
**Information technology — Open Systems
Interconnection — Service definition for
the Application Service Object
Association Control Service Element**

*Technologies de l'information — Interconnexion des systèmes
ouverts — Définition du service pour l'élément de service de contrôle
d'association des objets de service d'application*

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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.

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

International Standard ISO/IEC 15953 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, in collaboration with ITU-T. The identical text is published as ITU-T Recommendation X.217 bis.

This first edition of ISO/IEC 15953 cancels and replaces ISO/IEC 8649:1996 and its Amendment 1:1997 and Amendment 2:1998, of which it constitutes a technical revision.

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Introduction

This Recommendation | International Standard is one of a set of Recommendations | International Standards produced to facilitate the interconnection of information processing systems. It is related to other ITU-T Recommendations | International Standards in the set as defined by the Reference Model for Open Systems Interconnection (see ITU-T Rec. X.200 | ISO/IEC 7498-1). The reference model subdivides the areas of standardization for interconnection into a series of layers of specification, each of manageable size.

The goal of Open Systems Interconnection is to allow, with a minimum of technical agreement outside the Interconnection standards, the interconnection of information processing systems:

- from different manufacturers;
- under different managements;
- of different levels of complexity; and
- of different technologies.

This Recommendation | International Standard recognizes that application-processes may wish to communicate with each other for a wide variety of reasons. However, any communication will require the performance of certain services independent of the reasons for communication. The application-service-element defined herein provides such services.

This Service definition defines services provided by the application-service-element for ASO-association control: the Association Control Service Element (ACSE). The ACSE provides basic facilities for the control of an ASO-association among communicating application-service-objects (ASOs). The ACSE includes four optional functional units. One functional unit provides additional facilities for exchanging information in support of authentication during association establishment without adding services. The optional ASO-context negotiation functional unit allows multiple ASO-contexts to be offered during association establishment. The optional higher level association functional unit provides for the facility to identify ASO-associations and transparently pass data to child ASOs and allows the ASO-context or the presentation context on an ASO-association to be modified during the lifetime of the association. The optional nested-association functional unit provides for the facility to instantiate multiple associations nested over supporting upper layers. The X.410 compatibility mode is not provided by this Service definition, since the optional functional units defined in this Recommendation | International Standard are not used in this mode. The service definition herein is backwards compatible with ITU-T Rec. X.217 | ISO/IEC 8649.

The fast-associate mechanism allows a session connection, including its embedded presentation connection and application association, to be established using a compressed form of the information that would otherwise be sent on the S-CONNECT exchange. The compressed form, called the upper layer context identifier, is a reference to an upper-layer context specification, which is a definition of the fields of the application, ACSE, presentation and session protocols that would be sent on the full-form connect messages. The upper layer context identifier may be parameterized to include values for the variable fields allowed by the full form protocols for the upper layers.

Within the ACSE service, the only addition is the presence of a conceptual parameter which summarizes the contents of the User-information of the A-ASSOCIATE primitives.

It is recognized that, with respect to ACSE Quality of services (QoS), described in clause 8, work is still in progress to provide an integrated treatment of QoS across all layers of the OSI Reference Model, and to ensure that the individual treatments in each layer service satisfy overall QoS objectives in a consistent manner. As a consequence, an addendum may be added to this Service definition at a later time which reflects further QoS developments and integration.

INTERNATIONAL STANDARD

ITU-T RECOMMENDATION

**INFORMATION TECHNOLOGY – OPEN SYSTEMS INTERCONNECTION –
SERVICE DEFINITION FOR THE APPLICATION SERVICE OBJECT
ASSOCIATION CONTROL SERVICE ELEMENT**

1 Scope

This Recommendation | International Standard defines ACSE services for ASO-association control in an open systems interconnection environment. ACSE supports two modes of communication service: connection-mode and connectionless-mode.

The ACSE connection-mode service is provided by the use of the connection-mode ACSE protocol (see ITU-T Rec. X.227 *bis* | ISO/IEC 15954).

The ACSE connectionless-mode service (A-UNIT-DATA) is provided by the use of the connectionless-mode ACSE protocol (see ITU-T Rec. X.237 *bis* | ISO/IEC 15955).

Five functional units are defined in the ACSE. The mandatory Kernel functional unit is used to establish and release ASO-associations. The optional Authentication functional unit provides additional facilities for exchanging information in support of authentication during association establishment without adding services. The ACSE authentication facilities may be used to support a limited class of authentication methods. The optional ASO-context negotiation functional unit allows multiple ASO-contexts to be offered during association establishment. The optional higher level association functional unit provides for the facility to identify ASO-associations and transparently pass data to child ASOs and allows the ASO-context or the presentation context on an ASO-association to be modified during the lifetime of the association.

This Recommendation | International Standard does not specify individual implementations or products, nor does it constrain the implementation of entities and interfaces within a computer system.

No requirement is made for conformance to this Service definition.

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 this 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

- 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.215 (1995) | ISO/IEC 8326:1996, *Information technology – Open Systems Interconnection – Session service definition.*
- ITU-T Recommendation X.215 (1995)/Amd.1 (1997) | ISO/IEC 8326:1996/Amd.1:1998, *Information technology – Open Systems Interconnection – Session service definition – Amendment 1: Efficiency enhancements.*
- ITU-T Recommendation X.215 (1995)/Amd.2 (1997) | ISO/IEC 8326:1996/Amd.2:1998, *Information technology – Open Systems Interconnection – Session service definition – Amendment 2: Nested connections functional unit.*
- ITU-T Recommendation X.216 (1994) | ISO/IEC 8822:1994, *Information technology – Open Systems Interconnection – Presentation service definition.*
- ITU-T Recommendation X.216 (1994)/Amd.1 (1997) | ISO/IEC 8822:1994/Amd.1:1998, *Information technology – Open Systems Interconnection – Presentation service definition – Amendment 1: Efficiency enhancements.*
- ITU-T Recommendation X.216 (1994)/Amd.2 (1997) | ISO/IEC 8822:1994/Amd.2:1998, *Information technology – Open Systems Interconnection – Presentation service definition – Amendment 2: Nested connections functional unit.*
- ITU-T Recommendation X.217 (1995) | ISO/IEC 8649:1996, *Information technology – Open Systems Interconnection – Service definition for the association control service element.*
- ITU-T Recommendation X.225 (1995) | ISO/IEC 8327-1:1996, *Information technology – Open Systems Interconnection – Connection-oriented session protocol: Protocol specification.*
- ITU-T Recommendation X.225 (1995)/Amd.1 (1997) | ISO/IEC 8327-1:1996/Amd.1:1998, *Information technology – Open Systems Interconnection – Connection-oriented session protocol: Protocol specification – Amendment 1: Efficiency enhancements.*
- ITU-T Recommendation X.225 (1995)/Amd.2 (1997) | ISO/IEC 8327-1:1996/Amd.2:1998, *Information technology – Open Systems Interconnection – Connection-oriented session protocol: Protocol specification – Amendment 2: Nested connections functional unit.*
- ITU-T Recommendation X.226 (1994) | ISO/IEC 8823-1:1994, *Information technology – Open Systems Interconnection – Connection-oriented presentation protocol: Protocol specification.*
- ITU-T Recommendation X.226 (1994)/Amd.1 (1997) | ISO/IEC 8823-1:1994/Amd.1:1998, *Information technology – Open Systems Interconnection – Connection-oriented presentation protocol: Protocol specification – Amendment 1: Efficiency enhancements.*
- ITU-T Recommendation X.226 (1994)/Amd.2 (1997) | ISO/IEC 8823-1:1994/Amd.2:1998, *Information technology – Open Systems Interconnection – Connection-oriented presentation protocol: Protocol specification – Amendment 2: Nested connections functional unit.*
- ITU-T Recommendation X.227 bis (1998) | ISO/IEC 15954:1999, *Information technology – Open Systems Interconnection – Connection-mode protocol for the Application Service Object Association Control Service Element.*
- ITU-T Recommendation X.237 bis (1998) | ISO/IEC 15955:1999, *Information technology – Open Systems Interconnection – Connectionless protocol for the Application Service Object Association Control Service Element.*
- ITU-T Recommendation X.650 (1996) | ISO/IEC 7498-3:1997, *Information technology – Open Systems Interconnection – Basic Reference Model: Naming and addressing.*
- 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.*

2.2 Paired Recommendations | International Standards equivalent in technical content

- CCITT Recommendation 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.*

3 Definitions

3.1 Reference model definitions

3.1.1 Basic Reference Model definitions

This Recommendation | International Standard is based on the concepts developed in ITU-T Rec. X.200 | ISO/IEC 7498-1. It makes use of the following terms defined in them:

- a) application-entity;
- b) application-function;
- c) Application Layer;
- d) application-process;
- e) application-protocol-control-information;
- f) application-protocol-data-unit;
- g) application-service-element;
- h) connectionless-mode presentation-service;
- i) (N)-connectionless-mode transmission;
- j) (N)-function;
- k) presentation-connection;
- l) presentation-service;
- m) concrete syntax;
- n) session-connection;
- o) session-protocol; and
- p) session-service.

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3.1.2 Security architecture definitions

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This Recommendation | International Standard makes use of the following terms defined in CCITT Rec. X.800 | ISO 7498-2:

- a) credentials;
- b) password; and
- c) peer-entity authentication.

3.1.3 Naming and addressing definitions

This Recommendation | International Standard makes use of the following terms defined in ITU-T Rec. X.650 | ISO/IEC 7498-3:

- a) application-process title;
- b) application-entity qualifier;
- c) application-entity title;
- d) application-process invocation-identifier;
- e) application-entity invocation-identifier; and
- f) presentation address.

3.2 Service conventions definitions

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

- a) service-provider;
- b) service-user;
- c) confirmed service;

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- d) non-confirmed service;
- e) provider-initiated service;
- f) primitive;
- g) request (primitive);
- h) indication (primitive);
- i) response (primitive); and
- j) confirm (primitive).

3.3 Presentation service definitions

This Recommendation | International Standard makes use of the following terms defined in ITU-T Rec. X.216 | ISO/IEC 8822:

- a) abstract syntax;
- b) abstract syntax name;
- c) connectionless-mode [presentation];
- d) default context;
- e) defined context set;
- f) functional unit [presentation];
- g) normal mode [presentation];
- h) presentation context;
- i) presentation data value.

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3.4 Application Layer Structure definitions (standards.iteh.ai)

This Recommendation | International Standard makes use of the following terms defined in ITU-T Rec. X.207 | ISO/IEC 9545:

- a) ASO-context;
- b) ASO-invocation;
- c) control function;
- d) application-service-object (ASO);
- e) ASO-association;
- f) ASO-association-identifier;
- g) ASOI-identifier;
- h) ASOI-tag;
- i) ASO-name;
- j) ASO-qualifier;
- k) child ASO;
- l) parent ASO; and
- m) ASO-title.

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3.5 ACSE service definitions

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

3.5.1 Association Control Service Element: The particular application-service-element defined in this Recommendation | International Standard.

3.5.2 ACSE service-user: The part of the ASO that makes use of ACSE services.

3.5.3 ACSE service-provider: An abstraction of the totality of those entities which provide ACSE services to peer ACSE service-users.

3.5.4 requestor: The ACSE service-user that issues the request primitive for a particular ACSE service. For a confirmed service, it also receives the confirm primitive.

3.5.5 acceptor: The ACSE service-user that receives the indication primitive for a particular ACSE service. For a confirmed service, it also issues the response primitive.

3.5.6 association-initiator: The ACSE service-user that initiates a particular association, i.e. the requestor of the A-ASSOCIATE service that establishes the association.

3.5.7 association-responder: The ACSE service-user that is not the initiator of a particular association, i.e. the acceptor of the A-ASSOCIATE service that establishes the association.

3.5.8 authentication: The corroboration of the identity of objects relevant to the establishment of an association. For example, these can include the AEs, APs, and the human users of applications.

NOTE – This term has been defined to make it clear that a wider scope of authentication is being addressed than is covered by peer-entity authentication in CCITT Rec. X.800 | ISO 7498-2.

3.5.9 authentication-function: An application-function within an application-entity invocation that processes and exchanges authentication-values with a peer authentication-function.

3.5.10 authentication-value: The output from an authentication-function to be transferred to a peer ACSE service-user for input to the peer's authentication-function.

3.5.11 authentication-mechanism: The specification of a specific set of authentication-function rules for defining, processing, and transferring authentication-values.

3.5.12 normal mode: The mode of ACSE operation that results in the transfer of ACSE semantics, using the presentation-service.

3.5.13 disrupt: A service procedure is disrupted by another service procedure if the second service results in service primitives not being used as specified for the procedure of the first service.

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4 Abbreviations

ISO/IEC 15953:1999

For the purposes of this Recommendation, the following abbreviations apply:

ACSE	Association Control Service Element
AE	application-entity
AEI	application-entity invocation
Amd.	Amendment to an ITU-T Recommendation or an ISO/IEC International Standard
AP	application-process
ASE	application-service-element
ASO	application-service-object
ASOI	ASO-invocation
CF	control function
cnf	confirm primitive
ind	indication primitive
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
ITU-T	International Telecommunication Union – Telecommunication Standardization Sector
OSI	Open Systems Interconnection
QoS	Quality of service
Rec.	Recommendation [ITU-T]
req	request primitive
resp	response primitive

5 Conventions

This Recommendation | International Standard defines services for the ACSE following the descriptive conventions defined in ITU-T Rec. X.210 (1993) | ISO/IEC 10731 (1994). In clause 8, the definition of each ACSE service includes a table that lists the parameters of its primitives. For a given primitive, the presence of each parameter is described by one of the following values:

blank	Not applicable
C	Conditional
M	Mandatory
P	Subject to conditions defined in ITU-T Rec. X.216 ISO/IEC 8822
U	User option

In addition, the notation (=) indicates that a parameter value is semantically equal to the value to its left in the table.

6 Basic concepts

6.1 General

The reference model (ITU-T Rec. X.200 | ISO/IEC 7498-1) as extended by the Application Layer Structure (see ITU-T Rec. X.207 | ISO/IEC 9545) represents communication among application-processes (APs) in terms of communication among their application-service-objects (ASOs). The functionality of an ASO is factored into a number of ASOs and application-service-elements (ASEs). The interaction among ASOs in the same AE is described in terms of the use of the ASO's or the ASE's services. Interactions among ASOs in peer AEs in the same or different systems is described in terms of application-protocols.

This Service definition supports the modeling concepts of ASO-association, ASO-naming, and ASO-context.

An ASO-association is a cooperative relationship among ASOs. It provides the necessary frame of reference among the ASOs in order that they may interwork effectively. ACSE forms this relationship by the communication of application-protocol-control-information among the ASOIs. (Other means of establishing ASO-associations are outside the scope of this Recommendation | International Standard.)

ASO-naming provides the ability for an ASO to establish an ASO-association directly with another ASO in the recursive structure allowed by the Application Layer Structure. ASO-naming allows establishment to either the entity or to an invocation of the entity. The structure of ASO-names and ASOI-names is consistent with the structure of AE-titles and AEI-qualifiers, see ITU-T Rec. X.207 | ISO/IEC 9545.

An ASO-context is specified by identifying the role of the ASO-association and the control functions (CF) of the ASOs communicating over the ASO-association.

The ACSE is modeled as an ASE. The primary purpose of ACSE is to establish and release an ASO-association among ASOIs and to specify the ASO-context of that association, i.e. create explicit shared state among the communicating ASOIs. The ACSE supports two modes of communication: connection-mode and connectionless-mode. For the connection-mode, the ASO-association is established and released by the reference of ACSE connection-mode services (see 7.1). For the connectionless-mode, the ASO-association exists during the invocation of the single ACSE connectionless-mode service, A-UNIT-DATA (see 7.2).

The ACSE service-user is that part of an ASO that makes use of ACSE services. It may be the control function (CF), an ASO, or an ASE or some combination of the three.

A referencing specification does not need to specify the use of ACSE service primitive parameters that are not relevant to its operation. Such parameters may be passed by the CF between the ACSE service-provider and that part of the ASOI to which the parameters are relevant.

As an example, consider the authentication parameters of the Authentication functional unit discussed below in 6.2. The CF may be used to model the passing of authentication-values between the authentication function and the ACSE-provider. An ASE that references ACSE need not be concerned with these parameters.

The ACSE communicates with its service user by means of service primitives defined in this Service definition. Although not referenced by ACSE to send and receive its semantics, other supporting service primitives may affect the sequencing of ACSE primitives (see 9.2.4) on application-associations or higher level associations.