



INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

X.207

(11/93)

**DATA NETWORKS AND OPEN SYSTEM
COMMUNICATIONS**

OPEN SYSTEMS INTERCONNECTION – GENERAL

**INFORMATION TECHNOLOGY –
OPEN SYSTEMS INTERCONNECTION –
APPLICATION LAYER STRUCTURE**

ITU-T Recommendation X.207

(Previously “CCITT Recommendation”)

Foreword

ITU (International Telecommunication Union) is the United Nations Specialized Agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of the ITU. Some 179 member countries, 84 telecom operating entities, 145 scientific and industrial organizations and 38 international organizations participate in ITU-T which is the body which sets world telecommunications standards (Recommendations).

The approval of Recommendations by the members of ITU-T is covered by the procedure laid down in WTSC Resolution No. 1 (Helsinki, 1993). In addition, the World Telecommunication Standardization Conference (WTSC), which meets every four years, approves Recommendations submitted to it and establishes the study programme for the following period.

In some areas of information technology, which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC. The text of ITU-T Recommendation X.207 was approved on 16th of November 1993. The identical text is also published as ISO/IEC International Standard 9545.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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Summary

This Recommendation | International Standard provides a framework for the development of OSI application layer Recommendations | International Standard. The framework provided is flexible and modular, to allow reuse and coordination of application layer Recommendations | International Standard. This Recommendation | International Standard does not specify services and protocols for OSI.

Introduction

This Recommendation | International Standard is a refinement of the description of the OSI Application Layer contained in ITU-T Rec. X.200 | ISO/IEC 7498-1.

The purpose of this Recommendation | International Standard is to facilitate a coherent and modular approach to Application Layer standardization. It defines a set of architectural principles and concepts that provide a basis for structuring and relating the specifications contained in Application Layer Recommendations and Standards. It defines the internal structure of the Application Layer, providing a framework for the development of Application Layer Recommendations and Standards. It also describes the general principles underlying the operation of application-protocols.

The following subjects are covered by this Recommendation | International Standard:

- a) the relationship between distributed information processing and OSI communication services;
- b) the structure of application-entities;
- c) the OSI-service and protocol structure in the Application Layer; and
- d) ASO-context and application-context.

This Recommendation | International Standard only considers those aspects of distributed information processing for an application which are relevant for the derivation of generic requirements for the structuring of Application Layer communications.

The architectural framework specified in this Recommendation | International Standard embodies concepts that may not be fully supported by existing Application Layer Recommendations and Standards. However, these concepts have been specified so as to provide a basis for the development of future Application Layer Recommendations and Standards which, it is anticipated, will require their use.

This Recommendation | International Standard may be subject to future expansion, particularly with regard to multi-peer communication, security, application-context management, recovery, and Open Distributed Processing.

A companion Technical Report, which is currently under development, will provide guidance on applying this Application Layer Structure during the creation of Application Layer service and protocol Recommendations and Standards.

INTERNATIONAL STANDARD

ITU-T RECOMMENDATION

INFORMATION TECHNOLOGY – OPEN SYSTEMS INTERCONNECTION – APPLICATION LAYER STRUCTURE

1 Scope

This Recommendation | International Standard refines the description of the Application Layer contained in the Basic Reference Model for OSI (ITU-T Rec. X.200 | ISO/IEC 7498-1). It provides a framework for coordinating the development of existing and future Application Layer Recommendations and Standards. It is provided for reference by Application Layer Recommendations and Standards.

In particular this Recommendation | International Standard:

- a) defines the nature of Recommendations and Standards in the Application Layer and the relationships among them;
- b) defines the architectural framework in which individual OSI Application Layer protocols are developed.
- c) defines concepts which provide a flexible approach to structuring in the Application Layer;
- d) defines the categories of identifiable objects which are necessary for the specification and operation of protocols;
- e) relates distributed information processing activities to the Recommendations and Standards in the Application Layer;
- f) structures, and relates, specifications in Application Layer Recommendations and Standards;
- g) identifies the various kinds of specification necessary in Application Layer Recommendations and Standards.

This Recommendation | International Standard is provided for reference by Application Layer Recommendations and Standards. Its purpose is to facilitate a coherent and modular approach to the structuring of specifications for Application Layer behaviour. It neither specifies services nor protocols for OSI; nor is it an implementation specification for systems, nor a basis for appraising the conformance of implementations.

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 editions 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

- ITU-T Recommendation X.200 (1994)¹⁾ | ISO/IEC 7498-1:1994, *Information technology – Open Systems Interconnection – Basic Reference Model*.
- ITU-T Recommendation X.210 (1993) | ISO/IEC 10731:1993, *Information technology – Open Systems Interconnection – Conventions for the Definition of OSI services*.
- CCITT Recommendation X.660 (1992) | ISO/IEC 9834-1:1993, *Information technology – Open Systems Interconnection – Procedures for the operation of OSI Registration Authorities: General Procedures*.

¹⁾ Presently at the stage of draft.

2.2 Paired Recommendations | International Standards equivalent in technical content

- CCITT Recommendation X.217 (1992), *Service definition for the Association Control Service Element*.
ISO 8649:1989, *Information technology – Open Systems Interconnection – Service Definition for the Association Control Service Element*.
- CCITT Recommendation X.216 (1988), *Presentation service definition for Open Systems Interconnection for CCITT applications*.
ISO 8822:1988, *Information processing systems – Open Systems Interconnection – Connection oriented presentation service definition*.
- CCITT Recommendation X.650 (1992), *Open Systems Interconnection (OSI) Reference Model for naming and addressing*.
ISO 7498-3:1989, *Information processing systems – Open Systems Interconnection – Basic Reference Model: Naming and Addressing*.

3 Definitions

3.1 For the purposes of this Recommendation | International Standard, the following terms as defined in ITU-T Rec. X.200 | ISO/IEC 7498-1 apply:

- a) abstract syntax;
- b) application-entity;
- c) application-process;
- d) application-process-invocation;
- e) application-process-type;
- f) (N)-address;
- g) (N)-association;
- h) (N)-entity;
- i) (N)-entity-invocation;
- j) (N)-entity-type;
- k) (N)-function;
- l) (N)-layer;
- m) (N)-protocol;
- n) (N)-protocol-control-information;
- o) (N)-protocol-data-unit;
- p) (N)-service-access-point;
- q) presentation context;
- r) real open system; and
- s) transfer syntax.

3.2 For the purposes of this Recommendation | International Standard, the following terms as defined in CCITT Rec. X.650 | ISO 7498-3 apply:

- a) AEI-identifier;
- b) AE-qualifier;
- c) AE-title;
- d) AE-type-title;
- e) AP-invocation-identifier;
- f) application-association-identifier;
- g) AP-title;
- h) (N)-directory-function; and
- i) (N)-protocol-addressing-information.

- 3.3** For the purposes of this Recommendation | International Standard, the following terms as defined in ITU-T Rec. X.210 | ISO/IEC 10731 apply:
- a) deliver (primitive);
 - b) OSI-service;
 - c) OSI-service primitive;
 - d) OSI-service-user; and
 - e) submit (primitive).
- 3.4** For the purposes of this Recommendation | International Standard, the following definitions apply.
- NOTE – The word “object” is used here in the general English sense.
- 3.4.1 AE-invocation:** A specific utilization of part or all of the capabilities of a given application-entity in support of the communications requirements of an application-process-invocation.
- NOTE – This is a specific use of the ASO-invocation concept.
- 3.4.2 AE-type:** A description of a class of application-entities in terms of a set of capabilities defined for the Application Layer.
- NOTE – This is a specific use of the ASO-type concept.
- 3.4.3 application-association, association:** A cooperative relationship between two ASO-invocations which governs their bilateral use of the Presentation Service for communication of information and coordination of their joint operation.
- NOTE – This is a specific use of the ASO-association concept.
- 3.4.4 application-association-identifier:** A name that unambiguously identifies an application-association within the scope of the participating ASO-invocations.
- 3.4.5 application-context:** A set of rules shared in common by two ASO-invocations in order to support an application-association.
- NOTE – This is a specific use of the ASO-context concept.
- 3.4.6 application-context-definition:** A specification of an application-context.
- 3.4.7 application-context- name:** A name that unambiguously identifies an application-context-definition.
- 3.4.8 application-service-element:** A set of application-functions that provides a capability for the interworking of application-entity-invocations for a specific purpose; application-service-elements are a component of application-service-objects.
- NOTE – This definition refines the original definition of application-service-elements in ITU-T Rec. X.200 | ISO/IEC 7498-1.
- 3.4.9 application-service-object:** An active element within (or equivalent to the whole of) the application-entity embodying a set of capabilities defined for the Application Layer that corresponds to a specific ASO-type (without any extra capabilities being used).
- NOTE – This is a specific use of the (N)-entity concept defined in ITU-T Rec. X.200 | ISO/IEC 7498-1.
- 3.4.10 ASE-invocation:** A specific utilization of part or all of the capabilities of a given application-service-element.
- 3.4.11 ASE-type:** A description of a class of application-service-elements in terms of a set of capabilities defined for the Application Layer.
- 3.4.12 ASO-association:** A cooperative relationship among two or more ASO-invocations for the purpose of communication of information and the coordination of their joint operation.
- NOTE – This is a specific use of the (N)-association concept.
- 3.4.13 ASO-association-identifier:** A name that unambiguously identifies an ASO-association within the scope of the participating ASO-invocations.
- 3.4.14 ASO-context:** A set of rules shared in common among ASO-invocations in order to support an ASO-association.
- 3.4.15 ASO-context-definition:** A specification of an ASO-context.

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3.4.16 ASO-invocation: A specific utilization of part or all of the capabilities of a given ASO (without extra capabilities being used).

NOTE – This is a specific use of the (N)-entity-invocation concept defined in ITU-T Rec. X.200 | ISO/IEC 7498-1.

3.4.17 ASOI-identifier: A name that unambiguously identifies an ASOI within the scope of the pair (parent invocation, ASO).

3.4.18 ASOI-tag: A name that unambiguously identifies an ASOI within the scope of the pair (API, ASO).

3.4.19 ASO-name: A name that unambiguously identifies an ASO within the scope of an AP.

3.4.20 ASO-qualifier: A name that unambiguously identifies an ASO within the scope of its parent.

NOTE – When the ASO is the AE, the parent of the ASO is the AP. In all other cases, the parent is the parent ASO.

3.4.21 ASO-title: A name that unambiguously identifies an ASO in the OSI environment.

3.4.22 ASO-type: A description of a class of ASOs in terms of a set of capabilities defined for the Application Layer.

NOTE – This is a specific use of the (N)-entity-type concepts defined in ITU-T Rec. X.200 | ISO/IEC 7498-1.

3.4.23 ASO-type-title: A name that unambiguously identifies an ASO-type in the OSI environment.

3.4.24 association control service element: An ASE that provides the exclusive means for establishing and terminating all application-associations.

NOTE – The functionality of this ASE is defined in CCITT Rec. X.217 | ISO/IEC 8649.

3.4.25 child ASO: An ASO is a child ASO of the ASO that immediately contains it.

3.4.26 control function: The component of an ASO that controls the interactions among the ASEs and/or ASOs within the containing ASO.

3.4.27 parent ASO: An ASO is a parent ASO to its immediately contained ASOs and ASEs.

4 Abbreviations

ACSE	Association Control Service Element
AE	application-entity
AEI	AE-invocation
AP	application-process
APCI	application-protocol-control-information
API	AP-invocation
APDU	application-protocol-data-unit
ASE	application-service-element
ASEI	ASE-invocation
ASO	application-service-object
ASOI	ASO-invocation
CF	control function
ISP	International Standardized Profile
OSI	Open Systems Interconnection

5 Application Layer concepts

5.1 Introduction

5.1.1 Recommendations and International Standards for OSI are intended to support the communication requirements of applications (i.e. information processing tasks) requiring coordinated processing activities in two or more real open systems. In particular, standards for the OSI Application Layer define procedures for the support of distributed information processing.