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**Health informatics — Service  
architecture —**

**Part 3:  
Computational viewpoint**

*Informatique de santé — Architecture de service —  
Partie 3: Point de vue informatique*



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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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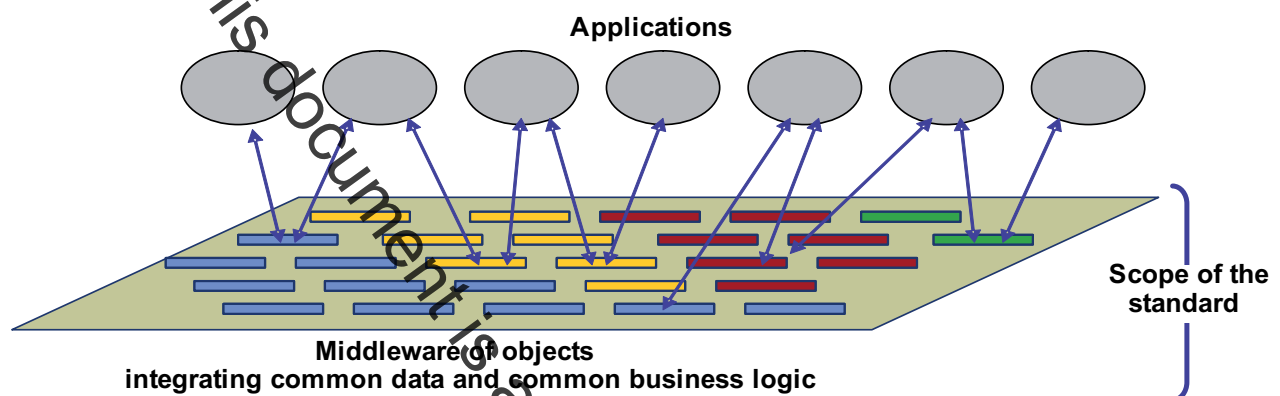
ISO 12967-3 was prepared by Technical Committee ISO/TC 215, *Health informatics*, based on the European Standard EN 12967-3:2007 with minor editorial amendments.

ISO 12967 consists of the following parts, under the general title *Health informatics — Service architecture*:

- *Part 1: Enterprise viewpoint*
- *Part 2: Information viewpoint*
- *Part 3: Computational viewpoint*

## Introduction

ISO 12967 is a multi-part standard that 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 middleware), distinct from individual applications and accessible throughout the whole information system through services, as shown in Figure 1.



**Figure 1 — Scope of this International Standard**

The overall architecture is formalized according to ISO/IEC 10746 (all parts)<sup>[10] [11][12][13]</sup> 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 must be supported by the information and functionality of the middleware. 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 middleware to integrate the common enterprise 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 ISO 12967-2.

- c) Computational viewpoint: specifies the scope and characteristics of the services that must be provided by the middleware for allowing access to the common data as well as 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 services needed to support local specific requirements in terms of common business logic to be implemented.

Computational viewpoint is specified in this part of ISO 12967.

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# Health informatics — Service architecture —

## Part 3: Computational viewpoint

### 1 Scope

HISA specifies fundamental requirements for 'information infrastructure' and healthcare specific middleware services.

This part of ISO 12967 specifies the fundamental characteristics of the computational model to be implemented by a specific architectural layer of the information system (i.e. the middleware) 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 be adopted 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 provides the basis for ensuring consistency between different engineering and technology specifications (including programming languages and communication mechanisms) since they must be consistent with the same computational object model. This consistency allows open inter-working and portability of components in the resulting implementation.

This specification does not aim at representing a fixed, complete, specification of all possible interfaces that may 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 middleware.

Preserving consistency with the provisions of this part of ISO 12967, physical implementations shall allow extensions to the standard computational model in order to support additional and local requirements. Extensions shall include both the definition of additional properties in the objects of the standard model and the implementation of entirely new objects.

Also this standard specification shall be extendable over time according to the evolution of the applicable standardization initiatives. The specification of extensions shall be carried out according to the methodology defined in Clause 7 of ISO 12967-1:2009, which identifies a set of healthcare common information services, describing their need and the methodology through which they will be used. These are only the minimal identifiable set of services according to the needs of the healthcare enterprise, and constituting the "middleware" platform (i.e. integration platform) to serve as the basis for healthcare applications, e.g. EHR or patient administration.

## 2 Normative references

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

ISO 12967-1:2009, *Health informatics — Service architecture — Part 1: Enterprise viewpoint*

ISO 12967-2:2009, *Health informatics — Service architecture — Part 2: Information viewpoint*

## 3 Terms and definitions

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

### 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

## 4 Abbreviations

EHR	Electronic Health Record
HISA	Health Informatics Service Architecture
ODP	Open Distributed Processing
UML	Unified Modelling Language

## 5 Methodological principles

### 5.1 General

This part of ISO 12967 encompasses the computational viewpoint, which is concerned in answering HISA middleware design aspects through the functional decomposition of the system into a set of computational objects that interact at interfaces, also enabling distribution. The Health Informatics Service Architecture 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 HISA standard by both developers and end users. It has described the scope of the business objects from the organization's viewpoint, by summarising the related user activities and requirements through natural language. During this process the main healthcare common clusters of objects have been identified:

- 1) Subject of care objects

These objects handle the information necessary for supporting the users' activities identified in the "Subject of Care workflow" of ISO 12967-1.