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

Part 5:
Requirements on test laboratories and clients for the conformance assessment process

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

Partie 5: Spécifications pour laboratoires d'essais et clients pour le procédé d'évaluation de conformité

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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 9646-5 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 form an integral part of this part of ISO/IEC 9646. Annexes D and E are for information only.

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Introduction

Conformance testing requires mutual understanding and agreement between the test laboratory and the client. This part of ISO/IEC 9646 addresses the roles of both the test laboratory and the client during the conformance assessment process, the need to reach mutual agreements between them, and the requirements on each of them.

The conformance assessment process is the most visible process of conformance testing, where the results of test suite standardization are put to real use. This is also the stage at which there is potentially the most scope for variations to occur. As this part of ISO/IEC 9646 is concerned with the relatively formal process of testing implementations, it is important that the number and nature of such variations is very limited. One of the major objectives of standardizing the conformance testing process is to achieve an acceptable and useful degree of comparability of results of conformance assessments of similar implementations. If this is to be achieved, not only should the same source of tests be used (*i.e.* as specified in standards), but also the methods of selecting and parameterizing these tests, and presenting their results, should be, to a large extent, the same.

This part of ISO/IEC 9646 addresses the issues which should be taken into account, by both the test laboratory and the client, if the necessary consistency of conformance assessment is to be achieved. The target audiences for this part of ISO/IEC 9646 are the test laboratories and their clients.

The test laboratory is responsible for conducting the conformance assessment of an OSI implementation at the request of a client. Typically, test laboratories are

a) organizations developing or supplying OSI implementations (first-party test laboratories);

b) organizations willing to verify OSI implementations themselves before using them (second-party test laboratories);

c) organizations, independent of suppliers or users of OSI implementations, whose business is the testing of such implementations (third-party test laboratories).

Clients may be implementors or suppliers of real open systems or other OSI systems, who are applying for their own implementations to be tested. Alternatively, they may be procurers of those implementations, or any other interested party. The applicability of this part of ISO/IEC 9646 is independent of the relationship between the client and the implementation. During the conformance assessment process, the client is responsible for the conformance statements accompanying the System Under Test (SUT) and for the configuration of the SUT.

Secondary, but related, audiences to whom this part of ISO/IEC 9646 could also be of interest are

a) test realizers;

b) organizations responsible for the accreditation of first- , second- or third-party test laboratories;

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c) organizations responsible for the issue of test certificates which are based upon the conformance test reports issued by test laboratories;

d) readers of conformance test reports.

Within this part of ISO/IEC 9646, the conformance assessment process relating to both the test laboratory and the client is divided into three phases:

a) preparation for testing;

b) test operation;

c) production of test reports.

An overview of these three phases is given in clause 5. Clauses 6 to 9 state requirements on how to conduct these three phases.

For the purposes of this part of ISO/IEC 9646, it is assumed that a test laboratory is available and is already organized to provide a conformance assessment service. The test laboratory is assumed to have acquired from a test realizer (whether or not the latter belongs to the same organization) Means of Testing IUTs, for one or more OSI protocols and according to one or more Abstract Test Methods (ATM)s. This part of ISO/IEC 9646 specifies requirements on the test laboratory with respect to the conduct of the conformance assessment process for a particular client.

Similarly, it is assumed that a client is ready to apply for conformance assessment of an OSI implementation. The client is assumed to be familiar with the appropriate standards, with the concepts of conformance testing and Abstract Test Methods, and to be ready to cooperate with the test laboratory. This part of ISO/IEC 9646 specifies requirements on the client with respect to both the testability of the proposed SUT and the conduct of the conformance assessment process.

It is recommended that this part of ISO/IEC 9646 be read in conjunction with ISO/IEC 9646-1.

This part of ISO/IEC 9646 is also to be published as CCITT Recommendation X.294 (1991).

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

Part 5:
Requirements on test laboratories and clients for the conformance assessment process

1 Scope

This part of ISO/IEC 9646 specifies requirements on both the test laboratory and the client, for the conduct of the conformance assessment process. The requirements are those necessary to achieve comparability of results of tests on similar implementations performed by different test laboratories. This part of ISO/IEC 9646 also provides some guidance on the conformance assessment process.

The requirements include

a) requirements for the testability of the implementation with respect to ATMs;

b) general requirements on the test laboratory and the client applicable to any conformance testing process;

c) exchange of technical and administrative information, including a System Conformance Statement (SCS), a Protocol Implementation Conformance Statement (PICS) for each relevant OSI protocol standard, and Protocol Implementation eXtra Information for Testing (PIXIT) for each Abstract Test Suite (ATS) to be used for testing;

d) cooperation between the test laboratory and the client to reach an agreement on the definition of the Implementation Under Test (IUT), on the ATMs and ATSs to be used and on the conditions under which testing will be performed;

e) requirements for the structure and content of the conformance test reports that document the results of conformance assessment.

This part of ISO/IEC 9646 is applicable equally to those test laboratories which are affiliated to suppliers or procurers, and those which are independent.

This part of ISO/IEC 9646 is applicable to conformance assessment of implementations of OSI and ISDN two-party protocol standards that comply with the relevant requirements for testability in ISO/IEC 9646-2, based on conformance testing standards specified in compliance with ISO/IEC 9646-2, and using Means of Testing (MOT) in compliance with ISO/IEC 9646-4.

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

a) the production of diagnostic trace information, additional to that in the conformance log, for the results of testing performed by the test laboratory, and its supply to the client;

b) aspects of test laboratory operations which are not specific to testing implementations of OSI protocols;

c) accreditation of test laboratories;

d) certification of implementations of OSI 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 indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO/IEC 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/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 9646-2 : 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 (TTCN).*

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)).

3 Definitions

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

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clause also apply to this part of ISO/IEC 9646.

3.1 client test manager: The person identified by the client organization as being responsible for all matters relating to the conformance testing of the IUT.

3.2 test laboratory manager: The person identified by the test laboratory as being responsible for all matters relating to test laboratory operations.

3.3 test operator: The person or persons designated by the test laboratory as being responsible for running conformance tests against the IUT.

3.4 SUT operator: The person or persons designated by the client organization as being responsible for operation of the SUT during conformance testing.

3.5 negotiated exit [NE] (from the conformance assessment process): A point in time at which the test laboratory and the client can mutually decide to terminate the conformance assessment process.

3.6 test laboratory checklist: A record of test-related information supplied to the client by the test laboratory during the test preparation phase of the conformance assessment process.

3.7 client checklist: A record of test-related information supplied to the test laboratory by the client during the test preparation phase of the conformance assessment process.

4 Abbreviations

4.1 Abbreviations defined in ISO/IEC 9646-1

For the purposes of this part of ISO/IEC 9646, the following abbreviations defined in ISO/IEC 9646-1: 1990, clause 4 apply:

ASP : abstract service primitive

ATM : abstract test method

ATS : abstract test suite

BIT : basic interconnection test

IUT : implementation under test

MOT : means of testing

OSI : open systems interconnection

PCO : point of control and observation

PCTR : protocol conformance test report

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

SUT : system under test

TMP : test management protocol

4.2 Other abbreviations

For the purposes of this part of ISO/IEC 9646, the following abbreviation also applies:

NE : negotiated exit

5 Overview of the Conformance Assessment Process

5.1 Introduction

Figure 1 illustrates the conformance assessment process. ISO/IEC 9646-1: 1990, 6.3 provides an overview of the conformance assessment process. An overview of the three phases (preparation for testing, test operations and test report production) is given as guidance in this clause.

5.2 Preparation for testing

The preparatory phase includes

a) general administrative steps, such as the application by the client, the provision of documents by the test laboratory describing the general policy, terms and conditions to be followed during test operations, and the provision of information about the SUT by the client;

b) checking the completeness of the documents provided by the test laboratory (PIXIT proforma), of those provided by the client (PICS, PIXIT, SCS), and also of the checklists exchanged between the test laboratory and the client;

c) analysis of the SUT configuration and choice of a conformance testing standard(s) for the OSI protocol(s) to be tested, either agreeing that the SUT and the test laboratory's MOT are both capable of supporting the ATM, or using a negotiated exit if an agreement cannot be reached;

d) preparation of the SUT and the MOT for the testing configuration that results from the choice of an ATM.

Requirements for test preparation, on both the test laboratory and the client, are given in clause 6.

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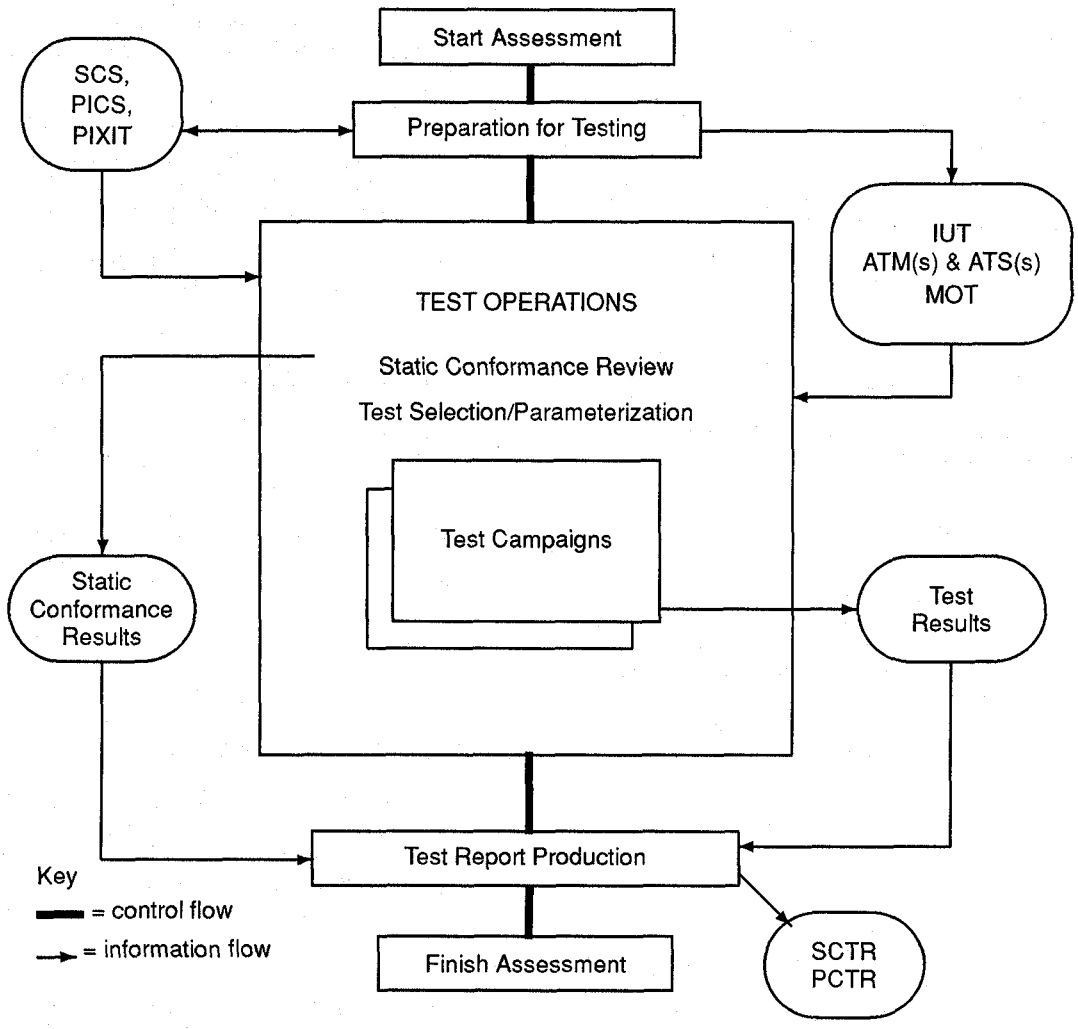

Figure 1 — Overview of the Conformance Assessment Process

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5.3 Test operations

During the second phase, the test operations are carried out. These include

a) the static conformance review, during which detailed analysis of the PICS and PIXIT takes place;

b) test selection and parameterization, applied to the executable (or abstract) test suite; this determines the Parameterized Executable Test Suite (PETS) that will be executed;

c) one or more test campaigns, running:

1) basic interconnection tests (optional);

2) capability tests;

3) behaviour tests.

If difficulties are encountered during test operations, it is possible for the client and test laboratory to negotiate a repetition of a test campaign as a whole or in part. Alternatively, they can take a negotiated exit from the conformance assessment process.

NOTE — The reasons for the negotiated exit are documented in an informal test report.

Requirements for test operations, on both the test laboratory and the client, are given in clause 7.

5.4 Test report production

After test operations are complete, the third phase commences: an evaluation of the conformance of the OSI implementation is made. This evaluation is recorded in System and Protocol Conformance Test Reports, the proformas for which are specified in annexes A and B respectively.

Requirements for test report production are given in clause 8.

6 Preparation for testing

6.1 Introduction

Clause 6 specifies requirements for test preparation on both the test laboratory and the client. Figure 2 illustrates the preparatory phase of the conformance assessment process. During this phase, both parties ensure that the required documentation (including SCS, PICS, PIXIT and the checklists) is completed to their mutual satisfaction: in particular, the characteristics of the SUT which determine its configurations and affect the choice of test method must have been precisely defined. It is assumed that the requirements for SUT testability have been met by the client before approaching the test laboratory.

As a prerequisite to test operations, the client and the test laboratory agree on the ATM and the conditions for the test campaign. If an agreement is reached, the test laboratory will select the MOT for the chosen test method, and proceed to the test operations phase; otherwise, a negotiated exit may be taken.

6.2 Requirements for SUT testability

6.2.1 Client role

6.2.1.1 General

The client shall ensure that the SUT is testable using at least one Abstract Test Method (ATM) as defined in ISO/IEC 9646-2.

NOTE — This part of ISO/IEC 9646 does not constrain the client to agree to any particular ATM, as long as one method is made possible by appropriately configuring the SUT.

Each of the ATMs described in ISO/IEC 9646-2: 1990, clause 12, imposes particular requirements on the SUT with respect to its testability. The requirements vary according to the test method.

For the ATM by which the client claims the SUT can be tested, the client shall ensure that the SUT provides the necessary means of control and observation and that it can enable the appropriate test coordination procedures to be performed.

The next four subclauses state further requirements for SUT testability for each of the ATMs.

6.2.1.2 Local test method

6.2.1.2.1 For the Local ATM, the client shall ensure that the IUT upper interface is realized in hardware and can be connected to a test system.

NOTE — The only requirements are that the interface is standardized and that there is a well-defined mapping between the relevant ASPs and the hardware interface.

6.2.1.2.2 There are no requirements on the client for the test coordination procedures.

6.2.1.3 Distributed test method

6.2.1.3.1 For the Distributed ATM, the client shall ensure that the SUT contains the means of generating, and indicating the receipt of, the ASPs for the relevant Points of Control and Observation (PCOs), that are appropriate to the envisaged IUT.

NOTES

1 The only requirements are that means be realized within the SUT for the control and observation of the effects of the relevant ASPs and that the upper service boundary of the IUT is either a human-user interface or a standardized programming language interface.

2 Any realization will satisfy this requirement provided that the appropriate ASPs can be generated and detected unambiguously. Example realizations are: pushing buttons, observing and controlling activities of OSI protocols which use the service primitives concerned, observing activity on peripherals and so on. There may be a one-to-one, one-to-many, or many-to-one correspondence between the means within the SUT and ASPs.

6.2.1.3.2 The client shall ensure that notification of the occurrence of ASP events within the SUT can be communicated by the SUT Operator to the Test Operator (at the test laboratory) when required by the test coordination procedures.

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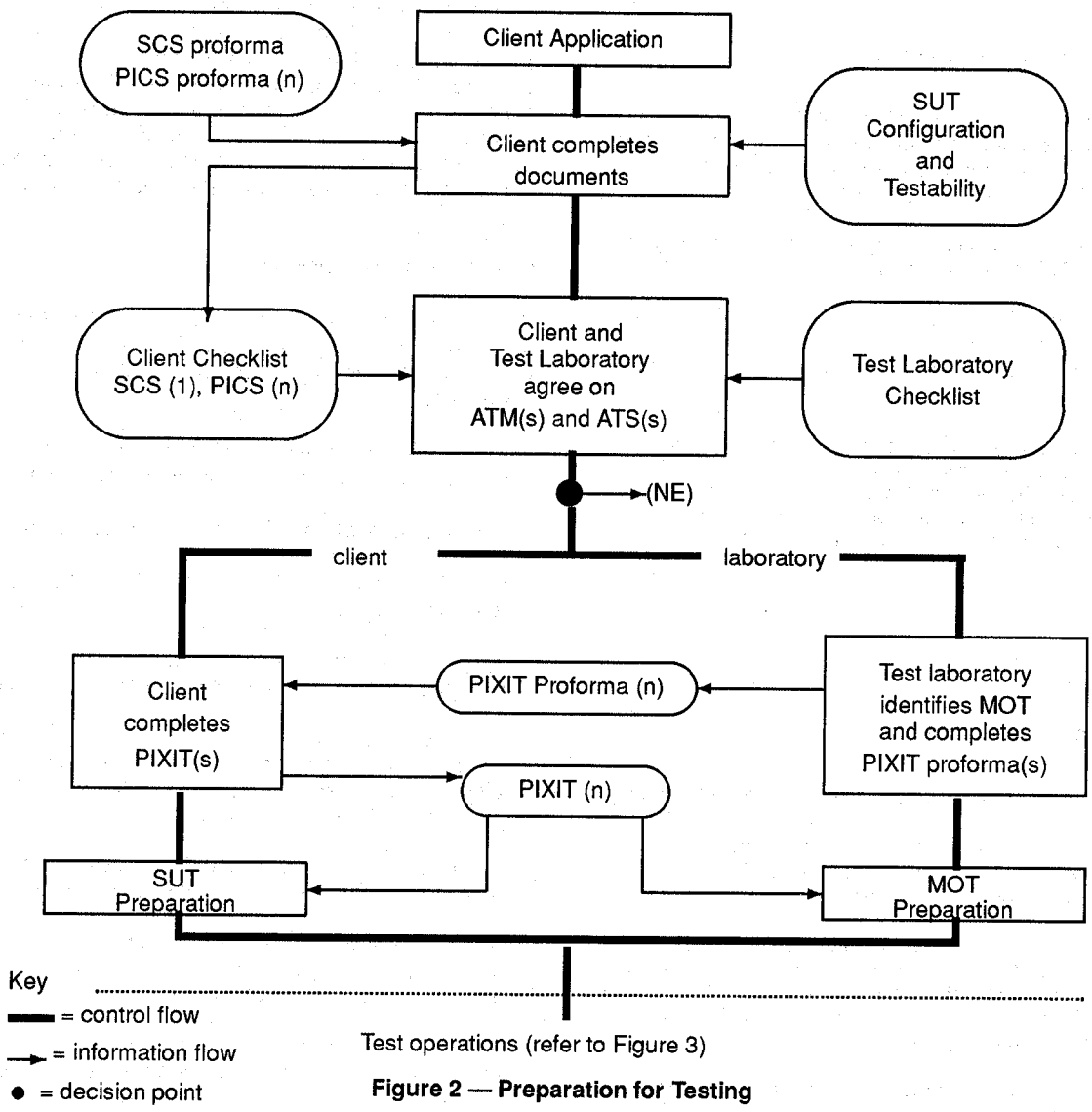

Figure 2 — Preparation for Testing

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