
**Information technology — Open Systems
Interconnection — Conformance test suite
for the OSI TP protocol —**

Part 2:

Test management protocol specification

*Technologies de l'information — Interconnexion de systèmes ouverts
(OSI) — Suite d'essais de conformité pour le protocole OSI TP —*

Partie 2: Spécification du protocole de gestion des essais



Contents

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Definitions	2
3.1 Terms defined in this International Standard	2
3.2 Terms defined in other International Standards	2
3.2.1 Terms defined in ISO/IEC 7498-1	2
3.2.2 Terms defined in ISO/IEC 9646	2
3.2.3 Terms defined in ISO/IEC 10731	2
4 Abbreviations	3
5 Conventions	3
6 Specification of the TP test management protocol	3
6.1 Test management phases	3
6.1.1 Test procedure establishment phase	4
6.1.2 Test execution phase	4
6.1.3 Test results collection phase	4
6.2 Dialogue management	5
6.3 Protocol data unit descriptions and effects	5
6.3.1 TM-TEST-PROCEDURE PDU	5
6.3.2 TM-START-TEST PDU	5
6.3.3 TM-REQUEST-LOG PDU	5
6.3.4 TM-TEST-LOG PDU	6
6.3.5 TM-END-TEST-SESSION PDU	6
7 Upper tester execution rules	6
7.1 Semantics of TM-TEST-PROCEDURE actions in the single-party testing context	6
7.1.1 SEND action	6
7.1.2 RECEIVE action	6
7.1.3 MATCH action	6
7.1.4 SYNC action	7

© ISO/IEC 1997

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

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

Printed in Switzerland

7.1.5 TIMER action	7
7.1.6 END action	7
7.2 Semantics of TM-TEST-PROCEDURE actions in the multi-party testing context.....	7
7.2.1 SEND action.....	7
7.2.2 RECEIVE action.....	7
7.2.3 MATCH action.....	7
7.2.4 SYNC action.....	8
7.2.5 TIMER action	8
7.2.6 END action	8
7.3 Upper tester default procedure	8
7.3.1 Normal default behaviour.....	8
8 Interface between the IUT and the upper tester	9
8.1 Values of the In-service and Out-service ASN.1 types	9
8.2 Relationship to TP services.....	9
9 TMPDU errors.....	9
10 Structure and encoding of test management protocol data units.....	9
11 Conformance	15

Annexes

A Examples	16
A.1 Examples of protocol flow in the results collection phase	16
A.2 Examples of the use of actions.....	16
A.2.1 Sequence of Actions.....	17
A.2.2 Branching.....	17
A.2.3 Multi-Party Testing	17
A.2.4 Alternative Styles	18
A.2.5 SYNC.....	19
A.2.6 Overlapping SYNC.....	19
B Dialogue management scenarios	21
B.1 Dialogue establishment	21
B.2 Dialogue Termination.....	22
B.2.1 Coordination level = none	22
B.2.2 Coordination level = commit	22

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 13650-2 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 13650 consists of the following parts, under the general title *Information technology — Open Systems Interconnection — Conformance test suite for the OSI TP protocol*:

- *Part 1: Test suite structure and test purposes*
- *Part 2: Test management protocol specification*

Annexes A and B of this part of ISO/IEC 13650 are for information only.

Introduction

ISO/IEC 10026, Distributed Transaction Processing (OSI TP), is one of a set of standards produced to facilitate the interconnection of computer systems. It is related to other international standards in the set as defined by the Basic Reference Model for Open Systems Interconnection (ISO/IEC 7498-1). The Basic Reference Model subdivides the area of standardization for interconnection into a series of layers of specification, each of manageable size.

In order to ensure that implementations of ISO/IEC 10026-3 are conformant, testing standards have been defined using the methodology described in ISO/IEC 9646. The Coordinated test method has been chosen for the Abstract Test Suite. This particular test method requires the use of a Test Management Protocol, and this part of ISO/IEC 13650 defines the protocol.

Information technology — Open Systems Interconnection — Conformance test suite for the OSI TP protocol —

Part 2: Test management protocol specification

1 Scope

This part of ISO/IEC 13650 provides:

A specification of a Test Management Protocol for use in conformance testing of Distributed Transaction Processing systems when the Coordinated Test Method of ISO/IEC 9646 is employed.

This Test Management Protocol does not rely on any specified Application Programming Interface (API) within the System Under Test, but rather assumes the existence of a mapping from the abstract service primitives issued by the upper tester to the functionality of the implementation under test realizing ISO/IEC 10026-3.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO/IEC 13650. 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 13650 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 7498-3:1997, *Information technology — Open Systems Interconnection — Basic Reference Model: Naming and addressing*.

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

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

ISO/IEC 8824-1:1995, *Information technology — Abstract Syntax Notation One (ASN.1): Specification of basic notation*.

ISO/IEC 8825-1:1995, *Information technology — ASN.1 encoding rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER)*.

ISO/IEC 9545:1994, *Information technology — Open Systems Interconnection — Application Layer structure*.

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*.

ISO/IEC 10026-1:1992¹⁾, *Information technology — Open Systems Interconnection — Distributed Transaction Processing — Part 1: OSI TP Model*.

ISO/IEC 10026-2:1996¹⁾, *Information technology — Open Systems Interconnection — Distributed Transaction Processing — Part 2: OSI TP Service*.

ISO/IEC 10026-3:1996¹⁾, *Information technology — Open Systems Interconnection — Distributed Transaction Processing — Part 3: Protocol specification*.

ISO/IEC 10026-4:1995, *Information technology — Open Systems Interconnection — Distributed Transaction Processing: Protocol Implementation Conformance Statement (PICS) proforma*.

ISO/IEC 10731:1994, *Information technology — Open Systems Interconnection — Basic Reference Model — Conventions for the definition of OSI services*.

1) Currently under revision.

3 Definitions

3.1 Terms defined in this International Standard

For the purposes of this part of ISO/IEC 13650, the following definitions apply.

- a) Action-list: a sequence of actions to be performed by the upper tester in support of a dialogue used in a test case.
- b) Done-needed: one or more of the following events has occurred during the current transaction and no subsequent TP-DONE req has been issued:
 - a TP-ROLLBACK req;
 - a TP-ROLLBACK ind;
 - a TP-COMMIT ind;
 - a TP-BEGIN-DIALOGUE(rejected, rollback = "true") ind;
 - a TP-P-ABORT(rollback = "true") ind;
 - a TP-U-ABORT(rollback = "true") ind;
 - a TP-P-ABORT(rollback = "false") ind on a coordinated dialogue during the termination phase of the current transaction; or
 - a TP-U-ABORT(rollback = "false") ind on a coordinated dialogue during the termination phase of the current transaction.
- c) Rollback-next-needed: on a chaining dialogue, a TP-P-ABORT ind was received after receipt of a TP-COMMIT ind, and there has been no subsequent TP-ROLLBACK ind received.
- d) SYNC group: a set of Action-lists participating in synchronization.
- e) Test session: the execution of a sequence of test cases from a test campaign.

3.2 Terms defined in other International Standards

3.2.1 Terms defined in ISO/IEC 7498-1

This part of ISO/IEC 13650 uses the following terms defined in ISO/IEC 7498-1:

- a) application-protocol-data-unit;
- b) open system.

3.2.2 Terms defined in ISO/IEC 9646

This part of ISO/IEC 13650 uses the following terms defined in ISO/IEC 9646-1:

- a) Abstract Test Suite;
- b) Coordinated Single Test Method;
- c) Implementation Conformance Statement;
- d) Implementation Under Test;
- e) Multi-party testing context;
- f) Single-party testing context;
- g) System Under Test;
- h) Test Management Protocol;
- i) Test Management Protocol Data Unit;
- j) Upper Tester.

3.2.3 Terms defined in ISO/IEC 10731

This part of ISO/IEC 13650 uses the following terms defined in ISO/IEC 10731:

- a) request;
- b) indication;
- c) response;
- d) confirm;
- e) OSI-service primitive; primitive;
- f) OSI-service-provider;
- g) OSI-service-user.

4 Abbreviations

For the purposes of this part of ISO/IEC 13650, the following abbreviations apply.

APDU	Application Protocol Data Unit
ASN.1	Abstract Syntax Notation One
FU	Functional Unit
IUT	Implementation Under Test
OSI	Open Systems Interconnection
PDU	Protocol Data Unit
SUT	System Under Test
TMP	Test Management Protocol
TMPDU	Test Management Protocol Data Unit
TP	(Distributed) Transaction Processing
U-ASE	User-Application Service Elements

5 Conventions

This part of ISO/IEC 13650 is guided by the conventions defined in ISO/IEC 10731, as they apply to the OSI TP service.

6 Specification of the TP test management protocol

The Transaction Processing Test Management Protocol (TMP) is designed for cooperative conformance testing between one or more lower testers and an upper tester. At any particular time, one unique lower tester shall be responsible for the transfer of TMP. This part of ISO/IEC 13650 defines the format the PDUs sent between this specific lower tester and upper tester, and the log records sent from the upper tester to the lower tester during a TP test campaign.

Information is exchanged between one of the lower testers and the upper tester in the form of TMPDUs. The TMPDUs are carried as parameters of U-ASE APDUs on TP dialogues. There are five TMPDUs which may be sent during a test case, namely:

- TM-TEST-PROCEDURE
- TM-START-TEST
- TM-REQUEST-LOG
- TM-TEST-LOG
- TM-END-TEST-SESSION

6.1 Test management phases

Each test case is structured in three phases, characterized by separate dialogues:

- Test Procedure Establishment Phase
- Test Execution Phase
- Test Result Collection Phase

The lower tester and the upper tester transmit the TMPDUs appropriate to each phase. Figure 1 depicts the overall control flow between phases, for the cases of one and more than one test in a test session, respectively. Each phase is described below. Subclause 6.2 describes dialogue management for the Test Procedure Establishment and Test Results Collection Phases.

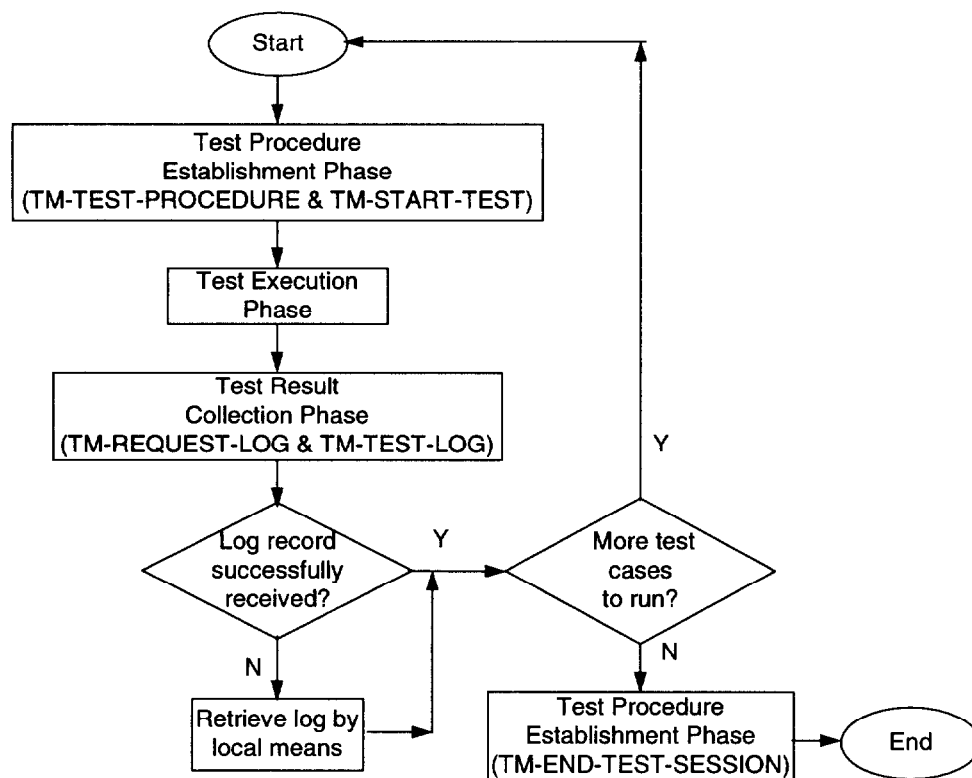


Figure 1 — Control flow for a test session

6.1.1 Test procedure establishment phase

The Test Procedure Establishment Phase always starts with the establishment of a dialogue between the lower tester and the IUT, as described in 6.2. After that there are two different ways to proceed depending on whether the Test Procedure Establishment Phase is used to either initiate execution of a test case or to terminate the test session.

If the Test Procedure Establishment Phase is used to initiate execution of a test case, the lower tester uses the dialogue established at the beginning to send a TM-TEST-PROCEDURE PDU which contains complete information on how the upper tester is to behave during this test case. After that the lower tester sends a TM-START-TEST PDU on the dialogue established at the beginning, thus informing the upper tester that execution of the test case is to be started.

If the Test Procedure Establishment Phase is used to terminate the test session, the lower tester uses the dialogue established at the beginning to send an TM-END-TEST-SESSION PDU, thus indicating that no further test cases are to be executed.

In both cases, the Test Procedure Establishment Phase concludes with termination of the dialogue established at the beginning, as described in 6.2. If the Test Procedure Establishment Phase was used to terminate the test session, the upper tester terminates together with the Test Procedure Establishment Phase.

6.1.2 Test execution phase

During the Test Execution Phase, a single test case is executed. The behaviour of the upper tester within this test case is determined by the contents of the TM-TEST-PROCEDURE PDU which was sent during the preceding Test Procedure Establishment Phase.

The protocol exchanges required by the test case occur only on dialogues which are established between the lower testers and the IUT, as part of the test case itself. No TMPDUs are exchanged during this phase.

During the Test Execution Phase, the upper tester records the service primitives that it sends and receives in a log file. The Test Execution Phase ends when all Action-lists have been executed, or when the default procedure is invoked.

6.1.3 Test results collection phase

The Test Results Collection Phase starts with establishment of a dialogue between the lower tester and the IUT, as described in 6.2. After that, the lower tester uses this dialogue to send a TM-REQUEST-LOG PDU in order to ask the upper tester to send the log file recorded during the preceding Test Execution Phase. The upper tester responds by sending a TM-TEST-LOG PDU containing the requested log file to the lower tester using the same dialogue.