
**Information technology — Open Systems
Interconnection — Conformance test suite
for the presentation layer —**

Part 2:

Test suite structure and test purposes for the
ASN.1 basic encodings

*Technologies de l'information — Interconnexion de systèmes ouverts
(OSI) — Suite d'essais de conformité pour la couche présentation —*

*Partie 2: Structure de la suite d'essais et objets des essais pour le codage
ASN.1 de base*



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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 10729-2 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 21, *Open systems interconnection, data management and open distributed processing*.

ISO/IEC 10729 consists of the following parts, under the general title *Information technology — Open Systems Interconnection — Conformance test suite for the presentation layer*.

- *Part 1: Test suite structure and test purposes for the presentation protocol*
- *Part 2: Test suite structure and test purposes for the ASN.1 basic encodings*
- *Part 3: Common presentation abstract test suite*

Introduction

This part of ISO/IEC 10729 specifies a test suite structure and a set of test purposes for use by test suite specifiers as the basis for all standardized conformance test suites needed to evaluate conformance to the Basic Encoding Rules (BER) as defined in ISO/IEC 8825-1, for Abstract Syntax Notation One (ASN.1).

A fundamental objective of the related standardized conformance test suites is to establish uniform conformance testing and unambiguous evaluation procedures for checking the ability of the syntax transformation facility of a Presentation Layer implementation to operate according to ISO/IEC 8825-1. The standardization of these test suites should lead to comparability and wide acceptance of the test results produced by different test laboratories, and therefore minimize repeated conformance testing of the same implementation.

The conformance test suites based on this International Standard are designed for use by:

- a) test laboratories which provide a conformance testing service for the ASN.1 basic encoding rules;
- b) test realizers which provide a means of testing to be used by such test laboratories;
- c) implementors of ASN.1 BER encoding and/or decoding.

The purpose of conformance testing is to increase the probability that different implementations are able to interwork, although conformance testing alone cannot give a guarantee of interworking. Conformance testing increases the confidence that each implementation conforms to the encoding rules specification, by establishing that it has the required capabilities and that its behaviour conforms to the specification in representative instances of communication.

Information technology – Open Systems Interconnection – Conformance test suite for the presentation layer –

Part 2:

Test suite structure and test purposes for the ASN.1 basic encodings

1 Scope

This part of ISO/IEC 10729 specifies a test suite structure and test purposes for the whole of the ASN.1 basic encodings, as defined in ISO/IEC 8825-1. This part of ISO/IEC 10729 does not specify how the conformance tests are to be realized or used, nor how the test results are to be presented or used.

NOTE - The choice of test method may restrict the test purposes which can be realized.

The test suite structure and test purposes specified in this part of ISO/IEC 10729 form a generic framework for the specification of abstract test suites. Any compliant generic or abstract test suite needs to be based not only on this part of ISO/IEC 10729, but also on some identified abstract syntax which determines the specific ASN.1 types and values to be used in the abstract test cases associated with the test purposes defined in this part of ISO/IEC 10729.

NOTE - Since abstract test suites for ASN.1 encodings are based on abstract syntaxes, multiple generic or abstract test suites for ASN.1 encodings may be necessary for application contexts which contain more than one abstract syntax.

This part of ISO/IEC 10729 does not include a general assessment of performance, reliability or robustness of relevant protocol implementations, nor an assessment of the design of the ASN.1 BER encoder/decoder.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO/IEC 10729. At this 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 10729 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 7498-1 : 1994, *Information technology - Open Systems Interconnection - Basic Reference Model: The Basic Model*.

ISO/IEC 8822 : 1994, *Information technology - Open Systems Interconnection - Presentation service definition*.

ISO/IEC 8823-1 : 1994, *Information technology - Open Systems Interconnection - Connection-oriented presentation protocol: Protocol specification*.

ISO/IEC 8824-1 : –¹⁾, *Information technology - Open Systems Interconnection - Abstract Syntax Notation One (ASN.1) - Part 1: Specification of Basic Notation*.

ISO/IEC 8825-1 : –¹⁾, *Information technology - Open Systems Interconnection - Specification of ASN.1 Encoding Rules - Part 1: Basic Encoding Rules (BER)*.

ISO/IEC 9646-1 : 1994, *Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General concepts*.

ISO/IEC 9646-2 : 1994, *Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 2: Abstract Test Suite specification*.

3 Definitions

3.1 Reference model definitions

This part of ISO/IEC 10729 makes use of the following terms defined in ISO/IEC 7498-1:

- a) Presentation Layer;
- b) presentation-protocol-data-unit.

1) To be published.

3.2 Presentation service definitions

This part of ISO/IEC 10729 makes use of the following terms defined in ISO/IEC 8822:

- a) abstract syntax.

3.3 Conformance testing methodology and framework definitions

This part of ISO/IEC 10729 makes use of the following terms defined in ISO/IEC 9646-1:

- a) abstract test case;
- b) basic interconnection testing;
- c) behaviour testing;
- d) capabilities of an IUT;
- e) capability testing;
- f) conformance testing;
- g) conformance test suite;
- h) dynamic conformance requirements;
- i) implementation under test (IUT);
- j) inopportune test event;
- k) lower tester;
- l) PICS proforma;
- m) protocol implementation conformance statement (PICS);
- n) static conformance requirements;
- o) syntactically invalid test event;
- p) system under test (SUT)
- q) test group;
- r) test purpose;

4 Abbreviations

4.1 Data units

PPDU	presentation-protocol-data-unit
PSDU	presentation-service-data-unit

4.2 Other abbreviations

ASN.1	Abstract Syntax Notation One (see ISO/IEC 8824-1)
DCS	Defined Context Set
FU	Functional Unit
IUT	Implementation Under Test

LT	Lower Tester
TSS & TP	Test Suite Structure and Test Purposes

5 Compliance

An abstract test suite which complies with this part of ISO/IEC 10729 shall:

- a) identify which abstract syntax is used as the basis of the test suite;
- b) consist of a set of test cases corresponding to the set or a subset of the test purposes specified in clause 10;
- c) identify clearly the test purposes used;
- d) cover all the relevant test purposes specified in clause 10 as appropriate to the coverage and test method chosen for that test suite;
- e) augment the chosen test purposes by appropriate ASN.1 values selected from the identified abstract syntax;
- f) use a test suite structure which is an appropriate subset (or the whole) of the test suite structure specified in clause 7;
- g) name its test groups and test cases using the naming conventions specified in clause 8 in such a way that the test group and test case names used in clause 10 are used whenever relevant;
- h) maintain the relationships specified in clause 10 between the chosen test purposes and the entries in the PICS proforma to be used for test case selection;
- i) contain references to the PICS relevant for the identified abstract syntax;
- j) comply with ISO/IEC 9646-2.

6 Testing methodology

6.1 Introduction

The testing methodology used in this part of ISO/IEC 10729 complies with the requirements of ISO/IEC 9646-2.

6.2 Relationship between the TSS & TP and abstract test suites

The test purposes in this part of ISO/IEC 10729 have been derived from the basic encoding rules for ASN.1, ISO/IEC 8825-1. This derivation has focused on identifying test purposes to test conformance aspects of the protocol. However, no consideration

has been given to any testing method, how such test purposes may be realised, or any practical or economic constraints that may be placed on testing.

Adequate coverage of the test purposes specified in this part of ISO/IEC 10729 may, for an abstract syntax identified for the abstract test suite, require that multiple values with different types from that abstract syntax are selected for a single test purpose. Test of the encoding or decoding of these ASN.1 value may not be possible within a single test case. Therefore, this part of ISO/IEC 10729 maps all identified test purposes to leaf test groups. From any such leaf test groups representing test purposes, one or more abstract test cases may be derived.

It is intended that all abstract test suites for the basic encoding of ASN.1 shall include tests for all the test purposes in this part of ISO/IEC 10729. However, an abstract test suite specifier may subset the test purposes given in this part of ISO/IEC 10729 provided this is in compliance with ISO/IEC 9646-2, clause 10.

6.3 Test selection

Selection of the test cases appropriate for an IUT must be based on the contents of the PICS relevant for the abstract syntax used for the derivation of the abstract test suite.

Since application PICS do not clearly identify which ASN.1 types and/or values are affected by PICS entries, the specifier of the abstract test suite shall provide references to the application PICS in order to enable test case selection.

6.4 Verdicts

Verdicts assigned by each abstract test case are determined on the basis of the IUT's ability to behave in accordance with the requirements of the basic encoding rules for ASN.1 and to support the capabilities and parameter values listed in the relevant application PICS. Conformance assessment is based on the individual verdicts, the basic encoding rules for ASN.1 standard and the IUT's relevant application PICS.

6.5 Test suite coverage

Test purposes are specified and structured such that full coverage is provided for various forms of encoding of an ASN.1 type. The coverage with respect to the universe of ASN.1 values of such types as members of the identified abstract syntax is determined by the specifier of the abstract test suite through the selection of test cases for leaf test

groups, i.e. for those test groups which represent test purposes.

7 Test suite structure

The test suite for ASN.1 basic encoding rules consists of test groups and test cases. Each test case has a narrowly defined purpose. Within the test suite, nested test groups are used to provide a logical ordering of the test cases. Test groups may be nested to an arbitrary depth. They may be used to aid planning, development, understanding or execution of the test suite.

The test suite consists of two main test groups:

- a) Encoder Tests, which are used to verify that the IUT's encoding of ASN.1 values is valid with respect to the ASN.1 basic encoding rules and with respect to the relevant application PICS.
- b) Decoder Tests, which test the extend to which the IUT correctly decodes all ASN.1 encodings valid with respect to the ASN.1 basic encoding rules and with respect to the relevant application PICS, and detects as invalid such encodings which violate the ASN.1 basic encoding rules or the identified abstract syntax.

Each of these groups is further divided into a number of lower level subgroups. The complete structure of the major test groups is given below in figure 1.

8 Naming conventions

This clause describes the proformas that are used for test group objectives and test purposes. Two proformas are used as described below:

- a) The first proforma is used for a test group which has other test groups below it. It describes the objectives of the group and lists the subgroups below it. The proforma takes the form:

V.W.X.Y AA/BB/FUNCTION (FN)

[Reference: ISO/IEC 8825-1...]

Test group objective:

Subgroups:

1 Function One (F1)

2 Function Two (F2)

n Function n (Fn)