

INTERNATIONAL STANDARD

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Information technology — Open Systems Interconnection — Basic Reference Model: Naming and addressing

*Technologies de l'information — Interconnexion de systèmes ouverts
(OSI) — Modèle de référence de base: Dénomination et adressage*



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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 7498-3 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 18, *Document processing and related communication*, in collaboration with ITU-T. The identical text is published as ITU-T Recommendation X.650.

This second edition cancels and replaces the first edition (ISO 7498-3:1989), which has been technically revised.

ISO/IEC 7498 consists of the following parts, under the general title *Information technology — Open Systems Interconnection — Basic Reference Model*:

- *Part 1: The Basic Model*
- *Part 2: Security Architecture*
- *Part 3: Naming and addressing*
- *Part 4: Management framework*
- *Part 5: Multipeer communication architecture*

Introduction

This Recommendation | International Standard extends the basic architectural concepts of identifiers described in ITU-T Rec. X.200 | ISO/IEC 7498-1.

This Recommendation | International Standard states the architectural principles which are followed in the production of any Recommendation | International Standard which involves the identification (naming) and location (addressing) of objects for the purpose of interconnection within the Open System Interconnection Environment (OSIE).

This Recommendation | International Standard has sufficient flexibility to accommodate advances in technology and expansion in user demands. This flexibility is also intended to allow the phased transition from existing implementations to OSI Standards.

NOTE 1 – This Recommendation | International Standard is expected to be subject to future expansion, in particular with regard to Multi-Peer Data Transmission (MPDT).

The architectural principles stated within this Recommendation | International Standard will ensure that any ITU-T Recommendation that involves the identification and location of objects within the OSIE for the purpose of interconnection will:

- a) Avoid any restrictions on:
 - 1) the functionality that may be made available through current or future Recommendations | International Standards;
 - 2) the functionality of any real open system;
 - 3) the internal design of any real open system.
- b) Preserve the principle of layer independence in the OSIE, i.e. the internal functioning of one layer is not constrained by any other layer.
- c) Preserve the principle of implementation independence in the OSIE, as expressed in 4.2 of ITU-T Rec. X.200 | ISO/IEC 7498-1. That is, no real open system (or administrator thereof) is required to know anything about the implementation design of any other real open system (or administration thereof), nor does any real open system impose such knowledge as a condition for communication using OSI Standards.
- d) Allow economical support for interconnection within the OSIE; in particular individual standards produced within the framework specified by this Recommendation | International Standard should make it possible to provide facilities which give adequate levels of performance, reliability, and integrity and which ease the administration by humans with respect to identifying and locating objects within the OSIE for the purpose of interconnection.

The description of naming and addressing for the OSIE given in this Recommendation | International Standard is developed in stages.

NOTE 2 – This Recommendation | International Standard provides clarifications of the basic architecture defined in ITU-T Rec. X.200 | ISO/IEC 7498-1 where this is necessary for a full understanding of the naming and addressing requirements within the OSIE.

INTERNATIONAL STANDARD

ITU-T RECOMMENDATION

INFORMATION TECHNOLOGY – OPEN SYSTEMS INTERCONNECTION – BASIC REFERENCE MODEL: NAMING AND ADDRESSING

1 Scope

This Recommendation | International Standard:

- a) defines general mechanisms for the use of names and addresses to identify and locate objects in the OSIE; and
- b) defines the use of these mechanisms within the layered structure of the Basic Reference Model.

This Recommendation | International Standard extends the concepts and principles defined in ITU-T Rec. X.200 | ISO/IEC 7498-1. This Recommendation | International Standard is not intended to be either an implementation specification or a basis for appraising the conformance of actual implementations.

The specific form of names and addresses is not within the scope of this Recommendation | International Standard.

2 Normative references

The following ITU-T 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 | International 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

- ITU-T Recommendation X.25 (1996) | ISO/IEC 8208:1995, *Interface between Data Terminal Equipment (DTE) and Data Circuit-terminating Equipment (DCE) for terminals operating in the packet mode and connected to public data networks by dedicated circuit.*
- ITU-T Recommendation X.200 (1994) | ISO/IEC 7498-1:1994, *Information technology – Open Systems Interconnection – Basic Reference Model: The Basic Model.*
- ITU-T Recommendation X.207 (1993) | ISO/IEC 9545:1994, *Information technology – Open Systems Interconnection – Application Layer structure.*
- ITU-T Recommendation X.210 (1993) | ISO/IEC 10731:1994, *Information technology – Open Systems Interconnection – Basic Reference Model: Conventions for the definition of OSI services.*
- ITU-T Recommendation X.213 (1995) | ISO/IEC 8348:1996, *Information technology – Open Systems Interconnection – Network service definition.*
- ITU-T Recommendation X.224 (1995) | ISO/IEC 8073:(1997), *Information technology – Open Systems Interconnection – Protocol for providing the connection-mode transport service.*

2.2 Paired Recommendations | International Standards equivalent in technical content

- ITU-T Recommendation X.700 (1992), *Management Framework for Open System Interconnection (OSI) for CCITT Applications.*
- ISO/IEC 7498-4:1989, *Information processing systems – Open Systems Interconnection – Basic Reference Model – Part 4: Management framework.*

2.3 Additional references

- ISO/IEC 9545:1989, *Information technology – Open Systems Interconnection – Application Layer structure.*

3 Definitions

3.1 This Recommendation | International Standard makes use of the following terms defined in ISO/IEC 9545:

- a) application-process-type;
- b) application-process-invocation.

3.2 This Recommendation | International Standard makes use of the following terms defined in ITU-T Rec. X.210 | ISO/IEC 10731:

- a) (N)-service-request-primitive;
- b) (N)-service-indication-primitive;
- c) (N)-service-response-primitive;
- d) (N)-service-confirm-primitive.

3.3 This Recommendation | International Standard makes use of the following term defined in ITU-T Rec. X.213 | ISO/IEC 8348:

- subnetwork point of attachment.

3.4 For the purposes of this Recommendation | International Standard, the following definitions apply.

3.4.1 (N)-address: A name unambiguous within the OSIE which is used to identify a set of (N)-service-access-points which are all located at a boundary between an (N)-subsystem and an (N + 1)-subsystem in the same open system.

NOTES

1 This definition of (N)-address is different from that in ITU-T Rec. X.200 | ISO/IEC 7498-1. This definition is the definitive one and will be moved to ITU-T Rec. X.200 | ISO/IEC 7498-1 to replace the existing definition when ITU-T Rec. X.200 | ISO/IEC 7498-1 is revised.

2 A name is unambiguous within a given scope when it identifies one, and only one, object within that scope. Unambiguity of a name does not preclude the existence of synonyms.

3.4.2 (N)-address-selector; (N)-selector: An element of addressing information that identifies a set of (N)-SAPs which are all in the same (N)-subsystem; an (N)-selector value is assigned by the local administration.

NOTE – The concept of (N)-address-selectors only applies above the Network Layer

3.4.3 (N)-association: A cooperative relationship among (N)-entity-invocations.

NOTE – This may be formed by the exchange of (N)-protocol-control-information.

3.4.4 calling-(N)-address: A parameter which may appear in an (N)-service request or indication primitive and which identifies the (N)-address at the (N)-initiator.

NOTE – In the service definition of a particular layer, such a parameter may be referred to either as a “calling-(N)-address” or “source-address”. Throughout this Specification, however, only the term “calling-(N)-address” is used.

3.4.5 called-(N)-address: A parameter which may appear in an (N)-service request or indication primitive which identifies the (N)-address at the (N)-recipient.

NOTE – In the service definition of a particular layer, such a parameter may be referred to either as a “called-(N)-address” or “destination-address”. Throughout this Recommendation | International Standard, however, only the term “called-(N)-address” is used.

3.4.6 descriptive name: A name that identifies a set of one or more objects by means of a set of assertions concerning the properties of the objects of the set.

3.4.7 (N)-directory-function: An (N)-function that processes (N)-addresses, (N – 1)-addresses, (N)-entity-titles, and (N)-PAI to provide mappings among these categories of information.

3.4.8 (N)-entity: An active element within an (N)-subsystem embodying a set of capabilities defined for the (N)-layer that corresponds to a specific (N)-entity-type (without any extra capabilities being used).

NOTE – This definition of (N)-entity is different from that in ITU-T Rec. X.200 | ISO/IEC 7498-1. This definition is the definitive one and will be moved to ITU-T Rec. X.200 | ISO/IEC 7498-1 to replace the existing definition when ITU-T Rec. X.200 | ISO/IEC 7498-1 is revised.

3.4.9 (N)-entity-invocation: A specific utilization of part or all capabilities of a given (N)-entity (without any extra capabilities being used).

NOTE – This definition will be moved to ITU-T Rec. X.200 | ISO/IEC 7498-1 to replace the existing definition when ITU-T Rec. X.200 | ISO/IEC 7498-1 is revised.

3.4.10 (N)-entity-title: A name that is used to identify unambiguously an (N)-entity.

3.4.11 (N)-entity-type: A description of a class of (N)-entities in terms of a set of capabilities defined for the (N)-layer.

NOTE – This definition will be moved to ITU-T Rec. X.200 | ISO/IEC 7498-1 to replace the existing definition when ITU-T Rec. X.200 | ISO/IEC 7498-1 is revised.

3.4.12 generic name: A name of a set of objects.

NOTE – A generic-title is a specific form of generic name.

3.4.13 (N)-initiator: An (N)-entity-invocation which issues an (N – 1)-service request primitive.

3.4.14 name: A linguistic construct which corresponds to an object in some universe of discourse.

3.4.15 naming-authority: A registration authority which allocates names according to specified rules. Where the naming-authority allocates titles, it is known as a title-authority. Where the naming-authority allocates addresses, it is known as an addressing-authority.

3.4.16 naming-domain: The set of names that are assignable to objects of a particular type. Where the names are titles, the set is known as a title-domain. Where the names are addresses, the set is known as an addressing-domain.

3.4.17 naming-subdomain: A subset of a naming-domain, which is disjoint from all other naming-subdomains of that naming-domain.

3.4.18 primitive name: A name that identifies an object and which is assigned by a designated naming-authority. The internal structure of the name is not required to be understood or to have significance to users of the name.

3.4.19 (N)-recipient: An (N)-entity-invocation which receives an (N – 1)-service indication primitive.

3.4.20 (N)-protocol-addressing-information; (N)-PAI: Those elements of (N)-PCI which contain addressing information.

3.4.21 responding-(N)-address: A parameter which may appear in an (N)-service response or confirm primitive and which identifies the (N)-address at the (N)-recipient.

NOTE – In the service definition of a particular layer, such a parameter may be referred to either as a “called-address” or “responding address”. Throughout this Recommendation | International Standard, however, only the term “responding-(N)-address” is used.

3.4.22 (N)-service-access-point-address; (N)-SAP-address: An (N)-address that is used to identify a single (N)-SAP.

NOTES

1 This definition of (N)-service-access-point-address is different from that in ITU-T Rec. X.200 | ISO/IEC 7498-1. This definition is the definitive one and will be moved to ITU-T Rec. X.200 | ISO/IEC 7498-1 to replace the existing definition when ITU-T Rec. X.200 | ISO/IEC 7498-1 is revised.

2 (N)-address is the general term which applies to any set of (N)-SAPs, including sets of one, and only one, (N)-SAP. (N)-SAP address is only used where it is necessary to specify precisely that the address identifies one, and only one, (N)-SAP. Whether an (N)-address is an (N)-SAP address or not is a matter local to the (N)-subsystem and is not known to other open systems. Nevertheless, at some layers and because of their possible use in subsequent communications, calling-(N)-addresses and responding-(N)-addresses may be constrained to identify a single (N)-SAP (see 8.4.4 and 8.5.5). The decision whether or not to apply this constraint is made on a layer-by-layer and protocol-by-protocol basis.

3.4.23 subnetwork-address: An identifier assigned to a subnetwork point of attachment by the registration authority of the subnetwork.

3.4.24 synonymous name; synonym: A name that identifies an object that is also identified by another distinct name. Synonymous generic names are distinct generic names that name the identical set.

3.4.25 system-title: A name, unique within the OSIE, which is used to identify a single real open system.

4 Abbreviations

The following abbreviations apply to this Recommendation | International Standard:

(N)-CEPI	(N)-Connection-EndPoint-Identifier
DLSAP	Data-Link-Service-Access-Point
NSAP	Network-Service-Access-Point

OSI	Open Systems Interconnection
OSIE	OSI Environment
(N)-PAI	(N)-Protocol-Addressing-Information
(N)-PCI	(N)-Protocol-Control-Information
PhSAP	Physical-Service-Access-Point
PSAP	Presentation-Service-Access-Point
(N)-SAP	(N)-Service-Access-Point
SNPA	Subnetwork Point of Attachment
SSAP	Session-Service-Access-Point
TSAP	Transport-Service-Access-Point

5 Basic Concepts of Naming

5.1 Names are linguistic constructs expressed in some language. They correspond to objects in some universe of discourse. The correspondence between names (in the language) and objects (in the universe of discourse) is the relation of identifying. A name identifies the object to which it is bound.

5.2 Within the context of OSI, names identify particular communications objects in the Open Systems Interconnection Environment (OSIE). There are two distinct kinds of names, primitive and descriptive.

5.3 Within any particular universe of discourse, a primitive name is a name assigned by a naming-authority to a specific object. A naming-authority is simply a source of names. The only architectural constraints imposed upon naming-authorities are that all of the names it provides:

- a) are expressed in a prescribed language; and
- b) are unambiguous (identify just one object).

5.4 A descriptive name consists of a set of assertions which are expressed in a formally defined language. The definition of the formal language determines those linguistic constructs which are well-formed descriptive names. A descriptive name may be incomplete, in that many objects satisfy all the assertions, or it may be complete, in that it serves to identify a single object. A complete descriptive name is equivalent to a primitive name in that it unambiguously identifies an object. Primitive names may be components of a descriptive name.

5.5 Although a primitive name is unambiguous, there may be more than one name that unambiguously identifies the same object.

5.6 A generic name is a primitive name or a descriptive name that identifies a set comprising more than one object with the intent that, when a generic name is used to denote an object, the result is that exactly one member of the set of objects will be selected. A generic name may be used to identify a set of objects of a particular type, which need not be located in the same open system.

5.7 A title is assigned to an object where the purpose of the name is to discriminate among different objects and to permit retrieval of information associated with an object from a Directory Facility. A title is assigned to an object type where the purpose of the name is to discriminate among different object types and to permit retrieval of information associated with an object type from a Directory Facility. The name may identify a system, application-process, application-process-type, (N)-entity, or (N)-entity-type.

NOTE – These objects and types are defined in either ITU-T Rec. X.200 | ISO/IEC 7498-1 or ISO/IEC 9545.

5.8 An identifier is assigned to an object where the purpose of the name is only to discriminate among occurrences of this object. The name may identify an (N)-association, an application process-invocation, or an (N)-entity-invocation.

NOTE – These objects are defined in either ITU-T Rec. X.200 | ISO/IEC 7498-1 or ISO/IEC 9545.

6 OSI naming and addressing concepts and the correct use of addresses

6.1 The naming of real open systems

6.1.1 A system-title is a layer independent primitive name, i.e. the same identifier is used within various layers to identify the same real open system. A single real open system is named by one, and only one, system-title.