

INTERNATIONAL STANDARD

ISO/IEC 9040

Second edition
1997-06-15

Information technology — Open Systems Interconnection — Virtual Terminal Basic Class Service

*Technologies de l'information — Interconnexion de systèmes ouverts
(OSI) — Service de classe de base de terminal virtuel*



Reference number
ISO/IEC 9040:1997(E)

Contents

1 Scope	1
2 Normative references	1
3 Definitions	2
3.1 Global OSI definitions	2
3.2 Association Control Service Element definitions	2
3.3 Virtual Terminal Service definitions	2
4 Abbreviations	5
4.1 General	5
4.2 Modes of operation	5
4.3 VTE model components	5
4.4 Access-rules	6
5 Conventions	6
6 General features	6
6.1 Introduction	6
6.2 Features of the Virtual Terminal Basic Class Service	6
6.3 VT Environment (VTE) and VTE-parameters	7
6.4 Virtual Terminal Environment Profiles	7
6.5 Dialogue Control	7
7 Communication facilities	7
7.1 Establishment facility	7
7.2 Termination facility	7
7.3 Negotiation facility	7
7.4 Data Transfer facility	7
7.5 Delivery Control facility	7
7.6 Dialogue Management facility	7
7.7 Interrupt facilities	7
7.8 Exception Reporting facility	7

© ISO/IEC 1997

All rights reserved. Unless otherwise specified no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

ISO/IEC Copyright Office • Case Postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

8 Modes of operation	8
8.1 S-mode	8
8.2 A-mode	8
9 Access-rules	8
10 VT functional units	9
10.1 Negotiation functional units	9
10.2 Negotiated Release functional unit	10
10.3 Urgent Data functional unit	10
10.4 Break functional unit	10
10.5 Enhanced Access-rules functional unit	10
10.6 Structured Control Objects functional unit	10
10.7 Blocks functional unit	10
10.8 Fields functional unit	10
10.9 Reference Information Objects functional unit	10
10.10 Ripple functional unit	10
10.11 Exceptions functional unit	10
10.12 Context Retention functional unit	11
11 VT Environment Profiles (VTE-profiles)	11
12 The VTE Model	11
13 Display Objects	12
13.1 Structure	12
13.2 Attributes	16
14 Control objects	16
14.1 CO structure facilities and related restrictions	17
14.2 Standard control objects for fields and controlled data entry	17
14.3 Standard control object for dynamic termination conditions	18
14.4 Standard control object for notifying termination	18
14.5 Standard control object for echo control	18
14.6 Standard control object for ripple mode editing	18
15 Reference Information Objects	18
15.1 Structure	18
15.2 Generation and use of RIOs	18
16 Device objects	19
17 VTE Parameters and directed graph	19
17.1 Directed graph of VTE-parameters	19
17.2 VTE consistency rules	19
18 Display Object VTE-parameters	22
18.1 Primary VTE-parameters	22
18.2 Secondary VTE-parameters	22
18.3 Tertiary VTE-parameter	25
19 Operations on display objects	26
19.1 Addressing operations	26
19.2 Ripple operations	30
19.3 Logical ripple operations	31
19.4 Update operations	31
19.5 Access control over display object	38

20 Control object VTE-parameters	39
20.1 Usage and effects of control object VTE-parameters	40
20.2 Usage and effects of data element VTE-parameters	41
20.3 Standard control objects	41
21 Reference Information Object VTE-parameters	46
21.1 Availability	46
21.2 VTE-parameters for RIOs	46
22 Operations on RIOs	47
22.1 Availability	47
22.2 Identification of RIO and RIO records	47
22.3 RIO update operations	47
22.4 RIO reference operations	47
23 Device object VTE-parameters	48
23.1 Default control object VTE-parameters	48
23.2 Minimum Length VTE-parameters	48
23.3 Device object VTE-parameters for Attributes	48
23.4 Termination VTE-parameters	49
23.5 Interaction between use of TCCO or FDCO and device object VTE-parameters	50
24 Delivery control, synchronisation and net-effecting	50
24.1 No delivery-control	50
24.2 Simple delivery-control	51
24.3 Quarantine delivery-control	51
24.4 Implicit delivery	51
24.5 Update queues and priority handling	51
25 Communication Model	53
26 VT Services	53
27 VT service sequences	55
27.1 Phases	55
27.2 Phase transitions	55
27.3 Ownership of the WAVAR access-right	56
27.4 Availability and usage conditions of VT services	56
27.5 Service collisions in A-mode	57
28 Establishment facility	57
28.1 VT-ASSOCIATE service	57
29 Termination facility	60
29.1 Services	60
29.2 VT-RELEASE service	60
29.3 VT-U-ABORT service	60
29.4 VT-P-ABORT service	61
30 Negotiation facilities	61
30.1 Switch Profile negotiation	61
30.2 Multiple interaction negotiation	62
30.3 Sequence control for multiple interaction negotiation	65
31 Data Transfer facility	66
31.1 VT-DATA service	66

32 Delivery Control facility	67
32.1 VT-DELIVER service	67
32.2 VT-ACK-RECEIPT service	68
33 Dialogue Management facility	68
33.1 VT-GIVE-TOKENS service	68
33.2 VT-REQUEST-TOKENS service	68
34 Destructive Interrupt facility	68
34.1 VT-BREAK service	68
35 Exception reporting facility	69
35.1 VT-P-EXCEPTION service	69
Annex A Default VTE-profiles	71
A.1 Introduction to VTE-profile definitions	71
A.2 Notation for definition of VTE-profiles	71
A.3 S-mode Default VTE-profile, vt-b-spr-sd	72
A.4 A-mode Default VTE-profile, vt-b-spr-ad	72
Annex B Explanatory notes	74
B.1 Types of VT communication supported	74
B.2 Aid to understanding the role of display objects	74
B.3 Relation of update-window to buffering	74
B.4 Control object semantics	74
B.5 Echoing	74
B.6 Echo control	74
B.7 Echo control algorithm	75
B.8 Termination conditions	75
B.9 Synchronisation of update delivery	75
B.10 Multiple Interaction Negotiation	76
B.11 Semantics of display objects	76
B.12 Repertoires	76
B.13 Use of ISO 6429 Additional Controls in repertoires	76
B.14 Font Assignment VTE-parameters	77
B.15 Net-effecting	77
B.16 Interrupt facilities	77
B.17 Emphasis attribute	77
B.18 Supplementary explanatory material on field facilities	79
B.19 Supplementary explanatory material on block facilities	83
Annex C ASN.1 OBJECT IDENTIFIER values	85
C.1 For identification of this International Standard	85
C.2 For identification of attribute assignment types	85
Annex D Size of urgent control objects	86

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO and IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75% of the national bodies casting a vote.

International Standard ISO/IEC 9040 was prepared by Joint Technical Committee ISO/IEC JTC1, *Information technology*, Subcommittee SC21, *Open systems interconnection, data management and open distributed processing*.

This second edition cancels and replaces the first edition (ISO 9040:1990), which has been technically revised. It also incorporates Amendment 2:1992, Technical Corrigendum 1:1991, Technical Corrigendum 2:1992 and Technical Corrigendum 3:1993.

Annexes A and C form an integral part of this International Standard. Annexes B and D are for information only.

Introduction

This International Standard is one of a set of standards produced to facilitate the interconnection of computer systems. It is related to other International Standards in the set as defined in the Reference Model for Open Systems Interconnection (ISO/IEC 7498-1). The Reference Model subdivides the area of standardization into a series of layers of specification, each of manageable size.

The purpose of this International Standard (ISO/IEC 9040) is to define the service provided in the Application Layer by the Virtual Terminal (VT) Basic Class Service.

The Virtual Terminal Basic Class Service is provided by the Virtual Terminal Basic Class Protocol specified in ISO/IEC 9041 and making use of services available from the Association Control Service Element (ACSE) in the Application Layer and the Presentation Service.

Information technology – Open Systems Interconnection – Virtual Terminal Basic Class Service

1 Scope

This International Standard defines, in an abstract way, the externally visible Basic Class Virtual Terminal Service within the OSI Application Layer in terms of

- a) a model defining the interaction between users of the service;
- b) the primitive actions and events of the service;
- c) the parameter data associated with each primitive action and event;
- d) the relationship between, and the valid sequences of, these actions and events.

The service defined in this International Standard is that which is provided by the OSI Basic Class Virtual Terminal Protocol (in conjunction with the Association Control Service Element and the Presentation Service) and which may be used by any user including other Application Service Elements. The relationship between the standards for Virtual Terminal Service, Virtual Terminal Protocol, ACSE, Presentation Layer Service and the user of the Virtual Terminal Service is shown in figure 1.

This International Standard also defines two standard default virtual terminal environment profiles and describes the form of registered virtual terminal environment profiles and control objects. Virtual terminal environment profiles define sets of virtual terminal environment parameters for use in the establishment of virtual terminal associations and subsequent negotiation. This International Standard also defines a structure

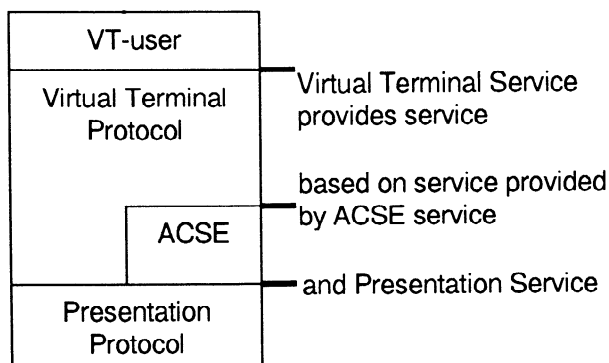


Figure 1 - Relationship of this International Standard to other OSI Application Layer Standards

of ASN.1 Object Identifiers for the objects defined in this International Standard and for use in a register of virtual terminal objects.

This International Standard does not specify individual implementations or products, nor does it constrain the implementation of entities and interfaces within a computer system. There is, therefore, no requirement for conformance to this International Standard.

This International Standard applies to interactive applications requiring terminal oriented communication expressed in terms of the transmission and manipulation of graphical images having the following characteristics:

- e) the images are composed of character-box graphic elements organised into a one, two or three dimensional structure;
- f) attributes may be associated with any graphic element to qualify its mode of display.

Control information for the communication can be modelled using virtual terminal control objects, and multiple devices can be modelled using virtual terminal device objects linked to the other virtual terminal objects.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO/IEC 646:1991, *Information technology – ISO 7-bit coded character set for information interchange*.

ISO/IEC 2022:1994, *Information technology – Character code structure and extension techniques*.

ISO/IEC 2375:1985, *Data processing – Procedure for registration of escape sequences*.

ISO/IEC 6429:1992, *Information technology – Control functions for coded character sets*.

ISO/IEC 7498-1:1994, *Information technology – Open Systems Interconnection – Basic Reference Model : The Basic Model.*

ISO/IEC 8649:1996, *Information technology – Open Systems Interconnection – Service definition for Association Control Service Element.*

ISO/IEC 8824:1990, *Information technology – Open Systems Interconnection – Specification for Abstract Syntax Notation One (ASN.1).*

ISO/IEC 8825:1990, *Information technology – Open Systems Interconnection – Specification of Basic Encoding Rules for Abstract Syntax Notation One (ASN.1).*

ISO/IEC 9041-1:1997, *Information technology – Open Systems Interconnection – Virtual Terminal Basic Class Protocol – Part 1: Specification.*

ISO/IEC 9834-4:1991, *Information technology – Open Systems Interconnection – Procedures for the operation of OSI Registration Authorities – Part 4: Register of VTE Profiles*

ISO/IEC 9834-5:1991, *Information technology – Open Systems Interconnection – Procedures for the operation of OSI Registration Authorities – Part 5: Register of VT Control Object Definitions*

ISO/IEC 10731:1994, *Information technology – Open Systems Interconnection – Basic Reference Model – Conventions for the Definition of OSI Services.*

The International Register of Coded Character Sets to be used with Escape Sequences. ¹⁾

1) Available from the European Computer Manufacturers Association (ECMA), 114 rue du Rhône, CH-1204 Genève, Switzerland.