INTERNATIONAL STANDARD

ISO 12967-3

Second edition
2020-11

Health informatics — Service architecture (HISA) —

Part 3: Computational viewpoint

Informatique de santé — Architecture de service —

Partie 3: Point de vue informatique

Reference number
ISO 12967-3:2020(E)

© ISO 2020



COPYRIGHT PROTECTED DOCUMENT

© ISO 2020

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword ... **iv**
Introduction ... **v**
1 Scope ... **1**
2 Normative references ... **1**
3 Terms and definitions ... **2**
4 Abbreviated terms ... **2**
5 Methodological principles ... **2**
5.1 General ... 2
5.2 Clusters of objects ... 2
5.3 Computational language ... 3
5.4 The computational objects and interfaces ... 4
5.5 Interactions ... 5
6 General characteristics of the model ... **6**
6.1 The two types of computational objects for handling the information ... 6
6.2 The 'basic' information services ... 6
6.2.1 General requirements ... 6
6.2.2 'Add' basic information services ... 7
6.2.3 "Update" basic information services ... 8
6.2.4 "Delete" basic information services ... 10
6.2.5 "Detail" basic information services ... 12
6.2.6 "List" basic information services ... 13
6.3 General-purpose interface ... 15
6.3.1 General ... 15
6.3.2 List of information services ... 16
6.3.3 Behavioural specifications ... 16
6.4 The eHealth business-related interfaces supporting the workflow computational objects ... 17
6.4.1 General ... 17
6.4.2 eHealth business-related services managing healthcare workflows ... 17
6.4.3 Interfaces supporting the "Subject of care workflow" ... 17
6.4.4 Interfaces supporting the "Healthcare information workflow" ... 19
6.4.5 Interfaces supporting the "Activity management workflow" ... 21
6.4.6 Behavioural specifications, common to the eHealth business-related services ... 23
6.5 Common requirements of the interfaces ... 24
6.5.1 Interface documentation and organization ... 24
6.5.2 Naming criteria ... 24
6.5.3 Data types ... 25
6.5.4 Structure and organization of the interfaces ... 25
Annex A (informative) **Example of services** ... **27**
Annex B (informative) **HISA and FHIR®** ... **29**
Bibliography ... **33**

© ISO 2020 – All rights reserved

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).

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.

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).

This second edition cancels and replaces the first edition (ISO 12967-3:2009), 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);

— reference to further standards, such as HL7® and FHIR®;

— 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.

© ISO 2020 – All rights reserved

Introduction

The ISO 12967 series specifies fundamental requirements for 'information infrastructure' and 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 healthcare specific service architecture), distinct from individual applications and accessible throughout the whole information system through information services, as shown in Figure 1.

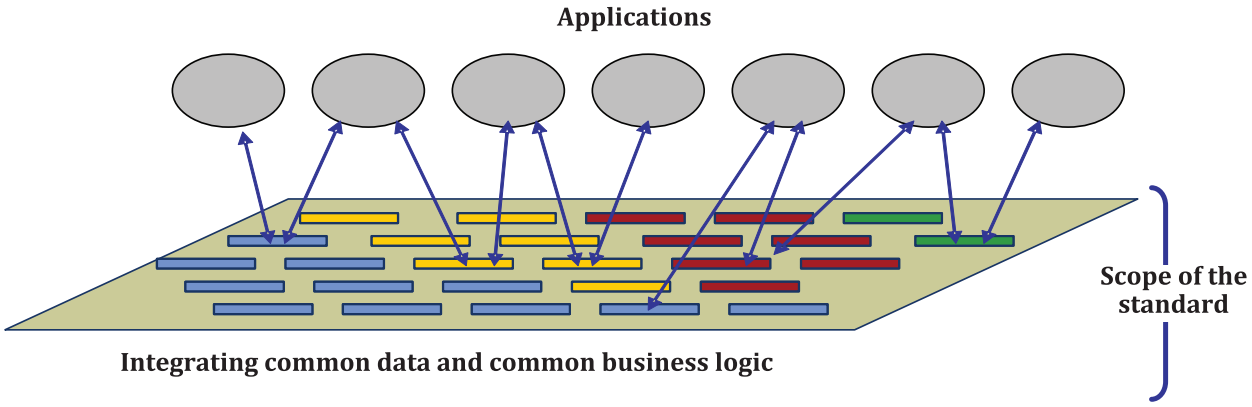


Figure 1 — Scope of the ISO 12967 series

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

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 ISO 12967 series information model with additional concepts needed to support local requirements in terms of information to be put in common.

   Information viewpoint is specified in ISO 12967-2.

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 this document.

© ISO 2020 – All rights reserved

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.

© ISO 2020 – All rights reserved

Health informatics — Service architecture (HISA) —

Part 3: Computational viewpoint

1 Scope

This document specifies the fundamental characteristics of the computational model implemented by a specific architectural layer of the information system (i.e. the service architecture) to provide a comprehensive and integrated interface to the common enterprise information and to support the fundamental business processes of the healthcare organization, as defined in ISO 12967-1. The computational model is specified without any explicit or implicit assumption about 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 which will be selected for the physical implementation.

The computational model specified in this document provides the basis for ensuring consistency between different engineering and technology specifications (including programming languages and communication mechanisms) since they are intended to be consistent with the same computational object model. This consistency allows open inter-working and portability of components in the resulting implementation.

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

Preserving consistency with the provisions of this document, physical implementations of the computational model specified in this document can allow extensions in order to support additional and local requirements. Extensions can include both the definition of additional properties of the objects of the computational model specified in this document and the implementation of entirely new objects.

Also, the computational model specified in this document can be extendable over time according to the evolution of the applicable standardization initiatives, in accordance to the methodology defined in ISO 12967-1:2020, Clause 7, which identifies a set of healthcare common information services, describing the requirements behind them and the methodology through which they will be used.

The information services specified in this document are only the minimal set identifiable according to the identified requirements of the healthcare enterprise, and constituting the service architecture (i.e. the integration platform) to serve as the basis for healthcare applications, e.g. EHR or patient administration.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 12967-1:2020, *Health informatics — Service architecture — Part 1: Enterprise viewpoint*

ISO 12967-2:2020, *Health informatics — Service architecture — Part 2: Information viewpoint*

© ISO 2020 – All rights reserved

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/

3.1
interface
abstraction of the behaviour of an object which consists of a subset of the possible interaction mechanisms of that object, together with the set of constraints when that interaction occurs

3.2
computational object
object as seen in a computational viewpoint representing the functional decomposition of a system showing a state and behaviour as well as interactions through interfaces with other computational objects

3.3
subject of care
patient
subject of healthcare
healthcare actor with a person role; who seeks to receive, is receiving, or has received healthcare

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

4 Abbreviated terms

EHR Electronic Health Record

HISA Health Informatics — Service Architecture

ODP Open Distributed Processing

UML Unified Modeling Language

5 Methodological principles

5.1 General

This document encompasses the computational viewpoint, which is concerned in answering HISA design aspects through the functional decomposition of the system into a set of computational objects that interact at interfaces, also enabling distribution. HISA will thus be further specified in terms of computational objects, which manage information and provide services, and their interfaces, starting from the clusters of objects identified in ISO 12967-1 and further detailed in ISO 12967-2.

5.2 Clusters of objects

ISO 12967-1 has identified the scope, need for, and use of the ISO 12967 series by both developers and end users. It has described the scope of the business objects from the organization's viewpoint, by summarizing the related user activities and requirements through natural language. During this process the main healthcare common clusters of objects have been identified in ISO 12967-1:

a) Subject of care objects

These objects handle the information necessary for supporting the users' activities that are identified in the "Subject of care workflow".

© ISO 2020 – All rights reserved