INTERNATIONAL STANDARD

ISO/IEC 8649

Second edition
1996-10-15

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

Technologies de l'information — Interconnexion de systèmes ouverts (OSI) — Définition du service pour l'élément de service de contrôle d'association

Reference number
ISO/IEC 8649:1996(E)

Contents

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 8649 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 21, *Open Systems Interconnection, data management and open distributed processing*, in collaboration with ITU-T. The identical text is published as ITU-T Recommendation X.217.

This second edition cancels and replaces the first edition (ISO 8649:1988), which has been technically revised. It also incorporates Amendment 1:1990, Amendment 2:1991 and Technical Corrigendum 1:1991.

Introduction

This Service Definition is one of a set of Recommendations and International Standards produced to facilitate the interconnection of information processing systems. It is related to other Recommendations and 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 area 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 Recommendations | International Standards, the interconnection of information processing systems:

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

This Service Definition 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 application-association control: the Association Control Service Element (ACSE). The ACSE provides basic facilities for the control of an application association between two application-entities. The ACSE includes two optional functional units. One functional unit supports the exchange of information in support of authentication during association establishment. The second functional unit supports the negotiation of application context during association establishment. The ACSE services apply to a wide range of application-process communications.

The ACSE services apply to a wide range of application-process communication requirements.

It is recognized that, with respect to ACSE Quality of Services (QOS) described in clause 9, 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.

This page intentionally left blank

INTERNATIONAL STANDARD

ITU-T RECOMMENDATION

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

1 Scope

This Service Definition defines ACSE services for application-association control in an open systems interconnection environment. ACSE supports two modes of communication service: connection-oriented and connectionless.

The ACSE connection-oriented service is provided by the use of the connection-oriented ACSE protocol (see ITU-T Rec. X.227 | ISO/IEC 8650-1) in conjunction with the connection-oriented presentation-service (see ITU-T Rec. X.216 | ISO/IEC 8822). The ACSE connection-oriented service assumes as a minimum the use of the presentation-service connection-oriented Kernel functional unit.

The ACSE connectionless service (A-UNIT-DATA) is provided by the use of the connectionless ACSE protocol (see ITU-T Rec. X.237 | ISO/IEC 10035-1) in conjunction with the connectionless presentation-service (P-UNIT-DATA).

Three functional units are defined in the ACSE. The mandatory Kernel functional unit is used to establish and release application-associations. The ACSE includes two optional functional units. The optional Authentication functional unit supports the exchange of information in support of authentication during association establishment. It 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 second optional functional unit supports the negotiation of application context during association establishment. The ACSE services apply to a wide range of application-process communications.

This Service Definition 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 the time of publication, the editions indicated were valid. All Recommendations and International Standards are subject to revision, and the 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.216 (1994) | ISO/IEC 8822:1994, *Information technology – Open Systems Interconnection – Presentation service definition.*

- 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.227 (1995) | ISO/IEC 8650-1:1996, *Information technology – Open Systems Interconnection – Connection-oriented protocol for the Association Control Service Element: Protocol specification.*
- ITU-T Recommendation X.237 (1995) | ISO/IEC 10035-1:1995, *Information technology – Open Systems Interconnection – Connectionless protocol for the Association Control Service Element: Protocol specification.*
- 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.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 – Part 3: Naming and addressing.*
- 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.*

2.3 Additional references

- CCITT Recommendation X.410 (1984), *Message Handling Systems: Remote operation and reliable transfer server.*
- ISO 6523:1984, *Data interchange – Structures for the identification of organizations.*

3 Definitions

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

3.1 Reference model definitions

3.1.1 Basic Reference Model definitions

This Service Definition 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) session-connection;
n) session-protocol; and
o) session-service.

3.1.2 Security architecture definitions

This Service Definition 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 Service Definition makes use of the following terms defined in CCITT Rec. X.650 | ISO 7498-3:

a) application-process title;
b) application-entity qualifier;
c) application-entity title;[1)]
d) application-process invocation-identifier;
e) application-entity invocation-identifier; and
f) presentation address.

3.2 Service conventions definitions

This Service Definition 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;
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 Service Definition 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; and
j) X.410-1984 mode (presentation).

---

1) As defined in CCITT Rec. X.650 | ISO 7498-3, an application-entity title is composed of an application-process title and an application-entity qualifier. The ACSE service provides for the transfer of an application-entity title value by the transfer of its component values.

3.4 Application Layer Structure definitions

This Service Definition makes use of the following terms defined in ISO/IEC 9545:

a) application-context;

b) application-entity invocation;

c) control function; and

d) application-service object.

3.5 ACSE service definitions

For the purposes of this Service Definition, the following definitions apply:

3.5.1 application-association; association: A cooperative relationship among application-entity invocations which enables the communication of information and the coordination of their joint operation for an instance of communication. This relationship may be formed by the transfer of application-protocol-control-information using the presentation service.

3.5.2 Association Control Service Element: The particular application-service-element defined in this Service Definition.

3.5.3 ACSE service-user: The part of the application-entity that makes use of ACSE services.

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

3.5.5 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.

3.5.6 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.

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

3.5.8 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.

3.5.9 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.

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

3.5.11 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.

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

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

3.5.14 X.410-1984 mode: The mode of ACSE operation that allows ACSE service-users to interwork using the protocol specified in Recommendation X.410, 1984 version. The use of this mode results in no transfer of ACSE semantics.

3.5.15 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.

4 Abbreviations

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

ACSE Association Control Service Element

AE application-entity

AEI	application-entity invocation
AP	Application process
ASE	application-service-element
CF	Control function
cnf	confirm primitive
ind	indication primitive
OSI	Open Systems Interconnection
QOS	Quality of Service
req	request primitive

5 Conventions

This Service Definition defines services for the ACSE following the descriptive conventions defined in ITU-T Rec. X.210 | ISO/IEC 10731. In clause 9, 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 (see ITU-T Rec. X.200 | ISO/IEC 7498-1) represents communication between a pair of application-processes (APs) in terms of communication between their application-entities (AEs) using the presentation-service. The functionality of an AE is factored into a number of application-service-elements (ASEs). The interaction between AEs is described in terms of the use of their ASEs' services.

This Service Definition supports the modeling concepts of application-association and application context.

An **application-association** is a cooperative relationship between two AEIs. It provides the necessary frame of reference between the AEIs in order that they may interwork effectively. This relationship is formed by the communication of application-protocol-control-information between the AEIs through their use of the presentation-service.

An **application context** is an explicitly identified set of application-service-elements, related options and any other necessary information for the interworking of application-entities on an application association (see ISO/IEC 9545).

The ACSE is modeled an ASE. The primary purpose of ACSE is to establish and release an application-association between two AEIs and to determine the application context of that association. The ACSE supports two modes of communication: connection-oriented and connectionless. For the connection-oriented mode, the application-association is established and released by the reference of ACSE connection-oriented services (see 7.1). For the connectionless mode, the application-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 application-entity that makes use of ACSE services. It may be the Control Function (CF) or an ASE or some combination of the two.

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 AEI 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 service-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. The ACSE references Presentation Layer service primitives to send and receive its semantics as defined in ISO/IEC 8650-1. Although not referenced by ACSE to send and receive its semantics, several other Presentation Layer service primitives may affect the sequencing of ACSE primitives (see 10.2.4).

6.2 Authentication

This Service Definition includes the Authentication functional unit. The functional unit allows APIs, AEIs and their related objects to exchange authentication information during the establishment of an association.

6.2.1 Authentication concepts

This Service Definition includes the modeling concepts of authentication-function, authentication-mechanism, authentication-mechanism name and authentication-value. Each is discussed below.

6.2.1.1 Authentication-function

For this Service Definition, authentication is supported by a pair of authentication-functions. An **authentication-function** is modeled as an application-function [i.e. as an (N)-function as defined in ITU-T Rec. X.200 | ISO/IEC 7498-1] that is available to the ACSE service-user. Each is contained within the associated AEIs.

Modeling the authentication-function in this way allows ACSE to deal with authentication communication requirements without having to understand the semantics of the security information exchanged or how it is used.

6.2.1.2 Authentication-mechanism

An **authentication-mechanism** is a particular specification of the processing to be performed by a pair of application-functions for authentication. A specification contains the rules for creating, sending, receiving and processing information needed for authentication.

Annex B of ITU-T Rec. X.227 | ISO/IEC 8650-1 is an example of an authentication-mechanism. It defines the authentication of the sending AEI based on its AE title and its password. The password is contained in the Authentication-value parameter.

6.2.1.3 Authentication-mechanism name

An **authentication-mechanism name** is used to specify a particular authentication-mechanism. For example, the name of the authentication-mechanism specified in ITU-T Rec. X.227 | ISO/IEC 8650-1, Annex B, is assigned (i.e. registered) in that annex. The value has the data type of an OBJECT IDENTIFIER.

An authentication-mechanism name may also be used to specify a more general security mechanism that includes an authentication-mechanism. An example of a general security mechanism is an ASE that provides security facilities to its service-user).

Authentication-mechanism names and general security mechanism names are subject to registration within OSI (see clause 12 of ITU-T Rec. X.227 | ISO/IEC 8650-1).

6.2.1.4 Authentication-value

An **authentication-value** consists of information used by a pair of authentication-functions to perform authentication. It can consist of information such as, credentials, a time-stamp, a digital signature, etc. It can also identify the type and/or name of object to be authenticated, such as the AE, a human user, etc.

The semantic structure of an authentication-value is specified by the authentication-mechanism involved.

An authentication-function provides an authentication-value to its AEI to be sent to the peer AEI. The peer AEIs authentication-function receives and processes this authentication-value. For example, it may use the value to authenticate objects at the sending AEI.

An authentication-mechanism may be part of an ASE that provides security facilities to its service-user. In this situation, the authentication-mechanism name identifies the ASE; the authentication-value is an APDU of the ASE.

6.2.2 ACSE authentication facilities

The ACSE Kernel functional unit does not support authentication. However, AP Title, AE Qualifier, AP invocation-identifier and AE invocation-identifier values are optionally transferred during the establishment of an association. They may be used to identify the calling, called and responding AEIs.

The ACSE Authentication functional unit supports the transfer of authentication-values as part of the A-ASSOCIATE service. An authentication-value is treated as an atomic item by ACSE. Its semantics are transparent to the ACSE service-provider.

The facilities of the Authentication functional unit may be used to convey other security-related information. This may be done with the transfer of authentication information during association establishment.

7 Service overview

ACSE supports both a connection-oriented and connectionless mode of operation. Each mode is discussed below. Table 1 lists all of the ACSE services. Table 1 indicates the communication mode and type of service.

Table 1 – ACSE services

Communication mode	Service	Type
Connection-oriented	A-ASSOCIATE	Confirmed
	A-RELEASE	Confirmed
	A-ABORT	Non-confirmed
	A-P-ABORT	Provider-initiated
Connectionless	A-UNIT-DATA	Non-confirmed

7.1 Connection-oriented mode

The connection-oriented mode of ACSE is based on the use of the connection-oriented mode of the presentation service (ITU-T Rec. X.216 | ISO/IEC 8822).

7.1.1 ACSE services

This Service Definition defines the following services for the control of a single association:

a) A-ASSOCIATE;

b) A-RELEASE;

c) A-ABORT; and

d) A-P-ABORT.

The A-ASSOCIATE service causes the start of use of an association by those ASE procedures identified by the value of Application Context Name parameter.

NOTE – The use of an association by several ASEs is the subject of ongoing work.

The A-RELEASE service, if successful, causes the completion of the use of an association by those ASE procedures identified by the application context that is in effect without loss of information in transit. However, the success of the A-RELEASE service may be negotiated.

The A-ABORT service causes the abnormal release of the association with the possible loss of information in transit.

The A-P-ABORT service indicates the abnormal release of the association as a result of action by the underlying presentation-service with the possible loss of information in transit.

For a particular association, the ACSE services operate in one of the following modes:

a) normal mode; or

b) X.410-1984 mode.

The **normal mode** of operation allows the ACSE service-user to take full advantage of the functionality provided by both ACSE and the presentation-service (ITU-T Rec. X.216 | ISO/IEC 8822). In this mode the ACSE service-provider transfers its semantics using the normal mode of the presentation-service.

The **X.410-1984 mode** of operation allows the ACSE service-user to interwork with a peer using the protocol specified by the Recommendation X.410-1984. In this mode, the ACSE service-provider does not transfer any semantics of its own and uses the X.410-1984 mode of the presentation-service.

7.1.2 Functional units

Functional units are used by this Service Definition to identify ACSE user requirements during association establishment. Three functional units are defined:

a) Kernel functional unit;

b) Authentication functional unit; and

c) Application Context Negotiation functional unit.

The Kernel functional unit is always available, and includes the basic services identified in 7.1.

The Authentication functional unit supports authentication during association establishment. The availability of this functional unit is negotiated during association establishment. This functional unit does not include additional services. It adds parameters to the A-ASSOCIATE and A-ABORT services.

The Application Context Negotiation functional unit supports the negotiation of application context during association establishment. The Application Context Negotiation functional unit allows the association-initiator to propose a list of application context names to the association-acceptor during association establishment. The association-acceptor selects one name. This functional unit does not include additional services. It adds a single parameter to the A-ASSOCIATE and A-ABORT services.

Table 2 shows the services and parameters associated with the ACSE functional units for the connection-oriented mode of communication. The services and their parameters are discussed in clause 9.

7.2 Connectionless mode

The connectionless mode of ACSE is based on the use of the connectionless mode of the presentation service. This Service Definition defines a single service (A-UNIT-DATA) for the connectionless mode of ACSE. The A-UNIT-DATA service simultaneously establishes and releases an association. That is, the application-association exists during the invocation of the A-UNIT-DATA service.

The connectionless mode of ACSE does not have the notion of functional units. It does not support authentication as does the connection-oriented mode of ACSE.

8 Relationship with other ASEs and lower layer services

8.1 Other application-service-elements

The ACSE is intended to be used with other ASEs in order to support a specific information processing task. Therefore, it is expected that the ACSE will be included in all application context specifications.

The collection of the ACSE and other ASE(s) included in an application context are required to use the facilities of the presentation-service in a coordinated manner.

8.2 Presentation-service

8.2.1 Connection-oriented mode

A one-to-one correspondence exists between an application-association and a presentation-connection.

The connection-oriented ACSE services require access to the P-CONNECT, P-RELEASE, P-U-ABORT and P-P-ABORT services. The ACSE services shall be the sole user of these presentation services. The ACSE services neither use nor constrain the use of any other presentation service. However, the A-RELEASE service is disrupted by a request or indication primitive the P-RESYNCHRONIZE, P-U-EXCEPTION-REPORT, or P-P-EXCEPTION-REPORT services.

The requestor and acceptor of the A-ASSOCIATE service determine the mode, the default presentation context, and the initial defined context set of the underlying presentation-connection using the following A-ASSOCIATE parameters:

– Mode;

– Presentation Requirements;

– Presentation Context Definition List;

- Presentation Context Definition Result List;
- Default Presentation Context Name; and
- Default Presentation Context Result.

Table 2 – Functional unit services and their parameters (connection-oriented)

Functional Unit	Service	Parameter
Kernel	A-ASSOCIATE	Mode Application Context Name Calling AP Title Calling AE Qualifier Calling AP Invocation-identifier Calling AE Invocation-identifier Called AP Title Called AE Qualifier Called AP Invocation-identifier Called AE Invocation-identifier Responding AP Title Responding AE Qualifier Responding AP Invocation-identifier Responding AE Invocation-identifier User Information Result Result Source Diagnostic Calling Presentation Address Called Presentation Address Responding Presentation Address Presentation Context Definition List Presentation Context Definition Result List Default Presentation Context Name Default Presentation Context Result Quality of Service Session Requirements Initial Synchronization Point Serial Number Initial Assignment of Tokens Session-connection Identifier
	A-RELEASE	Reason User Information Result
	A-ABORT	Abort Source User Information
	A-P-ABORT	Provider Reason
Authentication	A-ASSOCIATE	Authentication-mechanism Name Authentication-value ACSE Requirements
	A-ABORT	Diagnostic
Application Context Negotiation	A-ASSOCIATE	Application Context Name List ACSE Requirements

If the requestor specifies the value "normal" for the Mode parameter, the last five parameters above determine the presentation context facility for the association according to the rules for the normal mode of the presentation-service (ITU-T Rec. X.216 | ISO/IEC 8822). At the conclusion of the A-ASSOCIATE procedure, the requestor and acceptor must have obtained a presentation context that supports the abstract syntax specified in ITU-T Rec. X.227 | ISO/IEC 8650-1 for the ACSE application-protocol-data-units.

NOTE 1 – The ACSE service-provider is aware of the presentation context that contains its abstract syntax by a local mechanism.

If the requestor specifies the value "X.410-1984" for the Mode parameter, the ACSE service-provider does not transfer ACSE semantics and therefore does not require a presentation context for its abstract syntax. However, the user information that the ACSE service-provider does transfer uses the unnamed default presentation context for the X.410-1984 mode of the presentation-service (see ITU-T Rec. X.216 | ISO/IEC 8822).

NOTE 2 – Table 3 indicates the A-ASSOCIATE service parameters that are not used in the X.410-1984 mode. None of the presentation context related parameters are used.

8.2.2 Connectionless mode

The connectionless ACSE service (A-UNIT-DATA) requires access to the P-UNIT-DATA service. The requestor and acceptor of the A-UNIT-DATA service determine the defined context set for the underlying P-UNIT-DATA. This is accomplished by the use of the Presentation Context Definition List on the A-UNIT-DATA request and indication primitives.

8.3 Session-service

8.3.1 Connection-oriented mode

Using the Session Requirements parameter, the A-ASSOCIATE service requestor and acceptor determine the functional units for the underlying session-service (see ITU-T Rec. X.215 | ISO/IEC 8326).

The rules and the parameter value length restrictions of the underlying session-service affect ACSE services. The ACSE service-user must be aware of these constraints.

NOTE – Some examples of these constraints are:

a) Version 1 of the session-protocol (see ITU-T Rec. X.225 | ISO/IEC 8327-1) imposes user data length restrictions which affect ACSE primitive parameters. Some special considerations apply to the A-ABORT service (see 9.3).

b) The choice of session functional units for a particular association affects the rules for the use of ACSE services. For example, the selection of session tokens controls the possibilities of negotiated release and release collisions.

8.3.2 Connectionless mode

For the connectionless mode, the functionality of the Session Layer is not manifested at the Application Layer. That is, the A-UNIT-DATA service does not include parameters that affect the Session Layer for the connectionless mode.

9 Service definition

Each of the ACSE services for both the connection-oriented and connectionless modes of communication is discussed below.

9.1 A-ASSOCIATE service

The A-ASSOCIATE service is used to cause the beginning of the use of an association; it is a confirmed service.

9.1.1 A-ASSOCIATE parameters

Table 3 lists the A-ASSOCIATE service parameters. In addition, groups of parameters are defined for reference by other ASEs as follows:

a) Calling AE Title is the composite of the Calling AP Title and the Calling AE Qualifier parameters;

b) Called AE Title is the composite of the Called AP Title and the Called AE Qualifier parameters; and

c) Responding AE Title is the composite of the Responding AP Title and the Responding AE Qualifier parameters.

The two components of the AE title (AP title and AE qualifier) are defined in CCITT Rec. X.650 | ISO 7498-3.

9.1.1.1 Mode

This parameter specifies the mode in which the ACSE services will operate for this association. It takes one of the following symbolic values:

– normal; or

– X.410-1984.

If this parameter is not included on the request primitive, the default value of "normal" is used by the ACSE service-provider. This parameter is always present on the indication primitive.

Table 3 – A-ASSOCIATE parameters

Parameter Name	Req	Ind	Rsp	Cnf
Mode	U	M		
Application Context Name[a)]	M	M(=)	M	C
Application Context Name List	C	C(=)	C	C(=)
Calling AP Title[a)]	U	C(=)		
Calling AE Qualifier[a)]	U	C(=)		
Calling AP Invocation-identifier[a)]	U	C(=)		
Calling AE Invocation-identifier[a)]	U	C(=)		
Called AP Title[a)]	U	C(=)		
Called AE Qualifier[a)]	U	C(=)		
Called AP Invocation-identifier[a)]	U	C(=)		
Called AE Invocation-identifier[a)]	U	C(=)		
Responding AP Title[a)]			U	C(=)
Responding AE Qualifier[a)]			U	C(=)
Responding AP Invocation-identifier[a)]			U	C(=)
Responding AE Invocation-identifier[a)]			U	C(=)
ACSE Requirements[a)]	U	C	C	C(=)
Authentication-mechanism Name[a)]	U	C(=)	U	C(=)
Authentication-value[a)]	U	C(=)	U	C(=)
User Information	U	C(=)	U	C(=)
Result			M	M
Result Source				M
Diagnostic[a)]			U	C(=)
Calling Presentation Address	P	P		
Called Presentation Address	P	P		
Responding Presentation Address			P	P
Presentation Context Definition List[a)]	P	P		
Presentation Context Definition Result List[a)]		P	P	P
Default Presentation Context Name[a)]	P	P		
Default Presentation Context Result[a)]			P	P
Quality of Service	P	P	P	P
Presentation Requirements[a)]	P	P	P	P
Session Requirements	P	P	P	P
Initial Synchronization Point Serial Number	P	P	P	P
Initial Assignment of Tokens	P	P	P	P
Session-connection Identifier	P	P	P	P

a) Not used in X.410-1984 mode.

9.1.1.2 Application Context Name

The requestor (i.e. the association-initiator) uses the Application Context Name parameter to identify a single application context name that it proposes for the association.

NOTE 1 – If the requestor proposes the Application Context Negotiation functional unit for this association (see 9.1.1.15), the requestor may also propose application context names by using the Application Context Name List parameter (see 9.1.1.2a).

NOTE 2 – The value of the Application Context Name parameter may be different from any of the names in the Application Context Name List parameter or it may be equal to one of the names in the list.

The acceptor (i.e. the association-responder) uses the Application Context Name parameter to select the application context name for this association.

If the Application Context Negotiation functional unit is not selected for this association, the acceptor may return any value in the response primitive.

NOTE 3 – In this case, the offer of an alternative application context name by the acceptor provides a possible mechanism for limited negotiation. However, the semantics and rules for this exchange are entirely user specific. If the requestor cannot operate in the application's application context name, it may issue an A-ABORT request primitive.

If the Application Context Negotiation functional unit is selected for this association, the acceptor is limited to the values that it returns on the response primitive. It shall return a value from either the Application Context Name parameter or from the Application Context Name List parameter (if any) on the indication primitive.

If the ACSE service-provider is not capable of supporting the requested association, the indication primitive is not issued by the ACSE service-provider. Therefore, the response primitive is not issued by the ACSE service-user. In this situation, when the confirm primitive is issued, it does not include the Application Context Name parameter.

If the ACSE service-provider is not capable of supporting the requested association, the indication primitive is not issued by the ACSE service-provider. Consequently, the response primitive is not returned by the responding ACSE service-user. In this situation, the Application Context Name parameter is not present on the confirm primitive.

9.1.1.2a Application Context Name List

The requestor (i.e. the association-initiator) may use the Application Context Name List parameter to identify a list of application context names that it is capable of supporting on the association.

If the association is accepted, the parameter shall not be included on the response primitive. If the association is rejected, the acceptor may use this parameter on the response primitive to express a list of application context names that it could have supported on the association. The Application Context Name List parameter may only be used if the Application Context Negotiation is selected for this association.

9.1.1.3 Calling AP Title

This parameter identifies the AP that contains the requestor of the A-ASSOCIATE service.

9.1.1.4 Calling AE Qualifier

This parameter identifies the particular AE of the AP that contains the requestor of the A-ASSOCIATE service.

9.1.1.5 Calling AP Invocation-identifier

This parameter identifies the AP invocation that contains the requestor of the A-ASSOCIATE service.

9.1.1.6 Calling AE Invocation-identifier

This parameter identifies the AE invocation that contains the requestor of the A-ASSOCIATE service.

9.1.1.7 Called AP Title

This parameter identifies the AP that contains the intended acceptor of the A-ASSOCIATE service.

9.1.1.8 Called AE Qualifier

This parameter identifies the particular AE of the AP that contains the intended acceptor of the A-ASSOCIATE service.

9.1.1.9 Called AP Invocation-identifier

This parameter identifies the AP invocation that contains the intended acceptor of the A-ASSOCIATE service.

9.1.1.10 Called AE Invocation-identifier

This parameter identifies the AE invocation that contains the intended acceptor of the A-ASSOCIATE service.

9.1.1.11 Responding AP Title

This parameter identifies the AP that contains the actual acceptor of the A-ASSOCIATE service.

9.1.1.12 Responding AE Qualifier

This parameter identifies the particular AE of the AP that contains the actual acceptor of the A-ASSOCIATE service.

9.1.1.13 Responding AP Invocation-identifier

This parameter identifies the AP invocation that contains the actual acceptor of the A-ASSOCIATE service.

9.1.1.14 Responding AE Invocation-identifier

This parameter identifies the AE invocation that contains the actual acceptor of the A-ASSOCIATE service.

9.1.1.15 ACSE Requirements

This parameter is used by the requestor to indicate the functional units requested for the association. If not present, only the Kernel functional unit is available for the association. In supporting this negotiation mechanism, the ACSE service-provider removes values for unsupported functional units before issuing the indication primitive to the acceptor.

This parameter is used by the acceptor to indicate which of the requested functional units the acceptor selects. The acceptor shall not select a functional unit in the response primitive which was not requested in the indication primitive.

The value of the parameter in the response primitive is delivered unchanged in the confirm primitive.

This parameter may take one or more of the following symbolic values:

- authentication;
- application context negotiation.

9.1.1.16 Authentication-mechanism Name

This parameter is only used if the ACSE Requirements parameter includes the Authentication functional unit. If present, the value of this parameter identifies the authentication-mechanism in use. If not present, the communicating AEIs must implicitly know the mechanism in use, e.g. by prior understanding.

NOTES

1 Some authentication-mechanisms may require this parameter, and if so, will state this in their specification.

2 This parameter may specify a more general authentication mechanism. For example, it may specify an ASE that provides security facilities to its service-user.

9.1.1.17 Authentication-value

This parameter shall only be used if the ACSE Requirements parameter includes the Authentication functional unit.

The Authentication-value parameter is used as defined below:

a) If present on the request or the response primitive, it contains an authentication-value generated by the authentication-function in the AEI that issued the service primitive. It is intended for the peer's authentication-function.

b) If present on the indication or the confirm primitive, it contains an authentication-value generated by the authentication-function in the AEI that issued the corresponding request or response primitive. It is intended for the peer's authentication-function.

9.1.1.18 User Information

Either the requestor or the acceptor may optionally include user information. Its meaning depends on the application context that accompanies the primitive.

NOTES

1 For example, this parameter may be used to carry the initialization information of other ASEs included in the application context specified by the value of the accompanying Application Context Name parameter.

2 This parameter can contain several pieces of data, each providing initialization information corresponding to the application-service-elements for each application context identified in the Application Context Name List parameter.

9.1.1.19 Result

This parameter is provided by either the acceptor, by the ACSE service-provider, or by the presentation service-provider. It indicates whether the request to establish the association is accepted or rejected. It takes one of the following symbolic values:

- accepted;
- rejected (permanent); or
- rejected (transient).

If the parameter has the value "accepted", the association is established. Otherwise, the association is not established.

9.1.1.20 Result Source

The value of the parameter is supplied by the ACSE service-provider. It identifies the creating source of the Result parameter and the Diagnostic parameter, if present. It takes one of the following symbolic values:

- ACSE service-user;
- ACSE service-provider; or
- presentation service-provider.

NOTE – If the Result parameter has the value "accepted", the value of this parameter is "ACSE service-user".

9.1.1.21 Diagnostic

This parameter may be used by the acceptor to provide diagnostic information about the establishment of the association.

NOTE – The use of this parameter is independent of the value of the Result parameter.

If the Result Source parameter has the value "ACSE service-provider", it takes one of the following symbolic values:

- no reason given; or
- no common ACSE version.

If the Result Source parameter has the value "ACSE service-user", it takes one of the following symbolic values:

- no reason given;
- application context name not supported;
- calling AP title not recognized;
- calling AE qualifier not recognized;
- calling AP invocation-identifier not recognized;
- calling AE invocation-identifier not recognized;
- called AP title not recognized;
- called AE qualifier not recognized;
- called AP invocation-identifier not recognized;
- called AE invocation-identifier not recognized;
- Authentication-mechanism Name not recognized;
- Authentication-mechanism Name required;
- Authentication failure; or
- Authentication required.

9.1.1.22 Calling Presentation Address

This parameter is as defined in ITU-T Rec. X.216 | ISO/IEC 8822.

9.1.1.23 Called Presentation Address

This parameter is as defined in ITU-T Rec. X.216 | ISO/IEC 8822.

9.1.1.24 Responding Presentation Address

This parameter is as defined in ITU-T Rec. X.216 | ISO/IEC 8822.

9.1.1.25 Presentation Context Definition List

This parameter is as defined in ITU-T Rec. X.216 | ISO/IEC 8822.

9.1.1.26 Presentation Context Definition Result List

This parameter is as defined in ITU-T Rec. X.216 | ISO/IEC 8822.

9.1.1.27 Default Presentation Context Name

This parameter corresponds to the Default Context Name parameter defined in ITU-T Rec. X.216 | ISO/IEC 8822.

9.1.1.28 Default Presentation Context Result

This parameter corresponds to the Default Context Result parameter defined in ITU-T Rec. X.216 | ISO/IEC 8822.

9.1.1.29 Quality of Service

This parameter is as defined in ITU-T Rec. X.216 | ISO/IEC 8822.

9.1.1.30 Presentation Requirements

This parameter is as defined in ITU-T Rec. X.216 | ISO/IEC 8822.

9.1.1.31 Session Requirements

This parameter is as defined in ITU-T Rec. X.216 | ISO/IEC 8822.

9.1.1.32 Initial Synchronization Point Serial Number

This parameter is as defined in ITU-T Rec. X.216 | ISO/IEC 8822.

9.1.1.33 Initial Assignment of Tokens

This parameter is as defined in ITU-T Rec. X.216 | ISO/IEC 8822.

9.1.1.34 Session Connection Identifier

This parameter is as defined in ITU-T Rec. X.216 | ISO/IEC 8822.

9.1.2 A-ASSOCIATE service procedure

The A-ASSOCIATE service procedure has a one-to-one correspondence with the P-CONNECT service defined in ITU-T Rec. X.216 | ISO/IEC 8822. When the A-ASSOCIATE service is used, the association is created simultaneously with the creation of the underlying presentation-connection.

An ACSE service-user that desires to establish an association issues an A-ASSOCIATE request primitive. The called AE is identified by parameters of the request primitive. The requestor cannot issue any primitives except an A-ABORT request primitive until it receives an A-ASSOCIATE confirm primitive.

The ACSE service-provider issues an A-ASSOCIATE indication primitive to the acceptor.

The acceptor accepts or rejects the association by sending an A-ASSOCIATE response primitive with an appropriate Result parameter. ACSE service-provider issues an A-ASSOCIATE confirm primitive having the same Result parameter. The Result Source parameter is assigned the symbolic value of "ACSE service-user".

If the acceptor accepts the association, the association is available for use. Requestors in both AEs may now use any service provided by the ASEs included in the application context that is in effect (with the exception of A-ASSOCIATE).

If the acceptor rejects the association, the association is not established.

The ACSE service-provider may not be capable of supporting the requested association. In this situation, it returns an A-ASSOCIATE confirm primitive to the requestor with an appropriate Result parameter. The Result Source parameter is appropriately assigned either the symbolic value of "ACSE service-provider" or "presentation service-provider". The indication primitive is not issued. The association is not established.

A requestor in either AE may disrupt the A-ASSOCIATE service procedure by issuing an A-ABORT request primitive. The acceptor receives an A-ABORT indication primitive. The association is not established.

9.2 A-RELEASE service

The A-RELEASE service is used by a requestor in either AE to cause the completion of the use of an association; it is a confirmed service. If the session Negotiated Release functional unit was selected for the association, the acceptor may respond negatively (see 8.3.1). This causes the unsuccessful completion of the A-RELEASE service and the continuation of the association without loss of information in transit.

9.2.1 A-RELEASE parameters

Table 4 lists the A-RELEASE parameters.

Table 4 – A-RELEASE parameters

Parameter Name	Req	Ind	Rsp	Cnf
Reason[a)] User Information[a)] Result	U U	C(=) C(=)	U U M	C(=) C(=) M(=)
[a)] Not used in X.410-1984 mode.				

9.2.1.1 Reason

When used on the request primitive, this parameter identifies the general level of urgency of the request. It takes one of the following symbolic values:

- normal;
- urgent; or
- user defined.

NOTE 1 – For example, if the session Negotiated Release functional unit was selected for the association, the value "urgent" may be used on the request primitive when the requestor desires to urgently release the association.

When used on the response primitive, this parameter identifies information about why the acceptor accepted or rejected the release request. It takes one of the following symbolic values:

- normal;
- not finished; or
- user defined.

NOTE 2 – For example, if the session Negotiated Release functional unit was not selected for the association, the value "not finished" may be used on the response primitive when the acceptor is forced to release the association but wishes to give a warning that it has additional information to send or receive.

9.2.1.2 User Information

Either the requestor or acceptor may optionally include user information on the request or response primitive. Its meaning depends on the application context that is in effect.

9.2.1.3 Result

This parameter is used by the acceptor to indicate if the request to release the association normally is acceptable. It takes one of the following symbolic values:

- affirmative; or
- negative.

9.2.2 A-RELEASE service procedure

The A-RELEASE service procedure has a one-to-one correspondence with the P-RELEASE service defined in ITU-T Rec. X.216 | ISO/IEC 8822. When the A-RELEASE service is used, the association is released simultaneously with the release of the underlying presentation-connection.

An ACSE service-user that desires to release the association issues an A-RELEASE request primitive. This requestor cannot issue any further primitives other than an A-ABORT request primitive until it receives an A-RELEASE confirm primitive.

In order to issue an A-RELEASE request primitive, the requestor is required to meet all the requirements for issuing a P-RELEASE request (see 8.2.1).

The ACSE service-provider issues an A-RELEASE indication primitive to the acceptor. The acceptor then cannot issue any ACSE primitives other than an A-RELEASE response primitive or an A-ABORT request primitive.

The acceptor replies to the A-RELEASE indication primitive by issuing an A-RELEASE response primitive with a Result parameter that has a value of "affirmative" or "negative". The acceptor may give a negative response only if the session Negotiated Release functional unit was selected for the association (see 8.3.1).

If the acceptor gives a negative response, it may once again use any service provided by the ASEs included in the application context that is in effect (with the exception of the A-ASSOCIATE service). If it gave a positive response, it cannot issue any further primitives for the association.

The ACSE service-provider issues an A-RELEASE confirm primitive with an "affirmative" or "negative" value for the Result parameter. If the value is "negative", the requestor may once again use any of the services provided by the ASEs of the application context that is in effect (with the exception of A-ASSOCIATE).

If the value of the Result parameter is "affirmative", the association and the underlying presentation-connection have been released.

A requestor in either AE may disrupt the A-RELEASE service procedure by issuing an A-ABORT request. The acceptor receives an A-ABORT indication. The association is released with the possible loss of information in transit.

An A-RELEASE service procedure collision results when requestors in both AEs simultaneously issue an A-RELEASE service primitive. This can occur only when no session tokens are available on the association (see 8.3.1). In this situation, both ACSE service-users receive an unexpected A-RELEASE indication primitive. The following sequence then occurs to complete the normal release of the association:

a) The association-initiator issues an A-RELEASE response primitive.

b) The association-responder waits for an A-RELEASE confirm primitive from its peer. When it receives one, it then issues an A-RELEASE response primitive.

c) The association-initiator receives an A-RELEASE confirm primitive.