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Raziskovanje sintakse obstoječih izmenjevalnih formatov za uporabo v zdravstvenem varstvu

Investigation of syntaxes for existing interchange formats to be used in health care

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Investigation of syntaxes for existing interchange formats to be used in healthcare

This CEN REPORT has been established by the CEN/TC 251 "Medical informatics" and has been approved by CEN on 1993-07-01.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

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Foreword

This technical report was prepared under the direction of the European Committee for Standardization (CEN) and approved by the CEN Technical Committee 251 (TC 251 - Medical Informatics).

A project team, CEN/TC 251/PT004, was established in February 1992 based on mandate BC-IT 211 given by CEN/TC 251 and approved by the CEN/BT. A copy of the terms of reference for the project team is provided in annex A. The project team consisted of 8 members, given annex B.

This technical report has gone through three stages:

First, an Interim Report (INR) was produced and presented for the CEN/TC 251/WG 3 for technical control. Based on the comments received from members of WG 3, the report was updated and a First Working Document (FWD) was produced.

The FWD was submitted to CEN/TC 251 for a three months period of comments. A total of 84 comments were received. Based on the these comments, an amendment to the Technical Report was produced and presented to WG3. The amendments, together with the FWD, were accepted by WG3 as a final technical document and forwarded to CEN/TC 251 for approval. CEN/TC 251 approved these documents on 1993-01-26.

This Final Document (FIN) of the Technical Report is an editorial update of the FWD together with the approved amendments. In order to enhance the readability of the report, it has been split into two parts. Part I is the main part and includes the explanation of the method and investigation together with conclusions and recommendations. Part II contains two examples of health care domain analyses and supplementary information about the investigation of each interchange format.

Sigurd From
Leader of CEN/TC 251/PT 004

Oslo, January 1993

PART I: Method, Investigation, Conclusions and Recommendations

1. Introduction

The objective of this technical report is to investigate syntaxes for existing interchange formats (IFs) to be used in health care and to define a strategy for selecting IFs. This requires the establishment of a framework for interworking between health care applications. Today such a framework does not exist and PT 004 has described a preliminary method for development of messages for information exchange within the health care which will be used in the investigation and the definition of a future strategy.

1.1. Scope

1.1.1. Original Scope

In the terms of reference for PT 004 the scope of the investigation was the whole of the health care area. The number of suggested evaluation criteria was large. In the recommended strategy for the project team it is stated "The interchange formats need to be evaluated against a set of properties. The properties will be selected both from health care and technical requirements including efficiency, richness, complexity, ambiguity, flexibility, cost and practicality".

1.1.2. Reduced Scope

Due to resource constrains, PT 004 has reduced the scope of its work. This has been done in three ways:

1. The domain of health care is reduced to two examples from the laboratory communication domain and the internal medicine domain. This selection is explained in chapter 4.
2. The number and type of evaluation criteria were reduced compared to the suggested properties in the terms of reference. Selection of the evaluation criteria was done based on the established method for message development. A more detailed explanation is given in chapter 5.
3. The number of IFs were reduced from a possible 23 down to 5. The selected formats were ASN.1, ASTM E1238, EDIFACT, EUCLIDES and ODA. This selection is explained in chapter 6.

1.2. Definitions and Acronyms

1.2.1. Definitions

Term	Definition
Communication Party	An actor of the problem domain participating in the communication therein.
Communication Role	The role of a party in a communication situation defining the party's behaviour in the communication. Associated with a communication role is a set of services which the party provides to other parties.
Domain Information Model	The model describing common concepts and relationships for a problem domain.
General Message Description	A conceptual description of a message independent of interchange format. A GMD may be regarded as one specific subset of a DIM related to one message type.
Interchange Format	The representation of the data elements and the structure of a message while in transfer between systems. The IF consists of a set of construction elements and a syntax. The representation is technology specific.
Interchange Format Dependent Message Description	The mapping of a conceptual message (GMD) into a message using a specific interchange format.
Problem Domain	The field of health care under consideration in a modelling process. Modified from [Coad-91].
Scenario	Formal description of a class of business activities including the semantics of business agreements, conventions and information content [Open-Edi-91].
Service	A specific behaviour that a communication party in a specific role is responsible for exhibiting. Modified from [Coad-91].
Syntax	The syntax of an interchange format describes the rules for combining the construction elements of the IF.

1.2.2. Acronyms

Acronym	Description
ASCII	American Standard Code for Information Interchange
ASN.1	Abstract Syntax Notation One
ASTM	American Society for Testing and Materials
BER	Basic Encoding Rules
CMIS	Common Management Information Service
CMIP	Common Management Information Protocol
DICOM	Digital Imaging and Communication in Medicine
DIM	Domain Information Model
EDI	Electronic Data Interchange
EDIFACT	Electronic Data Interchange For Administration, Commerce and Transport
GMD	General Message Description
HL7	Health Level 7
IF	Interchange Format
IFDMD	Interchange Format Dependent Message Description
IPI	Image Processing and Interchange
JPEG	Joint Photographic Experts Group (JTC1/SC29/WG10)
MEDIX	Medical Data Interchange Committee
ODA	Open Document Architecture (CCITT)
OSI	Open Systems Interconnection
SGML	Standardized Generalised Mark-up Language
SQL	Structured Query Language

2. Interworking between Health Care Applications

The health service consists of a set of health care parties that collaborate in a network. Each party provides and requests services to and from the other parties. This mutual dependency results in exchange of information between the parties. Today this information is mostly exchanged by phone or mail. The information exchange may be part of any health care activity including clinical, patient management, financial management, logistics, etc.

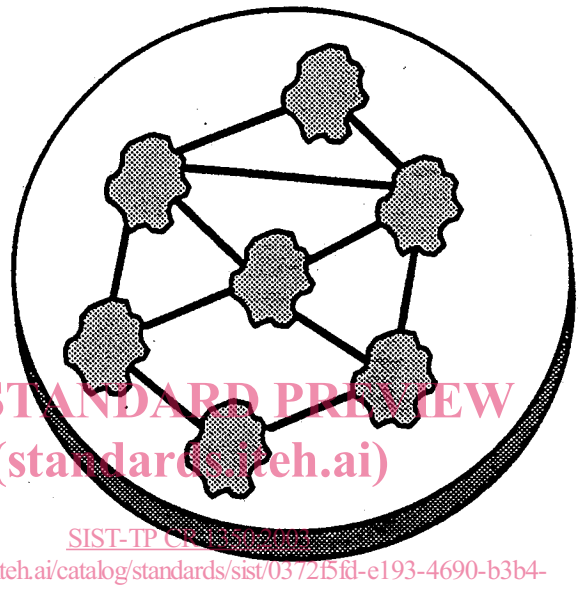

Figure 1: The health care network with health care service requesters and providers

The introduction of electronic communication in the health care should make communication between the parties in the network easier and more efficient and improve the quality of the service provided by the health care parties. In addition new ways of communicating will open the way for new types of services such as remote diagnosis between hospitals.

Each party participating in the network must be supported by computer applications that are able to interwork. Integrating computer applications have two sides: the development of a common description of the health care or application domain and finding good technical solutions to support the requirements in the application domain.

IFs can be viewed as technical solutions to the problem of representing information exchanged between computers. The domain requirements should decide which functions of IFs are important, which again will help selecting an appropriate IF.

PT 004 has used a method for analysing an application domain, finding the domain requirements and creating formal descriptions of the domain. The result of applying this method is a set of message descriptions that are independent of any IF. These descriptions are called General Message Descriptions (GMDs). The GMDs set the functional requirements for the IF.

2.1. Message Development Method

Figure 2 shows the message development method used by PT 004. Each box in the figure illustrates a task in the method and the respective documentation. The method is developed based on results emerged from other standards activities
[From-91], [Harrington-93], [KITH-92], [Open-Edi-91].

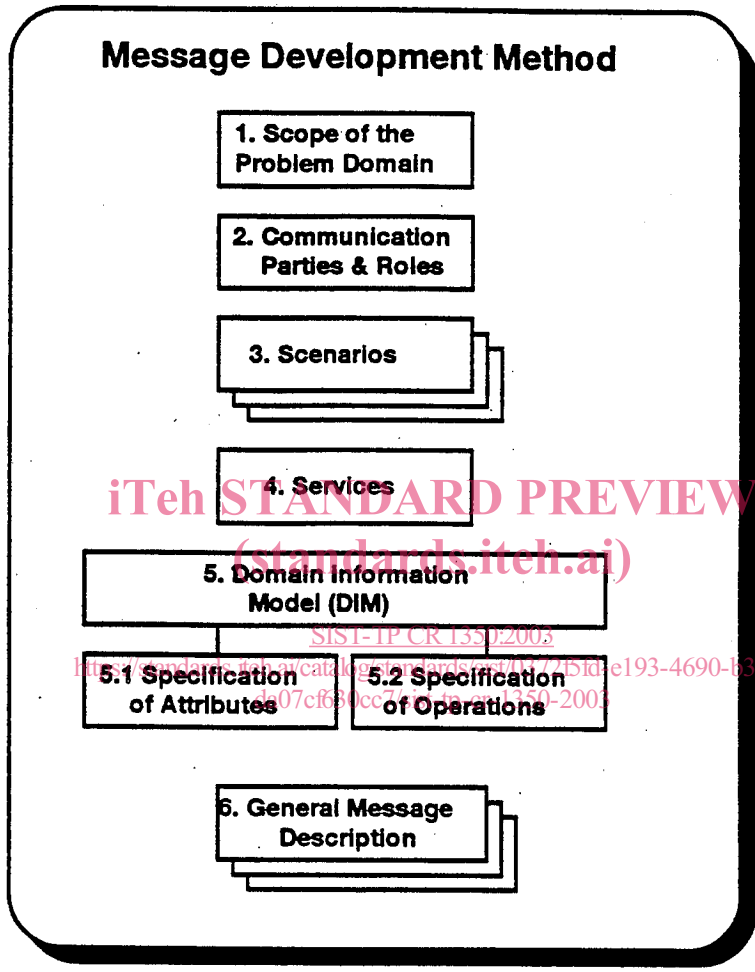

Figure 2: Message Development Method

2.1.1. Scope of the Problem Domain

Health care is a large entity which incorporates many application areas. In analysis, it is important to limit the scope to a manageable size. The field under consideration is called the **problem domain.** Our first task is to define the scope of the problem domain. The scope gives the purpose and the context for the modelling. It is helpful to specify what is both inside and outside the scope.

2.1.2. Communication Parties and Communication Roles

The main actors of the problem domain which participate in the communication are called the **communication parties.** Each communication party has one or more **communication role**