
<name use="OR C">
  <part type="GIV" value="Selby"/>
  <part type="FAM" qualifier="SP" value="Butt"/>
  <part type="FAM" value="Hadrian"/>
</name>
```

9.5 Entity name for an organization EN.ON

EXAMPLE

```
<name use="LS">
  <part value="Healthy Hospital"/>
  <part qualifier="SEFX">LLC</part>
</name>
```

9.6 Instance identifier II

An identifier that uniquely identifies a thing or object, in this Technical Specification, used for the identification of organizations only. The data type comprises the following two attributes:

- root is a unique identifier that guarantees the global uniqueness of the instance identifier. If root is populated, and there is no nullFlavor or extension, then the root is a globally unique identifier in its own right. In the presence of a non-null extension, the root is the unique identifier for the “namespace” of the identifier in the extension. In this Technical Specification, this field shall be an Object Identifier (OID);
- extension is a character string as a unique identifier within the scope of the identifier root. The root and extension scheme means that the concatenation of root and extension shall be a globally unique identifier for the item that this II value identifies.

For examples, see description of class Organization, attribute id (see [7.13.1.1](#)).

9.7 Interval of time stamp IVL_TS

An interval of timestamps is used to denote a start and an ending date, e.g.

- the date an object starts to be active or becomes valid (“low” component);
- the date an object stops its activities or validity expires (“high” component).

EXAMPLE

```
<validTime>
  <low value="20101201"/>
  <high value="20101224"/>
</validTime>
```

9.8 String ST

A character string, with possible translations.

EXAMPLE

```
<name value="I am a name"/>
```

9.9 String ST.NT

A character string, with no translations allowed.

9.10 Object identifier (dot notation) ST.OID

This is actually a character string without translation (ST.NT) with a certain pattern. The pattern can be found in the Schema for XML representation (see [Annex C](#)).

EXAMPLE

```
<oid value="1.2.3.4.5.0.6.7.8.9"/>
```

9.11 Object identifier (asn1 notation) ST.ASN1

This is actually a character string without translation (ST.NT) with a certain pattern. The pattern can be found in the Schema for XML representation (see [Annex C](#)).

9.12 Object identifier (iri notation) ST.IRI

This is actually a character string without translation (ST.NT) with a certain pattern. The pattern can be found in the Schema for XML representation (see [Annex C](#)).

9.13 Symbolic name ST.SYMB

This is actually a character string without translation (ST.NT) with a certain pattern. The pattern can be found in the Schema for XML representation (see Annex C).

9.14 Telecommunication TEL

EXAMPLE

```
<telecom value="tel:+491234567890" use="H WP" capabilities="voice fax"/>
```

9.15 Locatable resource TEL.URL

This points to a locatable resource, e.g. an internet address.

EXAMPLE

```
<ref value="http://x.y.org"/>
```

9.16 Time stamp TS

EXAMPLE

```
<applicationDate value="20101205"/>
```

Annex A (informative)

OID types and sub trees

A.1 General

This Annex includes a specification of those parts of the OID tree that are known to be used for national and for international e-health applications. A description of possible sub trees reflecting *OID types* is given.

A.2 OID types

In many OID registries, the type of an OID is used to improve, for example, the administrative process around assigning new OIDs or to improve search capabilities of registry users. The OID type has nothing to do with ISO standards, nor any intrinsic meaning or form of the OID itself; it is only a convenience for the users of an OID registry.

In order to store OID types along with OID metadata described in this Technical Specification, the class *AdditionalProperty* is used. It seemed from international experience with OID registries that this can be a recommendation only. OID types vary from registry to registry.

Therefore, OID types may be used as additional properties; if OID type is used, it is recommended that *AdditionalProperty.attribute* should be "OIDType" and *AdditionalProperty.value* shall be an enumeration or code string representing the OID type.

A.3 HL7 Viewpoint

HL7 International has created a type ontology for the OIDs in the HL7 registry to make it easier for the user community to search for OIDs they may be looking for, which can be found at hl7.org.

A.4 Recommendations for OID types

From a policy perspective, it is common practice in several healthcare related OID registries (HL7 International at hl7.org, OID Registry Germany at <http://www.dimdi.de>, OID registry Switzerland at <http://oid.refdata.ch>, and OID registry Austria at <https://www.gesundheit.gv.at/> OID_Frontend) to distinguish at least between the following types of OIDs:

Arc	Description
.3	organizational bodies and groups
.4	identifier systems and namespaces
.5	code systems
.7	document artifacts
.9	conformance profiles
.10	templates
.11	value sets
.19	examples
.99	experimental

Annex B (informative)

Use cases and object identifier resolution system (ORS)

B.1 General

This Annex specifies a list of **Use Cases** of an OID registry/repository and an **Object Identifier Resolution System (ORS)** for e-health related OIDs based on RESTful Web Services.

B.2 Use Cases

A list of OID Registry Use Cases has been defined in order to drive metadata model requirements and functional requirements for Registry interoperability.

U1: OID Creation where the registry owner is the RA

- *Creation of a new OID in the standard ontological structure*
- *Creation of a new OID in a sub-structure*

U2: OID Registration

- *Registration where the registry owner created the OID*
- *Registration of an OID created elsewhere*

U3: OID Withdrawal/Replacement

- *Withdraw an OID created in error with no replacement*
- *Withdraw an OID created in error with specified replacement*
- *Withdraw an OID registered in error with no replacement*
- *Withdraw an OID registered in error with specified replacement*
- *Withdraw an OID that is found to be a duplicate, with original specified*

U4: OID Metadata Update/Editing

- *Permissions model*
- *Distributed effort model*
- *Proxies for Editors*

U5: OID Information Publication

- *Web presence*
- *Internet-accessible API (Web service presence)*
- *Full registry output to machine-readable form*
- *Full registry output to human-readable form*
- *Partial registry output to machine-readable form*

— *Partial registry output to human-readable form*

U6: OID Information Request

— *Search for the OID of an object*

— *Search for the object identified by an OID*

— *Search for a list of kinds of OIDs*

— *Search for a list of OID based on various sub-criteria, with and without wildcards*

— *Those registered by a particular entity*

— *Those associated with a type of information object*

— *Those associated with implementation guides*

— *Those registered during some time period*

B.3 RESTful web services for an object identifier resolution system

Representational state transfer (REST) is a style of software architecture for distributed hypermedia systems such as the World Wide Web. The term representational state transfer was introduced and defined in 2000 by Roy Fielding in his doctoral dissertation (see Reference [18]).

A RESTful web service is implemented using HTTP and the principles of REST. It is a collection of resources, with three defined aspects:

- the base URI for the web service, such as <http://oid.server.org/>;
- the Internet media type of the data supported by the web service, in this case either XML or HTML only;
- the set of operations supported by the web service using HTTP methods, in this case GET only.

This subclause recommends a simple mechanism to be provided in order to retrieve lists of OIDs from a registry, details of a particular OID or an extract of the entire OID registry. Various formats should be supported like HTML and the original XML format.

The suggested calls should be implemented as RESTful Web Services and their parameters are stated as follows.

Resource	Description GET	Parameters
OIDIndex	retrieves an index of all OIDs in the OID registry in HTML format	id (optional): an OID language (optional): language format (default, fixed): html
	<p>EXAMPLES</p> <p>http://oid.server.org/OIDIndex gets an HTML table of all OIDs in the registry with links to the details for each OID</p> <p>http://oid.server.org/OIDIndex?id=1.0.3166.1.2.2 gets an HTML table of OID 1.0.3166.1.2.2 with links to the details for this OID</p> <p>http://oid.server.org/OIDIndex?id=1.0.3166.1.2.2&language=de-DE gets an HTML table of OID 1.0.3166.1.2.2 with links to the details for this OID in the German language</p>	
RetrieveOID	retrieves a particular OID in the OID registry	id (required): an OID format (optional): html or xml language (optional): language
	<p>EXAMPLES</p> <p>http://oid.server.org/RetrieveOID?id=1.0.3166.1.2.2&format=html gets details of OID 1.0.3166.1.2.2 in HTML format</p> <p>http://oid.server.org/RetrieveOID?id=1.0.3166.1.2.2&format=html&language=de-DE gets details of OID 1.0.3166.1.2.2 in HTML format in the German language</p> <p>http://oid.server.org/RetrieveOID?id=1.0.3166.1.2.2&format=xml gets details of OID 1.0.3166.1.2.2 in XML format</p>	
GetOIDRegistry	gets the entire content of the OID registry in XML format	format (default, fixed): xml
	<p>EXAMPLE</p> <p>http://oid.server.org/GetOIDRegistry gets the entire content of the OID registry in XML format</p>	

Annex C (informative)

W3C Schema for XML representation and information model

This Annex refers to a W3C Schema with embedded ISO schematron (ISO/IEC 19757-3) for the XML representation of the structures described in this Technical Specification.

The W3C schema can be found at <http://oidregistry.info/schema>.

The information model represented in [Figure 1](#) can be found at <http://oidregistry.info/model>.

Bibliography

- [1] ISO 8601, *Data elements and interchange formats — Information interchange — Representation of dates and times*
- [2] ISO/TS 22220, *Health informatics — Identification of subjects of health care*
- [3] ISO/IEC 8824-1, *Information technology — Abstract Syntax Notation One (ASN.1): Specification of basic notation*
- [4] ISO/IEC 8824-2, *Information technology — Abstract Syntax Notation One (ASN.1): Information object specification*
- [5] ISO/IEC 8824-3, *Information technology — Abstract Syntax Notation One (ASN.1): Constraint specification*
- [6] ISO/IEC 8824-4, *Information technology — Abstract Syntax Notation One (ASN.1): Parameterization of ASN.1 specifications*
- [7] ISO/IEC 19757-3, *Information technology — Document Schema Definition Languages (DSDL) — Part 3: Rule-based validation — Schematron*
- [8] ITU-T X.667 | 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*
- [9] ITU-T X.680 | ISO/IEC 8824-1, *Information Technology — Abstract Syntax Notation One (ASN.1), Specification of Basic Notation, 1997*
- [10] IETF RFC 1738 - Uniform Resource Locators (URL)
- [11] IETF RFC 2396 - Uniform Resource Identifiers (URI): Generic Syntax
- [12] IETF RFC 2806 - URLs for Telephone Calls
- [13] IETF RFC 2046 - Multipurpose Internet Mail Extensions (MIME) Part Two: Media Types
- [14] IETF RFC 2978 - IANA Charset Registration Procedures
- [15] IETF. Internet Engineering Task Force (IETF), <http://www.ietf.org>
- [16] W3C: XML Schema Part 1: Structures Second Edition - W3C Recommendation 28 October 2004
- [17] W3C: XML Schema Part 2: Datatypes Second Edition - W3C Recommendation 28 October 2004
- [18] FIELDING R.T. Architectural Styles and the Design of Network-based Software Architectures. Dissertation, University Of California, Irvine, 2000. <http://www.ics.uci.edu/~fielding/pubs/dissertation/top.htm>
- [19] HL7 V3- Data Types - Abstract Specification (R2)

