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

Part 1:
General concepts

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

Partie 1: Concepts généraux

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Contents

Page

Foreword iv
Introduction v
1 Scope 1
2 Normative references 1
3 Definitions 2
3.1 Reference model definitions 2
3.2 Terms defined in other International Standards, CCITT Recommendations and Technical Reports 2
3.3 Conformance testing definitions 2
3.4 Basic terms 2
3.5 Types of testing 3
3.6 Terminology of test suites 3
3.7 Terminology of results 4
3.8 Terminology of test methods 5
4 Abbreviations 6
5 The meaning of conformance in OSI 6
5.1 Introduction 6
5.2 Conformance requirements 6
5.3 Static conformance requirements 6
5.4 Dynamic conformance requirements 7
5.5 Protocol Implementation Conformance Statement (PICS) 7
5.6 A Conforming system 7
5.7 Interworking and conformance 7
6 Conformance and testing 7
6.1 Objectives of conformance testing 7
6.1.1 Introduction 7
6.1.2 Basic Interconnection Tests (BITs) 8
6.1.3 Capability tests 8
6.1.4 Behaviour tests 8
6.1.5 Conformance resolution tests 8
6.2 Protocol Implementation Extra Information for Testing (PIXIT) 9
6.3 Conformance assessment process overview 9
6.4 Use of BITs and capability tests in the test campaign 9
6.5 Analysis of results 11
6.5.1 Test outcomes and test verdicts 11
6.5.2 Conformance test reports 11

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Documents
Document Sharing Hub
Full document details: ISO_IEC 9646-1_1991

6.5.3 Repeatability of results . . . 11
6.5.4 Comparability of results . . . 11
6.5.5 Auditability of results . . . 11
7 Test methods . . . 11
7.1 Introduction . . . 11
7.2 Classification of real open systems and IUTs for conformance testing . . . 13
7.2.1 Classification of SUTs . . . 13
7.2.2 Identification of the IUT . . . 13
7.3 Abstract testing methodology . . . 13
7.3.1 General . . . 13
7.3.2 Points of Control and Observation (PCOs) . . . 13
7.4 Abstract testing functions . . . 15
7.5 Overview of Abstract Test Methods . . . 15
7.5.1 End-system IUTs . . . 15
7.5.2 The Local and Distributed test methods . . . 15
7.5.3 The Coordinated and Remote test methods . . . 15
7.5.4 Variants of end-system test methods . . . 15
7.5.5 Relay-system IUTs . . . 15
7.6 Applicability of test methods to real open systems . . . 15
7.7 Applicability of the test methods to OSI protocols and layers . . . 17
8 Test suites . . . 17
8.1 Structure . . . 17
8.2 Abstract and executable test cases . . . 17
9 Relationships between parts, concepts and roles . . . 17
10 Compliance . . . 19

Annexes

A (informative) Options . . . 21
B (informative) Applicability of the test methods to OSI protocols . . . 22
B.1 The Physical layer . . . 22
B.2 Data Link and Media Access Control protocols . . . 22
B.3 Network protocols . . . 22
B.4 Transport protocol . . . 22
B.5 Session protocol . . . 22
B.6 Presentation and Application protocols . . . 22
B.6.1 General comments . . . 22
B.6.2 Presentation . . . 23
B.6.3 Application . . . 23
B.6.4 Transfer syntaxes . . . 23
B.7 Connectionless protocols . . . 23
C (informative) Index to ISO/IEC 9646 Parts 1, 2, 4 and 5 . . . 24
C.1 Introduction . . . 24
C.2 The Index . . . 24

Documents
Document Sharing Hub

Full document details: ISO_IEC 9646-1_1991

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 9646-1 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*

Annexes A, B and C of this part of ISO/IEC 9646 are for information only.

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Introduction

The objective of OSI will not be completely achieved until systems can be tested to determine whether they conform to the relevant protocol specification(s). The relevant ones can be OSI International Standards or CCITT Recommendations.

Standardized abstract test suites should be developed for each International Standard or CCITT Recommendation which specifies an OSI protocol, for use by suppliers or implementors in self-testing, by users of OSI products, by telecommunications administrations and recognized private operating agencies, or by other third party testing organizations. This should lead to comparability and wide acceptance of test results produced by different test laboratories, and thereby minimize the need for repeated conformance testing of the same system.

The standardization of test suites requires international definition and acceptance of a common testing methodology, together with appropriate testing methods and procedures. It is the purpose of ISO/IEC 9646 to define the methodology, to provide a framework for specifying conformance test suites, and to define the procedures to be followed during testing.

Conformance testing involves testing both the capabilities and behaviour of an implementation, and checking what is observed against both the conformance requirements in the relevant International Standards or CCITT Recommendations and what the implementor states the implementation's capabilities are.

Conformance testing does not include assessment of the performance nor the robustness or reliability of an implementation. It cannot give judgements on the physical realization of the abstract service primitives, how a system is implemented, how it provides any requested service, nor the environment of the protocol implementation. It cannot, except in an indirect way, prove anything about the logical design of the protocol itself.

The purpose of conformance testing is to increase the probability that different OSI implementations are able to interwork. However it should be borne in mind that the complexity of most protocols makes exhaustive testing impractical on both technical and economic grounds. Also, testing cannot guarantee conformance to a specification since it detects errors rather than their absence. Thus conformance to a test suite alone cannot guarantee interworking. What it does do is give confidence that an implementation has the required capabilities and that its behaviour conforms consistently in representative instances of communication.

It should be noted that the OSI basic reference model (ISO 7498: 1984 or CCITT X.200(1984)) states (in 4.3):

> *"Only the external behaviour of Open Systems is retained as the standard of behaviour of real Open Systems"*

This means that although aspects of both internal and external behaviour are described in OSI International Standards and CCITT Recommendations, it is only the requirements on external behaviour that have to be met by real open systems. Although some of the methods defined in ISO/IEC 9646-2 do impose certain limitations on the implementor, for example that there be some means of realizing control

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and observation at one or more service access points, it should be noted that other methods defined herein do not impose such limitations.

However, in the case of partial OSI end-systems which provide OSI protocols up to a specific layer boundary, it is desirable to test not only the external behaviour of the implemented protocol entities, but also the ability of those entities to support correct external behaviour in higher layers.

Detailed investigation of relative benefits, efficiency and limitations of all methods is addressed in various parts of ISO/IEC 9646. However, any organization contemplating the use of test methods defined in ISO/IEC 9646-2 in a context such as certification should carefully consider the limitations on their applicability and the benefits of each.

Testing is voluntary as far as ISO/IEC and CCITT are concerned. Requirements for testing in procurement and other external contracts are not a matter for standardization.

This part of ISO/IEC 9646 is also to be published by CCITT as Recommendation X.290 (1991).

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

Part 1:
General concepts

1 Scope

1.1 ISO/IEC 9646 specifies a general methodology for testing the conformance of products to International Standards or CCITT Recommendations that specify OSI protocols which the products are claimed to implement. The methodology also applies to testing conformance to an International Standard or CCITT Recommendation that specifies a transfer syntax to the extent that can be determined by testing it in combination with a specific OSI protocol.

1.2 The contents of ISO/IEC 9646 are also, in principle, applicable to conformance testing for ISDN two-party protocols.

1.3 ISO/IEC 9646 is applicable to the different phases of the conformance testing process, these phases being characterized by three major activities. These activities are

a) the specification of abstract test suites for particular OSI protocols;

b) realization of the means of executing specific test suites;

c) the conformance assessment process carried out by a test laboratory for a specific client, culminating in the production of a Protocol Conformance Test Report, which gives the results in terms of the protocol specification and test suite used.

ISO/IEC 9646 is structured into five separate parts, each of which, apart from part 1, is applicable to just one of these activities.

This part of ISO/IEC 9646 is applicable to all three activities, providing tutorial introductory material, together with definitions of common terms and concepts.

NOTE – ISO/IEC 9646-2 deals with the requirements and guidance for the specification of abstract test suites, independent of test notation. ISO/IEC 9646-3 defines the recommended test notation. ISO/IEC 9646-4 deals with requirements and guidance for realization of the Means of Testing, and ISO/IEC 9646-5 deals with requirements and guidance for test laboratories and their clients for the conformance assessment process.

1.4 ISO/IEC 9646 specifies the requirements for and gives guidance on the procedures to be followed in OSI conformance testing.

1.5 ISO/IEC 9646 includes only such information as is necessary to meet the following objectives:

a) to achieve an adequate level of confidence in the tests as a guide to conformance;

b) to achieve comparability between the results of the corresponding tests on a particular OSI implementation applied in different places at different times;

c) to facilitate communication between the parties responsible for the activities described in 1.3 above for parts 2 to 5.

1.6 This part of ISO/IEC 9646 includes tutorial introductory material which provides

a) an exposition of the meaning of conformance in the context of OSI;

b) a description of the major categories of conformance tests;

c) an introduction to the conformance assessment process;

d) an introduction to the Abstract Test Methods and their applicability;

e) an introduction to the concepts of test suite design.

In addition, this part describes the relationship between the other parts of ISO/IEC 9646 and the activities involved in conformance testing, and introduces the concept of compliance with respect to the other parts of ISO/IEC 9646.

1.7 The following are outside the scope of ISO/IEC 9646:

a) certification, an administrative procedure which may follow conformance testing;

b) requirements for procurement and contracts;

c) testing by means of test methods which are specific to particular applications, protocols or systems;

d) testing of non-protocol conformance requirements;

e) test methods that involve more than two end-systems communicating together.

NOTE – ISO/IEC 9646 does not apply fully to 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.

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

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

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.209)

ISO/IEC 9646-2:1991, *Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 2: Abstract Test Suite specification.*
(See also CCITT Recommendation X.291(1991))

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

ISO/IEC 9646-4:1991, *Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 4: Test Realization.*
(See also CCITT Recommendation X.293(1991))

ISO/IEC 9646-5:1991, *Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 5: Requirements on test laboratories and clients for the Conformance Assessment Process.*
(See also CCITT Recommendation X.294(1991))

3 Definitions

3.1 Reference model definitions

This part of ISO/IEC 9646 is based upon the concepts developed in the Basic Reference Model for Open Systems Interconnection (ISO 7498 / CCITT X.200), and makes use of the following terms defined in that International Standard:

a) (N)-entity
b) (N)-layer
c) (N)-protocol
d) (N)-protocol-data-unit
e) (N)-relay
f) (N)-service
g) (N)-service-access-point
h) Application layer
i) Application-service-element
j) Data Link layer
k) Network layer
l) Physical layer
m) Presentation layer
n) real open system
o) real system
p) Session layer
q) subnetwork
r) Transfer syntax
s) Transport layer

3.2 Terms defined in other International Standards, CCITT Recommendations and Technical Reports

This part of ISO/IEC 9646 uses the following terms defined in the OSI Service Conventions (ISO/TR 8509 / CCITT X.210):

a) service-user
b) service-provider
c) service primitive

This part of ISO/IEC 9646 uses the following term defined in the ASN.1 – Basic Encoding Rules (ISO 8825 / CCITT X.209):

- encoding

3.3 Conformance testing definitions

For the purposes of this part of ISO/IEC 9646 the definitions in 3.4 to 3.8 apply.

3.4 Basic terms

3.4.1 implementation under test [IUT] : An implementation of one or more OSI protocols in an adjacent user/provider relationship, being that part of a real open system which is to be studied by testing.

3.4.2 system under test [SUT] : The real open system in which the IUT resides.

3.4.3 dynamic conformance requirement : One of the requirements which specifies what observable behaviour is permitted by the relevant OSI International Standard(s) or CCITT Recommendation(s) in instances of communication.

3.4.4 static conformance requirement : One of the requirements that specify the limitations on the combinations of implemented capabilities permitted in a real open system which is claimed to conform to that OSI International Standard or CCITT Recommendation.

3.4.5 capability (of an implementation) : A set of functions in the relevant protocol(s) which is supported by the implementation.

3.4.6 protocol implementation conformance statement [PICS] : A statement made by the supplier of an OSI implementation or system, stating which capabilities have been implemented, for a given OSI protocol.

3.4.7 PICS proforma : A document, in the form of a questionnaire, designed by the protocol specifier or conformance test suite specifier, which when completed for an OSI implementation or system becomes the PICS.

3.4.8 protocol implementation extra information for testing [PIXIT] : A statement made by a supplier or implementor of an IUT which contains or references all of the information (in addition to that given in the PICS) related to the IUT and its testing environment, which will enable the test laboratory to run an appropriate test suite against the IUT.

3.4.9 PIXIT proforma : A document, in the form of a questionnaire, provided by the test laboratory, which when completed during the preparation for testing becomes a PIXIT.

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3.4.10 conforming implementation : An IUT which satisfies both static and dynamic conformance requirements, consistent with the capabilities stated in the PICS.

3.4.11 system conformance statement [SCS] : A document summarizing which OSI International Standards or CCITT Recommendations are implemented and to which ones conformance is claimed.

3.4.12 client (of a test laboratory) : The organization that submits a system or implementation for conformance testing.

3.4.13 test laboratory : An organization that carries out conformance testing. This can be a third party, a user organization, a telecommunications administration or recognised private operating agency, or an identifiable part of a supplier organization.

3.5 Types of testing

3.5.1 static conformance review : A review of the extent to which the static conformance requirements are met by the IUT, accomplished by comparing the PICS with the static conformance requirements expressed in the relevant International Standard(s) or CCITT Recommendation(s).

3.5.2 basic interconnection test [BIT] : A test of an IUT which has limited scope to determine whether or not there is sufficient conformance to the relevant protocol(s) for interconnection to be possible, without trying to perform thorough testing.

3.5.3 capability test : A test to verify the existence of one or more claimed capabilities of an IUT.

NOTE – Capability testing involves checking all mandatory capabilities and those optional ones that are stated in the PICS as supported, but not checking those optional ones which are stated in the PICS as not supported by the IUT.

3.5.4 behaviour test : A test to determine the extent to which one or more dynamic conformance requirements are met by the IUT.

3.5.5 conformance resolution test : A non-standardized, possibly system-specific test to fulfil a test purpose for which a standardized abstract test case is not defined, in order to investigate the behaviour of an OSI protocol implementation with respect to one or more particular conformance requirements.

3.5.6 conformance testing : Testing the extent to which an IUT is a conforming implementation.

3.5.7 conformance assessment process : The complete process of accomplishing all conformance testing activities necessary to enable the conformance of an implementation or a system to one or more OSI International Standards or CCITT Recommendations to be assessed.

3.5.8 test campaign : The process of executing the Parameterized Executable Test Suite for a particular IUT and producing the conformance log.

3.5.9 embedded testing : Testing specified for a single-protocol within a multi-protocol IUT including the specification of the protocol activity above the one being tested, but without specifying control or observation at service boundaries within the multi-protocol IUT.

NOTE - This definition assumes that the protocols of the IUT are ordered in a continuous adjacent user/provider relationship.

3.6 Terminology of test suites

3.6.1 (abstract) test method [ATM] : The description of how an IUT is to be tested, given at an appropriate level of abstraction to make the description independent of any particular realization of a Means of Testing, but with enough detail to enable tests to be specified for this test method.

3.6.2 abstract testing methodology : An approach to describing and categorizing Abstract Test Methods.

3.6.3 abstract test case : A complete and independent specification of the actions required to achieve a specific test purpose (or a specified combination of test purposes), defined at the level of abstraction of a particular Abstract Test Method, starting in a stable testing state and ending in a stable testing state. This specification may involve one or more consecutive or concurrent connections.

NOTES

1 The specification should be complete in the sense that it is sufficient to enable a test verdict to be assigned unambiguously to each potentially observable test outcome (*i.e.* sequence of test events).

2 The specification should be independent in the sense that it should be possible to execute the derived executable test case in isolation from other such test cases (*i.e.* the specification should always include the possibility of starting and finishing in the "idle" state).

3.6.4 executable test case : A realization of an abstract test case.

NOTE – In general the use of the word "test" in ISO/IEC 9646 will imply its normal English meaning. Sometimes it may be used as an abbreviation for abstract test case or executable test case. The context should make the meaning clear.

3.6.5 test purpose : A prose description of a narrowly defined objective of testing, focusing on a single conformance requirement as specified in the appropriate OSI International Standard or CCITT Recommendation (*e.g.* verifying the support of a specific value of a specific parameter).

3.6.6 test group objective : A prose description of the common objective which the test purposes within a specific test group are designed to achieve.

3.6.7 generic test case : A specification of the actions required to achieve a specific test purpose, defined by a test body together with a description of the initial testing state in which the test body is to start.

3.6.8 (test) preamble : The sequences of test steps from the starting stable testing state of the test case up to the initial testing state from which the test body will start.

3.6.9 test body : The sequences of test steps that achieve the test purpose.

3.6.10 (test) postamble : The sequences of test steps from the end of the test body up to the finishing stable testing state(s) for the test case.

3.6.11 test step : A named subdivision of a test case, constructed from test events and/or other test steps.

3.6.12 test event : An indivisible unit of test specification at the level of abstraction of the specification (*e.g.* sending or receiving a single PDU).

3.6.13 unidentified test event : A test event which is used to provide for receipt of PDUs and/or ASPs without identifying them in the test case.

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NOTE – In TTCN, the unidentified test event is the Otherwise statement.

3.6.14 testing state : A state encountered during testing, comprising the combination of the states of the SUT, the test system, the protocols for which control and observation is specified in the ATS, and, if relevant, the state of the underlying service.

3.6.15 stable testing state : A testing state which can be maintained, without prescribed Lower Tester behaviour, sufficiently long to span the gap between one test case and the next in a test campaign.

3.6.16 idle testing state : A stable testing state in which there is no established connection of the relevant protocol(s) and in which the state of the SUT is independent of any previously executed test cases.

3.6.17 transient testing state : Any testing state which is not a stable testing state.

NOTE – Transient testing states include those testing states that are in the middle of a logical exchange of PDUs (*e.g.* to establish a connection or perform negotiation), particularly when a request PDU has been sent (or received) and the corresponding response PDU has not been received (or sent).

3.6.18 initial testing state : The testing state in which a test body starts.

NOTE – This may be either a stable testing state or a transient state.

3.6.19 (conformance) test suite : The complete set of test cases, possibly combined into nested test groups, that is needed to perform dynamic conformance testing for one or more OSI protocols.

NOTE – It should cover both capability testing and behaviour testing. It may be qualified by the adjectives: abstract, generic or executable, as appropriate. Unless stated otherwise, an "abstract test suite" is meant.

3.6.20 test case : A generic, abstract or executable test case.

3.6.21 test group : A named set of related test cases.

3.6.22 generic test suite : A test suite composed of generic test cases.

3.6.23 abstract test suite [ATS] : A test suite composed of abstract test cases.

3.6.24 executable test suite [ETS] : A test suite composed of executable test cases.

3.6.25 selected abstract test suite [SATS] : The subset of an ATS selected using a specific PICS and PIXIT.

3.6.26 selected executable test suite [SETS] : The subset of an ETS selected using a specific PICS and PIXIT.

3.6.27 parameterized abstract test case : An abstract test case in which all appropriate parameters have been supplied with values in accordance with a specific PICS and PIXIT.

3.6.28 parameterized executable test case : An executable test case, in which all appropriate parameters have been supplied with values in accordance with a specific PICS and PIXIT, and corresponding to a parameterized abstract test case.

3.6.29 parameterized abstract test suite [PATS] : A SATS in which all test cases have been parameterized in accordance with the appropriate PICS and PIXIT.

3.6.30 parameterized executable test suite [PETS] : A SETS, in which all test cases have been parameterized in accordance with the appropriate PICS and PIXIT, and corresponding to a PATS.

3.6.31 standardized abstract test suite [ATS] : An abstract test suite specified within an International Standard or CCITT Recommendation or, in the absence of such an International Standard or CCITT Recommendation, within a publicly available document which is in the process of being standardized within ISO/IEC or CCITT, and which has the highest standardization status currently available, having reached at least the committee draft, draft proposal or draft recommendation status.

3.6.32 conformance testing standard : The International Standard or CCITT Recommendation or draft thereof that contains a standardized ATS.

3.7 Terminology of results

3.7.1 repeatability (of results) : Characteristic of a test case, such that repeated executions on the same IUT under the same conditions lead to the same test verdict, and by extension a characteristic of a test suite.

3.7.2 comparability (of results) : Characteristic of conformance assessment processes, such that their execution on the same IUT, in different test environments, leads to the same overall summary of conformance for the specified IUT.

3.7.3 (observed) test outcome : The sequence of test events, together with associated data and/or parameter values, which occurred during test execution of a specific parameterized executable test case.

3.7.4 foreseen test outcome : An observed test outcome identified in the abstract test case.

NOTE – A foreseen test outcome may include an unidentified test event.

3.7.5 unforeseen test outcome : An observed test outcome not identified in the abstract test case.

NOTE – An unforeseen test outcome can only lead to a test case error or an abnormal test case termination.

3.7.6 (test) verdict : A statement of "pass", "fail" or "inconclusive", specified in an abstract test case, concerning conformance of an IUT with respect to that test case when it is executed.

3.7.7 system conformance test report [SCTR] : A document, written at the end of the conformance assessment process, giving an overall summary of the conformance of the system or implementation to the set of protocols for which conformance testing was carried out.

3.7.8 protocol conformance test report [PCTR] : A document, written at the end of the conformance assessment process, giving the details of the testing carried out for a particular protocol. It lists all of the abstract test cases and identifies those for which corresponding executable test cases were run, together with the verdicts assigned to each test case executed.

3.7.9 valid test event : A test event which is allowed by the protocol specification, being both syntactically and semantically correct, and occurring when allowed to do so by the protocol specification.

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3.7.10 invalid test event : A test event that violates at least one conformance requirement of the relevant protocol or transfer syntax specification.

NOTE – This term is not to be confused with the term "invalid event" as defined in ISO 7776.

3.7.11 inopportune test event : A test event which occurs when not allowed to do so by the protocol specification.

3.7.12 syntactically invalid test event : A test event which syntactically is not allowed by the protocol specification.

3.7.13 semantically invalid test event : A test event which is neither inopportune nor syntactically invalid, but which contains a semantic error with respect to the relevant protocol specification (*e.g.* a PDU containing a parameter value outside the negotiated range for that parameter).

3.7.14 pass (verdict) : A test verdict given when the observed test outcome gives evidence of conformance to the conformance requirement(s) on which the test purpose(s) of the test case is (are) focused, and when all the test events are valid with respect to the relevant International Standard(s) or CCITT Recommendation(s).

3.7.15 fail (verdict) : A test verdict given when the observed test outcome either demonstrates non-conformance with respect to (at least one of) the conformance requirement(s) on which the test purpose(s) of the test case is (are) focused, or contains at least one invalid test event, with respect to the relevant International Standard(s) or CCITT Recommendation(s).

3.7.16 inconclusive (verdict) : A test verdict given when the observed test outcome is such that neither a pass nor a fail verdict can be given.

3.7.17 test case error : The term used to describe the result of execution of a test case when an error is detected in the test case itself.

3.7.18 abstract test case error : A test case error resulting from an error in the abstract test case.

3.7.19 executable test case error : A test case error in the realization of an abstract test case.

3.7.20 abnormal (test case) termination : The term used to describe the result of execution of an abstract test case when it has been prematurely terminated by the test system.

3.7.21 conformance log : A human-readable record of information produced as a result of a test campaign, which is sufficient to record the observed test outcomes and verify the assignment of test results (including test verdicts).

3.8 Terminology of test methods

3.8.1 point of control and observation [PCO] : A point within a testing environment where the occurrence of test events is to be controlled and observed, as defined in an Abstract Test Method.

NOTE – A PCO is characterized by the set of ASPs and/or PDUs that can occur, according to the ATS, at that PCO.

3.8.2 lower tester [LT] : The representation in ISO/IEC 9646 of the means of providing, during test execution, indirect control and observation of the lower service boundary of the IUT via the underlying service-provider.

NOTE – The underlying service-provider is immediately beneath the (lowest layer) protocol which is the focus of testing. It may use one or more OSI layers, or only the Physical medium.

3.8.3 upper tester [UT] : The representation in ISO/IEC 9646 of the means of providing, during test execution, control and observation of the upper service boundary of the IUT, as defined by the chosen Abstract Test Method.

3.8.4 abstract (N)-service-primitive [(N)-ASP] : An implementation-independent description of an interaction between a service-user and a service-provider at an (N)-service boundary, as defined in an OSI service definition.

3.8.5 test coordination procedures : The rules for cooperation between the Lower and Upper Testers during testing.

3.8.6 test management protocol [TMP] : A protocol which is used in the test coordination procedures for a particular test suite.

3.8.7 test system : The real system which includes the realization of the Lower Tester.

NOTE – The same test system can be used as part of several Means of Testing.

3.8.8 local test method : An Abstract Test Method in which both the Lower and Upper Testers are located within the test system and there is a PCO at the upper service boundary of the IUT.

3.8.9 distributed test method : An Abstract Test Method in which the Upper Tester is within the SUT and there is a PCO at the upper service boundary of the IUT.

3.8.10 coordinated test method : An Abstract Test Method in which the Upper Tester is within the SUT and for which a standardized TMP is defined for the test coordination procedures, enabling the control and observation to be specified solely in terms of the Lower Tester activity, including the control and observation of Test Management PDUs.

3.8.11 remote test method : An Abstract Test Method in which the control and observation of test events is specified solely in terms of Lower Tester activity, and in which some requirements for test coordination procedures may be implied or informally expressed in the ATS, but in which no assumption is made regarding their feasibility or realization.

3.8.12 means of testing [MOT] (IUTs) : The combination of equipment and procedures that can perform the derivation, selection, parameterization and execution of test cases, in conformance with a reference standardized ATS, and can produce a conformance log.

3.8.13 test realization : The process of producing a Means of Testing IUTs.

3.8.14 reference standardized (OSI) abstract test suite [ATS] : The standardized ATS for which a Means of Testing is realized.

3.8.15 test realizer : An organization which takes responsibility for providing, in a form independent of the clients of a test laboratory and their IUTs, a Means of Testing IUTs in conformance with an ATS.

3.8.16 comprehensive testing service : A service, offered to clients by a test laboratory, to perform the conformance assessment process for one or more OSI protocol(s), with a choice of test methods sufficient to make the service applica-

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ble to all real open systems that claim to implement the specified protocols.

4 Abbreviations

For the purposes of this part of ISO/IEC 9646 the following abbreviations apply.

ACSE : association control service element

ASE : application-service-element

ASN.1 : abstract syntax notation one

ASP : abstract-service-primitive

ATM : abstract test method

ATS : abstract test suite

BIT : basic interconnection test

DTE : data terminal equipment

ETS : executable test suite

ISDN : integrated services digital network

IUT : implementation under test

LT : lower tester

MOT : means of testing

OSI : open systems interconnection

PATS : parameterized abstract test suite

PCO : point of control and observation

PCTR : protocol conformance test report

PDU : protocol data unit

PETS : parameterized executable test suite

PICS : protocol implementation conformance statement

PIXIT : protocol implementation extra information for testing

SAP : service-access-point

SATS : selected abstract test suite

SCS : system conformance statement

SCTR : system conformance test report

SETS : selected executable test suite

SUT : system under test

TMP : test management protocol

TM-PDU : test management PDU

TTCN : tree and tabular combined notation

UT : upper tester

5 The meaning of conformance in OSI

5.1 Introduction

In the context of OSI, a real system is said to exhibit conformance if it complies with the requirements of applicable OSI International Standards or CCITT Recommendations in its communication with other real systems.

Applicable OSI International Standards or CCITT Recommendations include those that specify OSI protocols, and those that specify OSI transfer syntaxes (insofar as they are implemented in conjunction with protocols).

OSI International Standards and CCITT Recommendations form a set of inter-related International Standards and CCITT Recommendations which together define behaviour of open systems in their communication. Conformance of a real system is, therefore, expressed at two levels, conformance to each individual International Standard or CCITT Recommendation, and conformance to the set.

NOTE – If the implementation is based on a predefined set of International Standards or CCITT Recommendations, often referred to as a functional standard or profile, the concept of conformance can be extended to specific requirements expressed in the functional standard or profile, as long as they do not conflict with the requirements of the base (protocol) International Standards and CCITT Recommendations.

5.2 Conformance requirements

5.2.1 The conformance requirements in an International Standard or CCITT Recommendation can be

a) mandatory requirements: these are to be observed in all cases;

b) conditional requirements: these are to be observed if the conditions set out in the specification apply;

c) options: these can be selected to suit the implementation, provided that any requirements applicable to the option are observed. More information on options is provided in Annex A.

For example, CCITT essential facilities are mandatory requirements; additional facilities can be either conditional or optional requirements.

NOTE – The CCITT terms "essential facilities" and "additional facilities" need to be considered in the context of the scope of the CCITT Recommendation concerned; for example, in many cases, essential facilities are mandatory for networks but not for DTEs.

5.2.2 Furthermore, conformance requirements in an International Standard or CCITT Recommendation can be stated

a) positively: they state what shall be done;

b) negatively: they state what shall not be done.

5.2.3 Finally, conformance requirements fall into two groups:

a) static conformance requirements;

b) dynamic conformance requirements.

These are discussed in 5.3 and 5.4, respectively.

5.3 Static conformance requirements

Static conformance requirements are those that specify the limitations on the combinations of implemented capabilities permitted in a real system which is claimed to conform to the relevant OSI International Standard or CCITT Recommendation. They define the allowed minimum capabilities in order to facilitate interworking. They may be specified at a broad level, such as the grouping of PDUs into functional units or protocol classes, or at a detailed level, such as a range of values that have to be supported for specific parameters or timers.

Static conformance requirements in OSI International Standards or CCITT Recommendations can be of two varieties:

a) those which determine the capabilities to be included in the implementation of the particular protocol;

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