TECHNICAL SPECIFICATION

**ISO/TS 13582**

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# 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

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ISO/TS 13582 was prepared by Technical Committee ISO/TC 215, *Health informatics.*

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# 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.

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# 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.

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## 2 Normative references

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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 1*

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

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### 3.2 Abbreviations

The following abbreviations 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.

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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.

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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 a 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.


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### 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.

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### 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).

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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.

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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.

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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 essentially 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.


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### 5.2 Additional descriptions

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

Informative 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.

Informative 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.

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

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| 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, *Health informatics,* in collaboration with HL7 International, ISO/IEC JTC 1/SC 6 and ITU-T SG 17.

The draft of this document 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.

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# 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.

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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 (Figure 1).

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Additional remarks:

— 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”.

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