
**Information technology — Open
distributed processing — Reference
model: Architecture**

*Technologies de l'information — Traitement réparti ouvert — Modèle de
référence: Architecture*

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CONTENTS

	<i>Page</i>
Foreword.....	v
Introduction	vi
1 Scope	1
2 Normative references	1
2.1 Identical Recommendations International Standards	1
2.2 Paired Recommendations International Standards equivalent in technical content.....	1
3 Definitions	2
3.1 Descriptive definitions	2
3.2 Abbreviations	3
4 Framework	3
4.1 Viewpoints	4
4.2 ODP viewpoint languages	5
4.3 ODP functions	5
4.4 ODP distribution transparencies.....	5
4.5 Standards derived from the framework	6
4.6 Conformance	7
5 Enterprise language	7
5.1 Concepts.....	7
5.2 Structuring rules.....	7
5.3 Conformance and reference points.....	8
6 Information language	8
6.1 Concepts.....	9
6.2 Structuring rules.....	9
6.3 Conformance and reference points.....	9
7 Computational language.....	10
7.1 Concepts.....	10
7.2 Structuring rules.....	12
7.3 Conformance and reference points.....	18
8 Engineering language	18
8.1 Concepts.....	19
8.2 Structuring rules.....	20
8.3 Conformance and reference points.....	28
9 Technology language	29
9.1 Concepts.....	29
9.2 Structuring rules.....	29
9.3 Conformance and reference points.....	29
10 Consistency rules.....	29
10.1 Computational and information specification correspondences.....	30
10.2 Engineering and computational specification correspondences	30
10.3 Technology and engineering specification correspondences	31
11 ODP functions.....	31
12 Management functions	32
12.1 Node management function	32
12.2 Object management function	33
12.3 Cluster management function.....	33
12.4 Capsule management function	34
13 Coordination functions	35
13.1 Event notification function.....	35
13.2 Checkpoint and recovery function	35

	<i>Page</i>
13.3 Deactivation and reactivation function.....	36
13.4 Group function	37
13.5 Replication function	37
13.6 Migration function	37
13.7 Transaction function.....	38
13.8 ACID transaction function	38
13.9 Engineering interface reference tracking function	39
14 Repository functions.....	39
14.1 Storage function	39
14.2 Information organization function.....	39
14.3 Relocation function	40
14.4 Type repository function	40
14.5 Trading function.....	41
15 Security functions.....	41
15.1 Concepts.....	41
15.2 Access control function.....	42
15.3 Security audit function	42
15.4 Authentication function.....	42
15.5 Integrity function.....	43
15.6 Confidentiality function	43
15.7 Non-repudiation function	43
15.8 Key management function	44
16 ODP distribution transparency	44
16.1 Access transparency	45
16.2 Failure transparency	45
16.3 Location transparency	46
16.4 Migration transparency	46
16.5 Persistence transparency	46
16.6 Relocation transparency	46
16.7 Replication transparency	47
16.8 Transaction transparency.....	47
Annex A – Formal computational supertype/subtype rules.....	48
A.1 Notations and conventions	48
A.2 Type system	48
A.3 Signal interface signature types.....	51
A.4 Operation interface signature types.....	52
A.5 Stream interface types	52
A.6 Example	52
Annex B – Human-computer interactions	54
B.1 Specifying human/system interactions	54

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 10746-3 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 7, *Software and systems engineering*, in collaboration with ITU-T. The identical text is published as Rec. ITU-T X.903 (10/2009).

This second edition cancels and replaces the first edition (ISO/IEC 10746-3:1996), which has been technically revised.

ISO/IEC 10746 consists of the following parts, under the general title *Information technology — Open distributed processing — Reference model*:

- *Part 1: Overview*
- *Part 2: Foundations*
- *Part 3: Architecture*
- *Part 4: Architectural semantics*

Introduction

The rapid growth of distributed processing has led to a need for a coordinating framework for the standardization of open distributed processing (ODP). This reference model provides such a framework. It creates an architecture within which support of distribution, interworking and portability can be integrated.

The reference model of open distributed processing, Recommendations ITU-T X.901 | ISO/IEC 10746-1 to X.904 | ISO/IEC 10746-4, is based on precise concepts derived from current distributed processing developments and, as far as possible, on the use of formal description techniques for specification of the architecture.

The reference model consists of:

- Recommendation ITU-T X.901 | ISO/IEC 10746-1: Overview: Contains a motivational overview of ODP giving scoping, justification and explanation of key concepts, and an outline of the ODP architecture. It contains explanatory material on how this reference model is to be interpreted and applied by its users, who may include standards writers and architects of ODP systems. It also contains a categorization of required areas of standardization expressed in terms of the reference points for conformance identified in this Recommendation | International Standard. This part is not normative.
- Recommendation ITU-T X.902 | ISO/IEC 10746-2: Foundations: Contains the definition of the concepts and analytical framework for normalized description of (arbitrary) distributed processing systems. It introduces the principles of conformance to ODP standards and the way in which they are applied. This is only to a level of detail sufficient to support this Recommendation | International Standard and to establish requirements for new specification techniques. This part is normative.
- Recommendation ITU-T X.903 | ISO/IEC 10746-3: Architecture: Contains the specification of the required characteristics that qualify distributed processing as open. These are the constraints to which ODP standards must conform. It uses the descriptive techniques from Recommendation ITU-T X.902 | ISO/IEC 10746-2. This part is normative.
- Recommendation ITU-T X.904 | ISO/IEC 10746-4: Architectural semantics: Contains a formalization of the ODP modelling concepts defined in Recommendation ITU-T X.902 | ISO/IEC 10746-2, clauses 8 and 9. The formalization is achieved by interpreting each concept in terms of the constructs of the different standardized formal description techniques. This part is normative.

This Recommendation | International Standard contains two annexes:

- Annex A – Formal computational supertype/subtype rules.
- Annex B – Human-computer interactions

Annex A forms an integral part of the reference model. Annex B does not form an integral part of the reference model.

INTERNATIONAL STANDARD RECOMMENDATION ITU-T

Information technology – Open distributed processing – Reference model: Architecture

1 Scope

This Recommendation | International Standard:

- defines how ODP systems are specified, making use of concepts in Rec. ITU-T X.902 | ISO/IEC 10746-2;
- identifies the characteristics that qualify systems as ODP systems.

It establishes a framework for coordinating the development of existing and future standards for ODP systems and is provided for reference by those standards.

2 Normative references

The following Recommendations and International Standards contain provisions which, through reference in this text, constitute provisions of this Recommendation | International Standard. At the time of publication, the editions indicated were valid. All Recommendations and Standards are subject to revision, and parties to agreements based on this Recommendation | International Standard are encouraged to investigate the possibility of applying the most recent edition of the Recommendations and Standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards. The Telecommunication Standardization Bureau of the ITU maintains a list of currently valid ITU-T Recommendations.

2.1 Identical Recommendations | International Standards

- Recommendation ITU-T X.200 (1994) | ISO/IEC 7498-1:1994, *Information technology – Open Systems Interconnection – Basic Reference Model: The basic model*.
- Recommendation ITU-T X.810 (1995) | ISO/IEC 10181-1:1996, *Information technology – Open Systems Interconnection – Security frameworks for open systems: Overview*.
- Recommendation ITU-T X.811 (1995) | ISO/IEC 10181-2:1996, *Information technology – Open Systems Interconnection – Security frameworks for open systems: Authentication framework*.
- Recommendation ITU-T X.812 (1995) | ISO/IEC 10181-3:1996, *Information technology – Open Systems Interconnection – Security frameworks for open systems: Access control framework*.
- Recommendation ITU-T X.813 (1996) | ISO/IEC 10181-4:1997, *Information technology – Open Systems Interconnection – Security frameworks for open systems: Non-repudiation framework*.
- Recommendation ITU-T X.814 (1995) | ISO/IEC 10181-5:1996, *Information technology – Open Systems Interconnection – Security frameworks for open systems: Confidentiality framework*.
- Recommendation ITU-T X.815 (1995) | ISO/IEC 10181-6:1996, *Information technology – Open Systems Interconnection – Security frameworks for open systems: Integrity framework*.
- Recommendation ITU-T X.816 (1995) | ISO/IEC 10181-7:1996, *Information technology – Open Systems Interconnection – Security frameworks for open systems: Security audit and alarms framework*.
- Recommendation ITU-T X.851 (1997) | ISO/IEC 9804:1998, *Information technology – Open Systems Interconnection – Service definition for the Commitment, Concurrency and Recovery service element*.
- Recommendation ITU-T X.902 (2009) | ISO/IEC 10746-2:2010, *Information technology – Open distributed processing – Reference model: Foundations*.
- ISO/IEC 11770-1:1996, *Information technology – Security techniques – Key management – Part 1: Framework*.

2.2 Paired Recommendations | International Standards equivalent in technical content

- Recommendation ITU-T X.800 (1991), *Security architecture for Open Systems Interconnection for CCITT applications*.
ISO 7498-2:1989, *Information processing systems – Open Systems Interconnection – Basic Reference Model – Part 2: Security Architecture*.