SLOVENSKI STANDARD
SIST-TP CEN/TR 15253:2006

01-april-2006

Zdravstvena informatika – Zahteve za kakovost storitev pri izmenjavi zdravstvenih informacij

Health informatics - Quality of service requirements for health information interchange

Medizinische Informatik - Anforderungen an die Service-Qualität für den Austausch von medizinischen Informationen

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Informatique de santé - Exigences de qualité de service pour les échanges d'information de santé

SIST-TP CEN/TR 15253:2006
https://standards.iteh.ai/catalog/standards/sist/7a765e55-12da-4832-a0ff-363cb9895e4b/sist-tp-cen-tr-15253-2006

Ta slovenski standard je istoveten z: **CEN/TR 15253:2005**

ICS:

03.120.99	Drugi standardi v zvezi s kakovostjo	Other standards related to quality
35.240.80	Uporabniške rešitve IT v zdravstveni tehniki	IT applications in health care technology

SIST-TP CEN/TR 15253:2006 **en**

2003-01.Slovenski inštitut za standardizacijo. Razmnoževanje celote ali delov tega standarda ni dovoljeno.

SIST-TP CEN/TR 15253:2006

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST-TP CEN/TR 15253:2006
https://standards.iteh.ai/catalog/standards/sist/7a765e55-12da-4832-a0ff-363cb9893e4b/sist-tp-cen-tr-15253-2006

SIST-TP CEN/TR 15253:2006

TECHNICAL REPORT

RAPPORT TECHNIQUE

TECHNISCHER BERICHT

CEN/TR 15253

December 2005

ICS 35.240.80

English Version

Health informatics - Quality of service requirements for health information interchange

Informatique de santé - Exigences de qualité de service pour les échanges d'information de santé

Medizinische Informatik - Anforderungen an die Service-Qualität für den Austausch von medizinischen Informationen

This Technical Report was approved by CEN on 13 November 2005. It has been drawn up by the Technical Committee CEN/TC 251.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST-TP CEN/TR 15253:2006
https://standards.iteh.ai/catalog/standards/sist/7a765e55-12da-4832-a0ff-363cb9893e4b/sist-tp-cen-tr-15253-2006

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

© 2005 CEN All rights of exploitation in any form and by any means reserved worldwide for CEN national Members.

Ref. No. CEN/TR 15253:2005: E

SIST-TP CEN/TR 15253:2006

Contents

page

iTeh STANDARD PREVIEW
(standards.iteh.ai)
SIST-TP CEN/TR 15253:2006
https://standards.iteh.ai/catalog/standards/sist/7a765e55-12da-4832-a0ff-363cb9893e4b/sist-tp-cen-tr-15253-2006

SIST-TP CEN/TR 15253:2006

Foreword

This Technical Report (CEN/TR 15253:2005) has been prepared by Technical Committee CEN /TC 251, "Health informatics" the secretariat of which is held by NEN.

This document has been developed by the Expert Group for Healthcare within the European Workshop for Open Systems (EWOS/EG MED). The editor of the document is Dr A J Kerr of Level-7 Ltd, a member of EWOS/EG MED. Thanks are due to all who have contributed ideas, text and scenarios to assist in the production of this report. Special appreciation is expressed to Jeremy Tucker, who has provided liaison with the ISO/IEC JTC/1 QoS Group and provided much of the text for Clause 9.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
SIST-TP CEN/TR 15253:2006
https://standards.iteh.ai/catalog/standards/sist/7a765e55-12da-4832-a0ff-363cb9893e4b/sist-tp-cen-tr-15253-2006

SIST-TP CEN/TR 15253:2006

Introduction

Background

This report considers user requirements for Quality of Service (QoS) specifically in the healthcare Information Technology (IT) environment.

QoS is defined in [4] as: ”A set of qualities related to the collective behaviour of one or more objects.” Thus the definition is very broad, even when restricted to the healthcare IT environment.

CR 12161 (EWOS/ETG 021): ”A Method for Defining Profiles for Health Care” [7] deals with the general categorisation of user requirements for healthcare information interchange. It assesses the suitability of profiles of standards from the domains of Open Systems Interconnection / Open Systems Environment (OSI/OSE) to satisfy those user requirements.

The method defined in CR 12161 was subsequently applied (by EWOS project team PT N024) to the specific domain of medical image interchange, and the findings were recorded in CR 12069 (EWOS/ETG 045): ”Profiles for Medical Image Interchange” [8]. In performing this work, a number of requirements were identified which could not adequately be mapped to the services provided by standardised OSI profiles. Some of these requirements could be considered as QoS issues.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

With this in mind, the Healthcare Expert Group of the European Workshop for Open Systems (EWOS/EG MED) initiated a work item in May 1995 to identify QoS requirements for healthcare information interchange which need to be supported by standardised communications services. This report is the result of that activity.

SIST-TP CEN/TR 15253:2006
https://standards.iteh.ai/catalog/standards/sist/...

At the same time, international IT standards have been under development (by ISO/IEC JTC1/SC21 and ITU-T SG7) to define a QoS Framework [2] of terminology and concepts, in order to assist those wishing to specify or procure systems in which QoS is important, and to publish a Guide to QoS Methods and Mechanisms [3], which is intended to be a source-book of references and widely-applicable mechanisms that can be used by systems designers and implementors. The scope of the activity is all forms of interaction between elements of distributed systems.

The QoS work in ISO has been applied to the development of time-critical communications and to enhanced communications transport service and protocol (ECTS & P) for multicast. It is now being applied it to Open Distributed Processing (ODP) and to the specifications produced by the Object Management Group (OMG).

This Technical Report attempts to apply the concepts in the developing international standards for QoS to the healthcare IT domain in order to address the issues identified in the above-mentioned CEN Reports.

Purpose

The purpose of this document is specifically to identify QoS requirements for healthcare information interchange, and to investigate possible extensions to the Method for Defining Profiles for Health Care defined in CR 12161 to point to possible ways to satisfy user QoS requirements.

This report is intended to provide assistance to those specifying and procuring systems in the healthcare environment. It is also potentially a contribution to the ISO/ITU-T activity described above.

SIST-TP CEN/TR 15253:2006

0 Scope

This Technical Report is concerned with QoS as it applies to interactions between components of distributed healthcare IT systems. The scope is not limited to network infrastructures; it includes the QoS requirements of information storage and processing IT systems. The related areas of security and financial cost considerations are not within the primary scope of the document, although they are considered briefly.

Of course, an informatics system with a high QoS does not guarantee a high standard of healthcare in terms of clinical outcomes or patient care. The quality of healthcare delivered to patients (the ultimate ”users”) depends upon a number of external factors such as the experience and competence of the healthcare professional(s) or institution(s) involved. Potential QoS characteristics for the total healthcare delivery process such as mortality rate, clinical outcome, etc. are therefore not within the scope of this report.

The report contains no provisions to avoid the incorporation of bad or dangerous practice into healthcare IT systems. It is possible to circumvent good clinical practice with technical solutions which may cause bad practice. This vital issue is not covered by this report. To take an example scenario:

A patient consults a doctor, who takes a blood sample and arranges to see the patient again in two weeks.

a) A "good" practice doctor sees and reviews the blood test result as soon as it comes back from the laboratory and then files it if no action is required.

b) A "bad" practice doctor sees and reviews the blood test results only when he reviews the patient’s case on the patient’s next visit. This case is not defensible if the patient has a preventable adverse event and takes legal action (source: MPS Casebook Summer 1997).

iTeh STANDARD PREVIEW
(standards.iteh.ai)

The healthcare information system put into the medical practice in electronic form could build-in either practice (a) or practice (b). This report does not consider the clinical quality assurance mechanism for the IT system.

SIST-TP CEN/TR 15253:2006
https://standards.iteh.ai/catalog/standards/sist/7a765e55-12da-4832-a0ff-3b2e3893e4b/sist-tp-cen-tr-15253-2006

1 Structure of this document

Introduction - defines the scope and background of the work on QoS for Healthcare Information Interchange, and gives a list of references and acronyms.

Clause 5 - Quality of Service Concepts - summarises QoS concepts from existing work.

Clause 6 - Current Relevant Work in Healthcare Informatics Standardisation - provides a brief survey of known work related to QoS requirements and mechanisms in the international healthcare community.

Clause 7 - Typical Healthcare QoS Scenarios- defines a number of User Scenarios demonstrating situations in which QoS is of importance.

Clause 8 - Healthcare QoS Categories- draws together QoS requirements in the Healthcare sector, derived from the examples in Clause 7, and from elsewhere. It gives some guidance on what solutions may be appropriate.

Clause 9 - Development of ETG 021 Method - considers how the ”Method for Defining Profiles for Health Care” defined in [7], and used in [8] and [9], might be extended to cover QoS requirements.

Clause 10 - Summary and Conclusions - summarises the main points of the document and provides recommendations on how to proceed.

Annex A - Application of QoS Concepts - contains examples of applications of the concepts in Clause 5, including aspects such as QoS in OSI and QoS in time-critical communications, in order to provide background information for the discussion of Attributes in Clause 9.

SIST-TP CEN/TR 15253:2006

2 References

2.1 Primary references

[1] ISO/IEC 7498-1:1994, *Information technology - Open Systems Interconnection - Basic Reference Model: the Basic Model*

[2] ISO/IEC 13236:1998, *Information technology – Quality of service – Framework [ITU-T Recommendation X.641]*

[3] ISO/IEC TR 13243:1999, *Information technology – Quality of service - Guide to methods and mechanisms [ITU-T Recommendation X.642]*

[4] ISO/IEC 10746-2:1996, *Information technology - Open Distributed Processing - Reference Model: Foundations [ITU-T Recommendation X.902]*

[5] RFC 1821 *Integration of Real-time Services in an IP-ATM Network Architecture, Borden et al (August 1995)*

[6] CEN/TC 251 *Directory of the European Standardisation Requirements for Healthcare Informatics and Telematics - Programme for the Development of Standards. Version 2.1 (1996-08-15)*

[7] EWOS/ETG 021 (CR 12161:1995), *A method for defining profiles for healthcare*

[8] EWOS/ETG 045 (CR 12069:1995), *Profiles for medical image interchange*

[9] EWOS/ETG 068 *Multimedia Medical Data Interchange*

[10] IEEE Std 1073-1996, *IEEE Standard for Medical Device Communications - Overview and Framework*

[11] Metz CE 1986, *ROC methodology in medical imaging. Investigative Radiology 21:720-733*

[12] ISO/IEC 11172, *Information technology - Coding of moving pictures and associated audio for digital storage media at up to about 1,5 Mbit/s (MPEG-1)*

[13] ISO/IEC DIS 13818, *Information technology – Generic coding of moving pictures and associated audio information (MPEG-2)*

[14] IEEE Std 1073.3.1-1994, *IEEE Standard for Medical Device Communications - Transport Profile - Connection Mode (ANSI)*

iTeh STANDARD PREVIEW
(standards.iteh.ai)
SIST-TP CEN/TR 15253:2006
https://standards.iteh.ai/catalog/standards/sist/363cb9893e4b/sist-tp-cen-tr-15253-2006

2.2 Supplementary references

The following references may also be of interest to the reader:

ISO 13485 *Medical devices - Quality management systems – Requirements for regulatory purposes*

ISO 13488 *Quality systems – Medical devices – Particular requirements for the application of ISO 9002*

Papers on QoS by Klara Nahrstedt, which can be found at the University of Illinois Department of Computer Science WWW site:

http://cs.uiuc.edu/CS_INFO_SERVER/DEPT_INFO/CS_FACULTY/FAC_HTMLS/nahrstedt.html

SIST-TP CEN/TR 15253:2006

3 Abbreviation

BCC	Bedside Communication Controller
CL	Connectionless
CLNS	Connectionless Network Service
CO	Connection Oriented
CT	Computed Tomography
DCC	Device Communication Controller
DIS	Draft International Standard
DTR	Draft Technical Report
ECG	Electrocardiogram
ECTS&P	Enhanced communications transport service and protocol
EG MED	EWOS Expert Group on Healthcare
EHR	Electronic healthcare record
ETG	EWOS Technical Guide
EWOS	European Workshop for Open Systems
GOFF	Goodness of Fit Factor
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
ITU-T	International Telecommunications Union - Telecommunication Standardisation Sector
JTC1	Joint Technical Committee (of ISO and IEC) number 1
MDIB	Medical Data Information Base
MIB	Medical Information Bus
MRI	Magnetic Resonance Imaging
ODP	Open Distributed Processing
OMA	Object Management Architecture
OMG	Object Management Group
OSE	Open Systems Environment
OSI	Open Systems Interconnection

iTeh STANDARD PREVIEW
(standards.iteh.ai)
SIST-TP CEN/TR 15253:2006
https://standards.iteh.ai/catalog/standards/sist/7a765e55-12da-4832-a0ff-363cb9893e4b/sist-tp-cen-tr-15253-2006

SIST-TP CEN/TR 15253:2006

PT	Project Team
QoS	Quality of Service
ROC	Receiver Operating Characteristic
RSVP	Resource Reservation Protocol
SC21	Subcommittee 21 (of ISO/IEC JTC1)
SG7	Study Group 7 (of ITU-T)
TA	EWOS Technical Assembly
TC	Technical Committee
TCC	Time-critical communications

4 Terms and definitions

For the purposes of this Technical Report, the terms and definitions in ISO/IEC 13236:1998 [2] and CEN/TR 12161:1996 [7] apply.

4.1
QoS category
group of user requirements that leads to the selection of a set of QoS requirements [ISO/IEC 13236:1998 [2]]

iTeh STANDARD PREVIEW
(standards.iteh.ai)

4.2
QoS characteristic
quantifiable aspect of QoS, which is defined independently of the means by which it is represented or controlled [ISO/IEC 13236:1998 [2]]

SIST-TP CEN/TR 15253:2006
https://standards.iteh.ai/catalog/standards/sist/7a765e39-12da-4652-a0ff-363cb9893e4b/sist-tp-cen-tr-15253-2006

4.3
QoS mechanism
specific mechanism that may use protocol elements, QoS parameters or QoS context, possibly in conjunction with other QoS mechanisms, in order to support establishment, monitoring, maintenance, control, or enquiry of QoS [ISO/IEC 13236:1998 [2]]

4.4
QoS information
information related to QoS: it is classified into QoS context (when retained in an entity) and QoS parameters (when conveyed between entities); and it is classified into QoS requirements (if it expresses a requirement for QoS) and QoS data (if it does not) [ISO/IEC 13236:1998 [2]]

4.5
QoS parameter
QoS information that is conveyed between entities as part of a QoS mechanism; parameters are classified into requirement parameters and data parameters; the information conveyed may relate to one or more QoS characteristics [ISO/IEC 13236:1998 [2]]

4.6
QoS management
any set of activities performed by a system or communications service to support QoS monitoring, control and administration (as distinct from general techniques such as OSI management) [ISO/IEC 13236:1998 [2]]

SIST-TP CEN/TR 15253:2006

4.7
QoS agreements
the term level of agreement is sometimes used to refer to the negotiated level of support for a given set of QoS characteristics [ISO/IEC 13236:1998 [2]]

4.8
attribute
property of a real-world object which can be characterised by a finite set of discrete values [CR 12161:1995 [7]]

4.9
Set of Attribute Values (SAV)
for a defined set of attributes corresponding to a particular domain of interest (e.g. information interchange), the SAV consists of an (ordered) list of values for each attribute [CR 12161:1995 [7]]

4.10
Goodness of Fit Factor (GOFF)
this defines how well a particular information processing solution (such as a profile) matches a particular SAV [CR 12161:1995 [7]]

4.11
user scenario
description of a real-world information processing requirement, which may be characterised by a Set of Attribute Values [CR 12161:1995 [7]]

iTeh STANDARD PREVIEW
(standards.iteh.ai)

5 Quality of service concepts

SIST-TP CEN/TR 15253:2006
https://standards.iteh.ai/catalog/standards/sist/7a765e55-12da-4832-a0ff-363cb9893e4b/sist-tp-cen-tr-15253-2006

5.1 Sources

The material in this clause is based on the QoS activity being undertaken by a Joint Rapporteur Group of ITU-T SG7 and ISO/IEC JTC1/ SC21/WG7, which was established in order to provide common guidance to any groups developing specifications relating to QoS.

The first objective of the QoS Group was to produce a QoS Framework standard, the aim of which is to provide a consensus set of concepts and terminology that will enable all those who are developing QoS specifications to adopt common approaches, to benefit from each others' work and to communicate effectively. This standard is currently an International Standard [2].

In parallel, the Group has been documenting references to QoS specifications in various standards and other documents, as well as the details of a number of mechanisms for use with QoS that are believed to be widely-applicable. These will be published in a Technical Report, the QoS Guide to Methods and Mechanisms [3].

The QoS Group is also specifying how QoS concepts can be incorporated into ODP (Open Distributed Processing) and the Object Management Architecture (OMA) of the Object Management Group (OMG).

5.2 Fundamental concepts

5.2.1 General

The fundamental objective of any specification, implementation choice or mechanism relating to QoS can be expressed using three concepts: the *management* of *QoS characteristics* to meet *QoS agreements*.

SIST-TP CEN/TR 15253:2006

5.2.2 QoS characteristics

QoS characteristics is the term used in the QoS Framework for the properties of systems and activities that are of relevance to Quality of Service. They include such quantities as

- time delay between two events, such as a request and a response,
- transit delay of a data item between two points
- throughput of a data transfer
- reliability of a system element
- capacity of a system element for storage, or processing
- error-rate of a transfer
- consistency between two copies of a database
- accuracy of data.

The QoS Framework defines a number of useful characteristics, mostly in a generic way (as listed above). In any specific case, the characteristics have to be specialised: for example, in the case of transit delay it is necessary to specify the data item and the two points concerned.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

5.2.3 QoS management

QoS characteristics have to be managed: and to distinguish this rather special form of management from general techniques, such as OSI Management, the QoS Framework calls it *QoS management*. (QoS management may, of course, call upon other management techniques to fulfil its purposes.)

SIST-TP CEN/TR 15253:2006
https://standards.iteh.ai/catalog/standards/sist/7a765e55-12da-4832-a0ff-

Meeting a particular requirement for QoS management may need many different types of action to be performed, for example: negotiation, admission control (e.g. controlling the rate that data is input) and monitoring. The QoS Framework uses the term *QoS mechanisms* for these elements of management function, which can be specified independently.

QoS mechanisms can be thought of as operating in different phases of activity with respect to the activity whose QoS is to be managed, as follows.

- Prediction phase: before the activity occurs. The purpose of this phase is to predict aspects of system behaviour so that the appropriate QoS mechanisms can be initiated.
- Establishment phase: before the activity occurs or during its initiation. In this phase elements of the system may express requirements for QoS, enter into negotiations or re-negotiations, make agreements on the QoS to be delivered and the actions to be performed if it degrades, and initiate mechanisms that will be needed during the operational phase (such as allocating resources).
- Operational phase: during the course of the activity. The purpose of this phase is to honour the agreements made during the establishment phase, or to take appropriate action if that is not possible. In this phase system elements may monitor QoS, take recovery actions if necessary and/or notify other system elements of changes in status.
- Release phase: during the orderly or abrupt termination of the activity, and after the activity has finished. In this phase, the mechanisms in place for the operational phase may need to be closed in an orderly manner. Log files may need to be closed for off-line analysis to ensure that QoS targets were in fact met.

QoS mechanisms typically require system elements to communicate with one another. Items of QoS-related information that are communicated in this way are termed *QoS parameters*. Note the distinction between QoS