

Implementation of ISO/IEC 9646-2 : 1991

**Information technology —
Open Systems Interconnection
— Conformance testing
methodology and framework —**

Part 2: Abstract test suite specification

National foreword

This British Standard reproduces verbatim ISO/IEC 9646-2 : 1991 and implements it as the UK national standard.

This British Standard is published under the direction of the Information Systems Technology Standards Policy Committee whose Technical Committee IST/21 has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international committee any enquiries on interpretation, or proposals for change, and keep UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

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Compliance with a British Standard does not of itself confer immunity from legal obligations.



Amendment No. 0
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Information technology — Open Systems
Interconnection — Conformance testing
methodology and framework —
Part 2 : Abstract test suite specification

NOTE. The European Committee for Standardization (CEN) has accepted ISO/IEC 9646-2 : 1991 as a European Standard, designated EN 29646-2 : 1992 and this amendment effects the implementation of EN 29646-2 : 1992 as a British Standard.

Revised text

AMD 7302
 November 1992

Front and back covers

In the top right hand corner of the front cover and on the back cover, immediately below 'BS ISO/IEC 9646-2 : 1991' insert 'EN 29646-2 : 1992'.

AMD 7302
 November 1992

Front cover

Below the title insert the following.

'The European Standard EN 29646-2 : 1992 has the status of a British Standard'

AMD 7302
 November 1992

National foreword

Between paragraphs 1 and 2 insert the following.

'ISO/IEC 9646-2 : 1991 was accepted as a European Standard by the European Committee for Standardization (CEN) in February 1992. This European Standard is designated EN 29646-2 : 1992 and is entitled 'Information technology – Open Systems Interconnection – Conformance testing methodology and framework – Part 2 : Abstract test suite specification'.'

AMD 7302
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New EN title page and foreword page

Insert the attached new EN title page and foreword page immediately before page 1 of BS ISO/IEC 9646-2 : 1991.

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English version

**Information technology – Open Systems Interconnection –
Conformance testing methodology and framework –
Part 2 : Abstract test suite specification**

(ISO/IEC 9646-2 : 1991 – edition 1)

Technologies de l'information – Interconnexion
de systèmes ouverts – Essais de conformité –
Méthodologie générale et procédures –
Partie 2: Spécification des suites de test
abstraites
(ISO/IEC 9646-2 : 1991 – édition 1)

Informationstechnik – Kommunikation Offener
Systeme – Methodik der Konformitätsprüfung –
Teil 2: Spezifikation der abstrakten Testsuite
(ISO/IEC 9646-2 : 1991 – Ausgabe 1)

This European Standard was approved by CEN on 1992-04-11. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

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

Central Secretariat: rue de Stassart 36, B-1050 Brussels

Foreword

The Technical Board has decided to submit the International Standard ISO/IEC 9646-2 : 1991 'Information technology – Open Systems Interconnection – Conformance testing methodology and framework – Part 2 : Abstract test suite specification (ISO/IEC 9646-2 – 1st edition 1991)' for Formal Vote. The standard was accepted.

However the German version of the international standard is not available at the time of publication of the present European Standard.

National Standards identical to this European Standard shall be published at the latest by 92-10-31 and conflicting national standards shall be withdrawn at the latest by 92-10-31.

According to the CEN/CENELEC Common Rules, the following countries are bound to implement this standard : Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

INTERNATIONAL STANDARD

ISO/IEC
9646-2

First edition
1991-07-15

Information technology — Open Systems Interconnection — Conformance testing methodology and framework —

Part 2:

Abstract test suite specification

*Technologies de l'information — Interconnexion de systèmes ouverts —
Cadre général et méthodologie des tests de conformité OSI —*

Partie 2: Spécification des suites de tests abstraites



Reference number
ISO/IEC 9646-2:1991(E)



Documents

Document Sharing Hub

Contents

Page

Foreword v

Introduction vi

1 Scope 1

2 Normative references 1

3 Definitions 1

4 Abbreviations 1

5 Compliance 2

6 Conformance requirements in OSI International Standards and CCITT Recommendations 2

6.1 Introduction 2

6.2 General requirements 2

6.3 Conformance clauses 2

7 Requirements on PICS proformas 2

8 Abstract Test Suite production process leading to conformance testing standards 3

9 Conformance requirements and PICS proforma 3

10 Test Suite Structure and Test Purposes 3

10.1 Basic requirements 3

10.2 Specification of the test suite structure 3

10.3 Specification of the test purposes 4

10.4 Coverage 5

10.5 TSS&TP compliance clause 6

11 Specification of generic test suites 6

12 Abstract Test Methods 6

12.1 Introduction 6

12.2 General principles 6

12.2.1 Lower Testers 6

12.2.2 Upper Testers 7

12.3 General specification of the ATMs for end-system IUTs 7

12.3.1 Introduction 7

12.3.2 The Local test method 7

12.3.3 The Distributed test method 7

12.3.4 The Coordinated test method 7

12.3.5 The Remote test method 9

12.3.6 Single-layer and embedded variants 9

12.4 Variants for single-protocol IUTs 9

12.4.1	Introduction	9
12.4.2	The LS test method	9
12.4.3	The DS test method	10
12.4.4	The CS test method	10
12.4.5	The RS test method	10
12.5	Variants for multi-protocol IUTs	10
12.5.1	Introduction	10
12.5.2	The LSE test method	11
12.5.3	The DSE test method	11
12.5.4	The CSE test method	11
12.5.5	The RSE test method	12
12.6	ATMs for open relay-systems	12
12.6.1	Introduction	12
12.6.2	The YL test method	12
12.6.3	The YT test method	12
12.7	Choice of ATM	12
12.7.1	Introduction	12
12.7.2	Comprehensive testing service	13
12.7.3	IUT environments	13
12.7.4	Applicability of the ATMs	13
12.8	Test coordination procedures	13
13	Specification of ATSS	13
13.1	General	13
13.2	Test cases	14
13.3	ATS conformance clause	15
13.4	Consistency with protocol	15
14	Specification of a TMP	15
15	Use of an ATS specification	15
16	ATS maintenance	16

Annexes

A	(normative) Requirements and guidance for a PICS proforma	17
A.1	Introduction	17
A.2	Relationship between PICS proformas and conformance requirements	17
A.3	General layout	18
A.4	Copyright	18
A.5	First section - Identification of the implementation	18
A.6	Second section - Identification of the protocol	19
A.7	Global statement of conformance	19
A.8	Other sections - Capabilities	19
A.8.1	Introduction	19
A.8.2	Initiator/responder capability	19
A.8.3	Major capabilities	19
A.8.4	Timers and protocol parameters	19
A.8.5	PDUs	19
A.8.6	PDU parameters	19
A.8.7	Negotiation capabilities	20
A.8.8	Protocol error handling	20
A.8.9	Multi-layer dependencies	20
A.8.10	Other conditions	20
A.9	Formats of the tables	20
A.9.1	Structure of the tables	20
A.9.2	Symbols and conventions	22
A.9.3	Instructions for completing a PICS proforma	23
B	(informative) Guidance for protocol specifiers to facilitate conformance testing	24
B.1	Introduction	24
B.2	Guidance on scope	24
B.3	Guidance on normative references	25
B.4	Guidance on requirements and options	25

B.5 Guidance on PDUs 25

B.6 Guidance on states 26

B.7 Guidance on FDTs 26

B.8 Miscellaneous guidance 26

C (informative) Incomplete static conformance requirements 27

D (informative) Guidance on generic test cases 28

D.1 Introduction 28

D.2 Description of generic test cases 28

D.3 Relation of generic to abstract test cases 28

D.4 Derivation of abstract test cases from generic test cases. 28

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 or 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 JTC 1. 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 9646-2 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*.

ISO/IEC 9646 consists of the following parts, under the general title *Information technology — Open Systems Interconnection — Conformance testing methodology and framework*:

- *Part 1: General concepts*
- *Part 2: Abstract test suite specification*
- *Part 3: The Tree and Tabular Combined Notation (TTCN)*
- *Part 4: Test realization*
- *Part 5: Requirements on test laboratories and clients for the conformance assessment process*

Annex A forms an integral part of this part of ISO/IEC 9646. Annexes B, C and D are for information only.

Introduction

This part of ISO/IEC 9646 provides a common approach to the specification of OSI conformance test suites at a level which is independent of the means of executing those test suites (hereafter called "abstract test suites"). This level of abstraction is suitable for standardization and facilitates the comparison of results produced by different organizations which run the corresponding executable test suites.

Clauses 6 and 7 recall that there are requirements on OSI protocol specifiers which have to be fulfilled before there can be an objective basis for the process of developing an abstract test suite. The need is expressed for consistent conformance clauses and for PICS proformas in International Standards or CCITT Recommendations which specify OSI protocol standards.

Clauses 8 to 16 describe the process of developing an abstract test suite, including the design criteria to be used and guidance on its structure and coverage. The possible abstract test methods are defined and guidance is given to help the test suite specifier to decide which test method(s) to use in the production of a particular test suite. Requirements and guidance are given on the specification of abstract test cases. These include the subdivision of test cases into test steps and the assignment of test verdicts to test outcomes.

The test suite specifier is also required to provide information to the test realizers (e.g. limitations governing test case selection).

Finally, guidance and requirements are given on test suite maintenance.

This part of ISO/IEC 9646 is also to be published by CCITT as Recommendation X.291 (1991).

Information technology — Open Systems Interconnection — Conformance testing methodology and framework —

Part 2:

Abstract test suite specification

1 Scope

1.1 This part of ISO/IEC 9646 specifies the requirements and gives guidance for the production of system-independent conformance test suites for one or more OSI International Standards or CCITT Recommendations. In particular, it is applicable to the production of all conformance testing standards for OSI and ISDN two-party protocols, including all draft versions of such conformance testing standards.

1.2 This part of ISO/IEC 9646 is applicable to the production of conformance test cases which check the conformance of an implementation to the relevant static and/or dynamic conformance requirements by controlling and observing protocol behaviour. The Abstract Test Methods included in this part of ISO/IEC 9646 are, in fact, capable of being used to specify any test case which can be expressed abstractly in terms of control and observation of Protocol Data Units and Abstract Service Primitives. Nevertheless, for some protocols, test cases may be needed which cannot be expressed in these terms. The specification of such test cases is outside the scope of this part of ISO/IEC 9646, although the test cases may themselves need to be included in a conformance testing standard.

NOTE — For example, some static conformance requirements related to an Application service element may require testing techniques which are specific to that particular Application.

1.3 The following are outside the scope of this part of ISO/IEC 9646:

- a) the relationship between Abstract Test Suite specification and Formal Description Techniques;
- b) testing by means of test methods which are specific to particular applications, protocols or systems, including the testing of non-protocol conformance requirements;
- c) test methods that involve more than two end-systems communicating together.

NOTE — This part of ISO/IEC 9646 applies fully to some but not all Physical layer protocols. Nevertheless, many of the concepts apply to all protocols.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO/IEC 9646. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO/IEC 9646 are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of IEC

and ISO maintain registers of currently valid International Standards.

ISO 7498 : 1984, *Information processing systems — Open Systems Interconnection — Basic Reference Model*.
(See also CCITT Recommendation X.200 (1984))

ISO/TR 8509 : 1987, *Information processing systems — Open Systems Interconnection — Service conventions*.
(See also CCITT Recommendation X.210 (1988))

ISO 8825 : 1990, *Information technology — Open Systems Interconnection — Specification of Basic Encoding Rules for Abstract Syntax Notation One (ASN.1)*.
(See also CCITT Recommendation X.409 (1988))

ISO/IEC 9646-1 : 1991, *Information technology — Open Systems Interconnection — Conformance testing methodology and framework — Part 1: General concepts*.
(See also CCITT Recommendation X.290 (1991))

ISO/IEC 9646-3 : -¹⁾, *Information technology — Open Systems Interconnection — Conformance testing methodology and framework — Part 3: The tree and tabular combined notation*.

3 Definitions

For the purposes of this part of ISO/IEC 9646, all the definitions given in ISO/IEC 9646-1 apply.

4 Abbreviations

For the purposes of this part of ISO/IEC 9646 the abbreviations given in ISO/IEC 9646-1 apply. The following abbreviations also apply to this part of ISO/IEC 9646.

CS : coordinated single-layer (test method)

CSE : coordinated single-layer embedded (test method)

DS : distributed single-layer (test method)

DSE : distributed single-layer embedded (test method)

FDT : formal description technique

LS : local single-layer (test method)

LSE : local single-layer embedded (test method)

RS : remote single-layer (test method)

RSE : remote single-layer embedded (test method)

TSS&TP : test suite structure and test purposes

YL : loop-back (test method)

YT : transverse (test method)

1) To be published.

5 Compliance

5.1 An International Standard or CCITT Recommendation which specifies a protocol in compliance with this part of ISO/IEC 9646 shall satisfy all the requirements stated in clauses 6 and 7 plus annex A.

NOTE – Such compliance is a precondition for the protocol specification to be an effective basis for conformance testing of implementations.

5.2 An ATS specification which complies with this part of ISO/IEC 9646

- a) shall be a conformance test suite;
- b) shall be specified in a test notation standardized by ISO/IEC or CCITT;
- c) shall satisfy all the requirements stated in clauses 9 to 14 inclusive;
- d) shall be an International Standard or CCITT Recommendation or, in the absence of such an International Standard or CCITT Recommendation, shall be a publicly available document which is in the process of being standardized within ISO/IEC or CCITT, which has the highest standardization status available, and which has the status of at least a Committee Draft, Draft Recommendation or equivalent.

NOTE - ATSs outside the standardization process need to be submitted for international standardization before they can fully comply with this part of ISO/IEC 9646, in order to ensure that they are subject to public scrutiny, correction and acceptance, internationally.

5.3 It is recommended that the test notation used be TTCN. If TTCN is used, the ATS shall comply with ISO/IEC 9646-3.

NOTE - X.290 (1988) is considered to be obsolete for this purpose.

6 Conformance requirements in OSI International Standards and CCITT Recommendations

6.1 Introduction

The meaning of conformance in OSI is discussed in ISO/IEC 9646-1. It is necessary that there be an unambiguous and objective understanding of the conformance requirements of an OSI protocol or transfer syntax specification, as a prerequisite to the production of an ATS for that specification. Clauses 6 and 7 state the requirements on protocol specifiers to ensure that there is such an understanding of the conformance requirements.

Additional guidance is given in annex B.

6.2 General requirements

6.2.1 A clear distinction shall be made between static and dynamic conformance requirements. To avoid ambiguity, they should be stated separately from one another.

6.2.2 It shall be clear what conformance to the International Standard or CCITT Recommendation means, in the sense of what shall be done, what is permitted but not mandatory, and what shall not be implemented, in order to conform to it.

6.2.3 It shall always be decidable whether an instance of communication conforms dynamically or not.

For example, it should be possible to look at a record of PDU activity and decide whether or not it is valid with respect to the relevant International Standard or CCITT Recommendation.

6.3 Conformance clauses

6.3.1 Each International Standard or CCITT Recommendation which specifies an OSI protocol or transfer syntax shall include a conformance clause, which shall be expressed clearly and unambiguously.

6.3.2 Conformance clauses shall distinguish between the following categories of information:

- a) *references* to clauses which state dynamic conformance requirements;
- b) static conformance requirements concerning the protocol implementation;
- c) static conformance requirements concerning multi-layer dependencies.

6.3.3 The requirement to produce a PICS, in compliance with the PICS proforma, shall be stated separately from the requirements on the protocol implementation itself.

6.3.4 The conformance clause should also include

- a) the requirement to be able to accept all correct sequences of PDUs received from peers, and respond with correct PDU sequences;
- b) the requirement to be able to respond correctly to all incorrect sequences of PDUs received;
- c) in connection oriented protocols, the option to support either the initiation of a connection or the acceptance of a connection, or both;
- d) in connectionless protocols, the option to support the transmission of a PDU, the receipt of a PDU, or both.

7 Requirements on PICS proformas

7.1 The specific requirements to be met by suppliers in respect of each PICS they provide shall be stated in the relevant International Standard or CCITT Recommendation which specifies the protocol. The specification of these requirements shall include a PICS proforma. The PICS proforma shall be found in a separate part of the International Standard or CCITT Recommendation which specifies the protocol.

7.2 The PICS proforma shall be in the form of a questionnaire or checklist to be completed by the supplier or implementor of an implementation of the relevant OSI protocol.

7.3 The PICS proforma shall cover all optional and conditional functions, elements of procedure, parameters, options, PDUs, timers, multi-layer dependencies and other capabilities identified in the protocol specification.

There shall be a well-defined mapping (by references) from the PICS proforma to the static conformance requirements.

Annex A provides requirements and guidance on the construction of PICS proformas.