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Health informatics - Service Architecture (HISA) - Part 2: Information viewpoint (ISO 12967- 2:2020)

Medizinische Informatik - Servicearchitektur - Teil 2: Informationssicht (ISO 12967-2:2020)

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SIST EN ISO 12967-2:2021

Contents

Page

European foreword **3**

iTeh STANDARD PREVIEW
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SIST EN ISO 12967-2:2021
https://standards.iteh.ai/catalog/standards/sist/a46d2eb5-73d1-4f99-b401-c56a30ab3e27/sist-en-iso-12967-2-2021

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European foreword

This document (EN ISO 12967-2:2020) has been prepared by Technical Committee ISO/TC 215 "Health informatics" in collaboration with Technical Committee CEN/TC 251 “Health informatics” the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 2021, and conflicting national standards shall be withdrawn at the latest by May 2021.

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INTERNATIONAL STANDARD

ISO 12967-2

Second edition
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Health informatics — Service architecture (HISA) —

Part 2: Information viewpoint

Informatique de santé — Architecture de service —

Partie 2: Point de vue de l'information

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SIST EN ISO 12967-2:2021

Contents

Page

Foreword ..... **v**

Introduction ..... **vi**

1 Scope **1**

2 Normative references **1**

3 Terms and definitions **1**

4 Abbreviated terms **2**

5 Methodological principles **2**
5.1 Language and notation adopted for the specification of the model 2
5.2 UML class diagram notation guidelines and profile 3
5.3 Clusters of objects in the information model 4
5.4 Operational and descriptive information: classifications, knowledge and its instantiation 5
5.5 Data types 7
5.6 General characteristics of the model 8

6 General characteristics of the model **8**
6.1 Common structure of each information object: the GenericHisaClass 8
6.2 UML diagram 9
6.3 Specification of Generic HISA Class 10
6.3.1 Generic meta-class 10
6.3.2 Class: Set of structure attributes 11
6.3.3 Class: Set of class specific attributes 11
6.3.4 Class: Set of common attributes 11
6.3.5 Class: Set of system attributes 11
6.3.6 Class: Set of version attributes 12
6.3.7 Class: Extended attributes 12
6.3.8 Class: State changes 13
6.3.9 Class: Business rules 13
6.3.10 Class: Classification criteria 14

7 The reference information models **14**
7.1 Classification objects 14
7.1.1 Aim 14
7.1.2 UML information model 14
7.1.3 Specification of the individual classes 15
7.2 Subject of care objects 18
7.2.1 Aim 18
7.2.2 UML information model 18
7.2.3 Specification of the individual classes 19
7.3 Activity management objects 23
7.3.1 Aim 23
7.3.2 UML information model 24
7.3.3 Specification of the individual classes 24
7.4 Clinical and health information objects 31
7.4.1 Aim 31
7.4.2 UML information model 31
7.4.3 Specification on the individual classes 32
7.5 Resource management objects 37
7.5.1 Aim 37
7.5.2 UML information model 37
7.5.3 Specification of the individual classes 37
7.6 User and authorization objects 43
7.6.1 Aim 43
7.6.2 UML information model 43
7.6.3 Specification of the individual classes 44

iTeh STANDARD PREVIEW
(standards.iteh.ai)
SIST EN ISO 12967-2:2021
https://standards.iteh.ai/catalog/standards/sist/a46d2eb5-73d1-4f99-b401-c50a50ab8e27/sist-en-iso-12967-2-2021

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SIST EN ISO 12967-2:2021

7.7 Messaging objects 49
7.7.1 Aim 49
7.7.2 UML information model 50
7.7.3 Specification of the individual classes 50
Bibliography **54**

iTeh STANDARD PREVIEW
(standards.iteh.ai)
SIST EN ISO 12967-2:2021
https://standards.iteh.ai/catalog/standards/sist/a46d2eb5-73d1-4f99-b401-c56a30ab3e27/sist-en-iso-12967-2-2021

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Foreword

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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).

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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

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This document was prepared by Technical Committee ISO/TC 215, *Health informatics*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 251, *Health informatics*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

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https://standards.iteh.ai/catalog/standards/sist/a46d2eb5-73d1-4f99-b401-c56a30ab3e27/sist-en-iso-12967-2-2021

This second edition cancels and replaces the first edition (ISO 12967-2:2009), which has been technically revised. The main changes compared to the previous edition are as follows:

— use of terms, definitions and concepts from ISO 13940:2015 (Contsys), with textual alignment throughout the document including figures, to the extent possible and beneficial;

— reference to further standards, such HL7®;

— updates to the Bibliography.

A list of all parts in the ISO 12967 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

The ISO 12967 series provides guidance for the description, planning and development of new systems as well as for the integration of existing information systems, both within one enterprise and across different healthcare organizations through an architecture integrating the common data and business logic into a specific architectural layer (i.e. the service architecture), distinct from individual applications and accessible throughout the whole information system through information services, as shown in Figure 1.

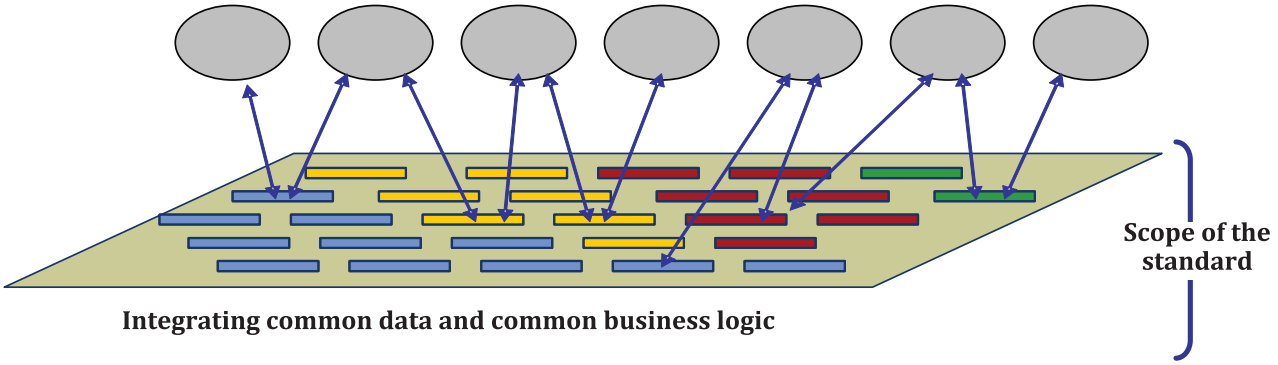

Figure 1 — Scope of the ISO 12967 series

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The overall architecture is formalized according to ISO/IEC 10746 (all parts) and is therefore structured through the following three viewpoints.

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a) Enterprise viewpoint: specifies a set of fundamental common requirements at enterprise level with respect to the organizational purposes, scopes and policies that should be supported by the information and functionality of the service architecture. It also provides guidance on how one individual enterprise (e.g. a regional healthcare authority, a large hospital or any other organization where this model is applicable) can specify and document additional specific business requirements, with a view to achieving a complete specification, adequate for the characteristics of that enterprise.

   Enterprise viewpoint is specified in ISO 12967-1.

b) Information viewpoint: specifies the fundamental semantics of the information model to be implemented by the service architecture to integrate the enterprise's common data and to support the enterprise requirements formalized in ISO 12967-1. It also provides guidance on how one individual enterprise can extend the standard model with additional concepts needed to support local requirements in terms of information to be put in common.

   Information viewpoint is specified in this document.

c) Computational viewpoint: specifies the scope and characteristics of the information services that should be provided by the service architecture for allowing access to the common data as well as for the execution of the business logic supporting the enterprise processes identified in the information viewpoint and in ISO 12967-1. It also provides guidance on how one individual enterprise can specify additional information services needed to support local specific requirements in terms of common business logic to be implemented.

   Computational viewpoint is specified in ISO 12967-3.

ISO 12967-1:2020, Annex C includes an explanation of ISO 23903:—[1)] and its relevance in regard to the ISO 12967 series, for integration with other International Standards such as ISO 13940.

1) Under preparation. Stage at the time of publication: ISO/DIS 23903:2020.

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Health informatics — Service architecture (HISA) —

Part 2: Information viewpoint

1 Scope

This document specifies the fundamental characteristics of the information model implemented by a specific architectural layer (i.e. the service architecture) of the information system to provide a comprehensive and integrated storage of the common enterprise data and to support the fundamental business processes of the healthcare organization, as defined in ISO 12967-1.

The information model is specified in this document without any explicit or implicit assumption on the physical technologies, tools or solutions to adopt for its physical implementation in the various target scenarios. The specification is nevertheless formal, complete and non-ambiguous enough to allow implementers to derive an efficient design of the system in the specific technological environment that will be selected for the physical implementation.

This document does not aim at representing a fixed, complete, specification of all possible data that can be necessary for any requirement of any healthcare enterprise. It specifies only a set of characteristics, in terms of overall organization and individual information objects, identified as fundamental and common to all healthcare organizations, and that is satisfied by the information model implemented by the service architecture.

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SIST EN ISO 12967-2:2021
https://standards.iteh.ai/catalog/standards/sist/a46d2eb5-75d1-4f99-b401-c56a3fab3e27/sist-en-iso-12967-2-2021

Preserving consistency with the provisions of this document, physical implementations are allowed extensions to the standard information model in order to support additional and local requirements. Extensions include both the definition of additional attributes in the objects of the standard model, and the implementation of entirely new objects.

Also, this document specification is extensible over time according to the evolution of the applicable standardization initiatives.

The specification of extensions is carried out according to the methodology defined in ISO 12967-1:2020, Clause 7.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

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3.1
information object
information held by the system about entities of the real world

Note 1 to entry: Entities including the ODP system itself can be represented in an information specification in terms of information objects, their relationships and behaviour.

3.2
package
cluster of *information objects* (3.1)

3.3
middleware
enabling technology of *enterprise application integration* (3.4) describing a piece of software that connects two or more software applications so that they can exchange data

3.4
enterprise application integration
EAI
use of software and computer systems architectural principles to integrate a set of enterprise computer applications

3.5
subject of care
patient
subject of healthcare
healthcare actor with a person role; who seeks to receive, is receiving, or has received healthcare

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[SOURCE: ISO 13940:2015, 5.2.1, modified — Note and Examples omitted.]

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4 Abbreviated terms

ODP Open Distributed Processing

HISA Health Informatics Service Architecture

UML Unified Modeling Language

5 Methodological principles

5.1 Language and notation adopted for the specification of the model

The objective of the information viewpoint specification is to describe the information relevant for the enterprise to be handled by the service architecture. It consists of a formal information model detailing the semantic and syntactic aspects of all data to be managed.

The specification is based on an object model, derived from the enterprise viewpoint by properly structuring and aggregating the information that has been identified as relevant in the specification of the business processes, tasks and activities.

The general approach of the ODP standard [i.e. ISO/IEC 10746 (all parts)] is also used in ISO 12967-1, the modeling language used in this document is UML.

The information viewpoint is concerned with information modeling (i.e. the kinds of information handled by the system). It focuses on the semantics of information and information processing in the system. It is fundamental that the individual components of a distributed system share a common understanding of the information they communicate when they interact, or the system will not behave as expected. Some of these items of information are handled, in one way or another, by many of the objects in the system. To ensure that the interpretation of these items is consistent, the information

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language defines concepts for the specification of the meaning of information stored within, and manipulated by, an ODP system, independently of the way the information processing functions themselves are to be implemented.

Thus, information held by the ODP system about entities in the real world, including the ODP system itself, is represented in an information specification in terms of information objects, and their associations and behaviour. Atomic information objects represent basic information elements. More complex information is represented as composite information objects, each expressing associations over a set of constituent information objects.

Some elements visible from the enterprise viewpoint will be visible from the information viewpoint and vice versa. For example, an activity seen from the enterprise viewpoint will be in the information viewpoint as the specification of some processing which causes a state transition of an information entity.

Different notations for information specifications model the properties of information in different ways. It is possible to place emphasis on classification and reclassification of information types, or on the states and behaviour of information objects. In some specification languages, atomic information objects are represented as values. The approach to be taken will depend on the modeling technique and notation being used.

Assessment of conformance to the information specification of a system involves relating the requirements expressed in the specification to sets of observations of the behaviour of the system at conformance points identified in the engineering and technology specification, and assessing the degree of consistency between the requirements and the observations.

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5.2 UML class diagram notation guidelines and profile

For each cluster of objects identified in the enterprise viewpoint, the information objects will be illustrated according to the following rationale.

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— Information objects (i.e. classes) grouped in the packages will be not be coloured.

— Classes not expressly grouped in the package will also be represented if there are associations from classes belonging to the package to these classes. These classes, however, will be coloured in yellow.

— The names of classes will be meaningful and start with a capital letter (e.g. Person). If the name is composed of more than one word the blank spaces between the words present in the diagrams will be instead omitted in the section of the tables containing the class identifiers (e.g. “subject of care will have as class identifier “SubjectOfCare”). Blank spaces are left in the class names and diagrams also with the scope of supporting readability.

— Associations will be labelled when the label adds value to the diagram.

— Association labels indicate a property, or a verb phrase; in the latter case, an arrow is added to the association label to avoid ambiguity.

— Labels are always in lower case and, if a label is a verb phrase (with arrow), it will have one blank space in between words.

— Navigability is not relevant when using UML for an information specification and will not be represented.

— In general, in order to support readability, the classes should only contain the name of the class. Properties should be described in the tables; however, if properties are displayed in the diagrams, the following two points hold.

  — Notation for visibility of properties is not used, as it is not pertinent for the conceptual models used in the information viewpoint. Although visibility symbols could be used to indicate access control, this is not done as all healthcare-related information should be accessed through careful authorization.

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