INTERNATIONAL STANDARD

ISO
8650
First edition
1988-12-15

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION
ORGANISATION INTERNATIONALE DE NORMALISATION
МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ

Information processing systems — Open Systems Interconnection — Protocol specification for the Association Control Service Element

Systèmes de traitement de l'information — Interconnexion de systèmes ouverts — Spécification du protocole pour l'élément de service de contrôle d'association

Reference number
ISO 8650 : 1988 (E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 8650 was prepared by Technical Committee ISO/TC 97, *Information processing systems.*

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

Printed in Switzerland

Contents

Information processing systems — Open Systems Interconnection — Protocol specification for the Association Control Service Element

0 Introduction

0.1 This International Standard is one of a set of International Standards produced to facilitate the interconnection of information processing systems. It is related to other International Standards in the set as defined by the Reference Model for Open Systems Interconnection (ISO 7498). The Reference Model subdivides the area of standardization for interconnection into a series of layers of specification, each of manageable size.

0.2 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.

0.3 This International Standard specifies the protocol for the application-service-element for application-association control: the Association Control Service Element (ACSE). The ACSE provides services for establishing and releasing application-associations. These services are intended to be applicable to a wide range of application-process communication requirements.

0.4 This International Standard includes an annex that describes the protocol machine of ACSE in terms of a state table. This protocol machine is referred to as the Association Control Protocol Machine (ACPM).

0.5 The protocol defined in this International Standard is also governed by the use of the presentation-service (ISO 8822) and the session-service (ISO 8326).

0.6 Quality of Services (QOS) is a parameter of the A-ASSOCIATE service. Work is still in progress to provide an integrated treatment of QOS across all of the 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 International Standard at a later time which reflects further QOS developments and integration.

1 Scope and field of application

The procedures defined in this International Standard are applicable to instances of communication between systems which wish to interconnect in an open systems interconnection environment.

This International Standard specifies:

a) procedures for the transfer of information relating to application-association control between application-entities; and

b) the abstract syntax for the representation of the ACSE APDUs.

The ACSE procedures are defined in terms of:

a) the interactions between peer ACSE protocol machines through the use of presentation-services; and

b) the interaction between an ACSE protocol machine and its service-user.

This International Standard also specifies conformance requirements for systems implementing these procedures. It does not contain tests which can be used to demonstrate conformance.

2 References

ISO 7498, *Information processing systems - Open Systems Interconnection - Basic Reference Model.*

ISO 7498-3, *Information processing systems - Open Systems Interconnection - Basic Reference Model - Part 3: Naming and Addressing.* [1]

1 At present at the stage of draft, publication anticipated in due course.

ISO 8326, *Information processing systems - Open Systems Interconnection - Basic connection oriented session service definition.*

ISO 8327, *Information processing systems - Open Systems Interconnection - Basic connection oriented session protocol specification.*

ISO/TR 8509, *Information processing systems - Open Systems Interconnection - Service conventions.*

ISO 8649, *Information processing systems - Open Systems Interconnection - Service definition for the Association Control Service Element.*

ISO 8822, *Information processing systems - Open Systems Interconnection - Connection oriented presentation service definition.*

ISO 8824, *Information processing systems - Open Systems Interconnection - Specification of Abstract Syntax Notation One (ASN.1).*

ISO 8825, *Information processing systems - Open Systems Interconnection - Specification of Basic Encoding Rules for Abstract Notation One (ASN.1).*

CCITT Recommendation X.410: Message Handling Systems: Remote Operations and Reliable Transfer Server (1984).

3 Definitions

3.1 Reference Model definitions

This International Standard is based on the concepts developed in ISO 7498 and makes use of the following terms defined in it:

a) Application Layer;

b) application-process;

c) application-entity;

d) application-service-element;

e) application-protocol-data-unit;

f) application-protocol-control-information;

g) presentation-service;

h) presentation-connection;

i) session-service;

j) session-protocol; and

k) session-connection.

3.2 Naming and addressing definitions

This International Standard makes use of the following terms defined in 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.

3.3 Service conventions definitions

This International Standard makes use of the following terms defined in ISO/TR 8509:

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).

3.4 Presentation service definitions

This International Standard makes use of the following terms defined in ISO 8822:

a) abstract syntax;

b) abstract syntax name;

c) default context;

1 As defined in ISO 7498-3, an application-entity title is composed of an application-process title and an application-entity qualifier. The ACSE protocol provides for the transfer of an application-entity title value by the transfer of its component values.

d) defined context set;

e) functional unit [presentation];

f) normal mode [presentation];

g) presentation context;

h) presentation data value; and

i) X.410-1984 mode [presentation].

3.5 ACSE service definitions

This International Standard makes use of the following terms defined in ISO 8649:

a) application-association; association;

b) application context;

c) Association Control Service Element;

d) ACSE service-user;

e) ACSE service-provider;

f) requestor;

g) acceptor;

h) association-initiator;

i) association-responder;

j) normal mode;

k) X.410-1984 mode; and

l) disrupt.

3.6 Association Control protocol specification definitions

The following terms are introduced in this International Standard.

3.6.1 Association Control Protocol Machine: The protocol machine for the Association Control Service Element specified in this International Standard.

3.6.2 requesting Association Control Protocol Machine: The Association Control Protocol Machine whose service-user is the requestor of a particular Association Control Service Element service.

3.6.3 accepting Association Control Protocol Machine: The Association Control Protocol Machine whose service-user is the acceptor for a particular Association Control Service Element service.

4 Symbols and abbreviations

4.1 Data units

APDU application-protocol-data-unit

4.2 Types of application-protocol-data-units

The following abbreviations have been given to the application-protocol-data-units defined in this International Standard.

AARQ	A-ASSOCIATE-REQUEST APDU
AARE	A-ASSOCIATE-RESPONSE APDU
RLRQ	A-RELEASE-REQUEST APDU
RLRE	A-RELEASE-RESPONSE APDU
ABRT	A-ABORT APDU

4.3 Other abbreviations

The following abbreviations are used in this International Standard.

ACPM	Association Control Protocol Machine
ACSE	Association Control Service Element
AE	application-entity
AP	application-process
APCI	application-protocol-control-information
ASE	application-service-element
ASN.1	Abstract Syntax Notation One
OSI	Open Systems Interconnection
QOS	quality of service

5 Conventions

5.1 This International Standard employs a tabular presentation of its APDU fields. In clause 7, tables are presented for each ACSE APDU. Each field is summarized using the following notation:

M	presence is mandatory
O	presence is ACPM option
U	presence is ACSE service-user option
req	source is related request primitive
ind	sink is related indication primitive
rsp	source is related response primitive
cnf	sink is related confirm primitive
sp	source or sink is the ACPM

5.2 The structure of each ACSE APDU is specified in clause 9 using the abstract syntax notation of ASN.1 (ISO 8824).

6 Overview of the protocol

6.1 Service provision

The protocol specified in this International Standard provides the services defined in ISO 8649. These services are listed in table 1. For a particular association, the ACSE services operate either in the normal mode or in the X.410-1984 mode. The mode of operation is determined by the Mode parameter on the A-ASSOCIATE request primitive.

Table 1 - Service summary

Service	Type
A-ASSOCIATE	Confirmed
A-RELEASE	Confirmed
A-ABORT	Non-confirmed
A-P-ABORT	Provider-initiated

6.2 Use of the presentation-service

6.2.1 ACSE's use of the presentation-service is determined by ACSE's mode of operation for an association as specified below.

a) ACSE normal mode: The ACPM uses the normal mode of the presentation- service (ISO 8822). The ACPM uses the presentation-service Kernel functional unit to exchange its APCI and, optionally, ACSE service-user information (i.e., ACSE APDUs) with its peer. The use of additional presentation-service functional units is an ACSE service-user choice. This choice does not affect the operation of the ACPM.

b) ACSE X.410-1984 mode: The ACPM uses the X.410-1984 mode of the presentation-service. Only the Kernel functional unit is available when using the presentation-service X.410-1984 mode. In this mode, the ACPM does not exchange its own APCI with its peer. It simply passes through information supplied to it by the ACSE service-user or by the presentation-service.

6.2.2 This International Standard assumes that the ACPM is the sole user of the P-CONNECT, P-RELEASE, P-U-ABORT, and P-P-ABORT services. The ACSE neither uses nor constrains the use of any other presentation service.

6.2.3 When supported by version 1 of the session-protocol (ISO 8327), the presentation-service is subject to length restrictions for its user-data parameters. This International Standard assumes that a local mechanism detects violations of these constraints and makes the ACSE service-user aware of them. An encoding optimization is specified for A-ABORT to mitigate this problem (see 7.3.3.1).

6.3 Relationship to the session-service

6.3.1 The session functional units required for the session-connection that supports the presentation-connection (that in turn supports the association) are determined by the A-ASSOCIATE service requestor and acceptor. They accomplish this using the Session Requirements parameter on the A-ASSOCIATE primitives. The session functional units are described in ISO 8326.

6.3.2 The rules of the session-service affect the operation of the ACPM and its service-user. The ACSE service-user must be aware of these constraints. This International Standard assumes that a local mechanism enforces them. Some examples of session-service constraints that affect the ACSE service-user are:

a) the availability of negotiated release; and

b) the possibility of release collisions.

6.4 Model

6.4.1 The Association control Protocol Machine (ACPM) is modeled as a finite state machine whose specification is given in this International Standard. The ACPM communicates with its service-user by means of the ACSE service primitives defined in ISO 8649. The ACPM communicates with its presentation service-provider by means of the presentation services defined in ISO 8822.

6.4.2 The ACPM is driven by the receipt of input events from its ACSE service-user and from its presentation service-provider for the underlying presentation-connection that supports the association. The input events from the ACSE service-user are ACSE request and response primitives. The input events from its presentation service-provider are presentation indication and confirm primitives.

6.4.3 The ACPM responds to input events by issuing output events to its presentation service-provider and to its ACSE service-user. The output events to its presentation service-provider are presentation request and response primitives. The output events to its ACSE service-user are ACSE indication and confirm primitives.

6.4.4 The receipt of an input event, the generation of dependent actions, and the resultant output event are considered to be an indivisible action.

6.4.5 During the establishment of an association between two AEs, the existence of invocations of both the requesting and responding AEs is presumed. How they are created is outside of the scope of this International Standard.

6.4.6 A new invocation of an ACPM is employed upon the receipt of an A-ASSOCIATE request primitive or a P-CONNECT indication primitive. Each such invocation controls exactly one association.

NOTE — Eacn association may be identified in an end system by a local mechanism so that the ACSE service-user and the ACPM can refer to the association.

6.4.7 The ACPM is modeled to operate in either one of two modes for a given association: the normal mode; and the X.410-1984 mode as specified below.

a) When operating in the normal mode, an ACPM communicates with its peer ACPM in support of an association by transferring ACSE application protocol data units

(APDUs) defined in clause 9. [1] An ACSE APDU is transferred as a presentation data value in the User Data parameter of the presentation primitive used on the underlying presentation- connection.

b) When operating in the X.410-1984 mode, an ACPM does not transfer ACSE APDUs with its peer. In this situation, the sending and receiving of presentation primitives are in themselves significant protocol events.

7 Elements of procedure

The ACSE protocol consists of the following procedures:

a) association establishment;

b) normal release of an association; and

c) abnormal release of an association.

In this clause, a summary of each of these elements of procedure is presented. This consists of a summary of the relevant APDUs, and a high-level overview of the relationship between the ACSE services, the APDUs involved, and the presentation service that is used. Clause 8 describes how the parameters of the presentation primitives are used. In clause 9, a detailed specification of the ACSE APDUs is given using the notation of ASN.1 (ISO 8824). Annex A presents the state table for the ACPM.

7.1 Association establishment

7.1.1 Purpose

The association establishment procedure is used to establish an association between two AEs. It supports the A-ASSOCIATE service.

7.1.2 APDUs used

The association establishment procedure uses the A-ASSOCIATE-REQUEST (AARQ) and the A-ASSOCIATE-RESPONSE (AARE) APDUs. The fields of the AARQ APDU are listed in table 2. The fields of the AARE APDU are listed in table 3.

Table 2 - AARQ APDU fields

Field name	Presence	Source	Sink
Protocol Version	O	sp	sp
Application Context Name	M	req	ind
Calling AP Title	U	req	ind
Calling AE Qualifier	U	req	ind
Calling AP Invocation-identifier	U	req	ind
Calling AE Invocation-identifier	U	req	ind
Called AP Title	U	req	ind
Called AE Qualifier	U	req	ind
Called AP Invocation-identifier	U	req	ind
Called AE Invocation-identifier	U	req	ind
Implementation Information	O	sp	sp
User Information	U	req	ind

Table 3 - AARE APDU fields

Field name	Presence	Source	Sink
Protocol Version	O	sp	sp
Application Context Name	M	rsp	cnf
Responding AP Title	U	rsp	cnf
Responding AE Qualifier	U	rsp	cnf
Responding AP Invocation-identifier	U	rsp	cnf
Responding AE Invocation-identifier	U	rsp	cnf
Result	M	rsp/sp	cnf
Result Source - Diagnostic	M	rsp/sp	cnf
Implementation Information	O	sp	sp
User Information	U	rsp	cnf

1 This is true with one exception. If the association is supported by version 1 of the session-protocol (ISO 8327), the requesting ACPM does not pass ACSE APCI as user data on a P-U-ABORT request primitive. The absence of ACSE APCI in this situation does not imply that the association is operating in the X.410-1984 mode (see 6.4.6 and 7.3.3.1).

7.1.3 Association establishment procedure

This procedure is driven by the following events:

a) an A-ASSOCIATE request primitive from the requestor;

b) an AARQ APDU as user data on a P-CONNECT indication primitive;

c) an A-ASSOCIATE response primitive from the acceptor; and

d) a P-CONNECT confirm primitive (that may or may not contain an AARE APDU).

7.1.3.1 A-ASSOCIATE request primitive

7.1.3.1.1 The requesting ACPM forms an AARQ APDU from parameter values of the A-ASSOCIATE request primitive and optionally, the Protocol Version and implementation information. It issues a P-CONNECT request primitive also using information from the A-ASSOCIATE request primitive. The User Data parameter of the P-CONNECT request primitive contains the AARQ APDU.

7.1.3.1.2 The requesting ACPM waits for a primitive from the presentation service-provider and does not accept any other primitive from the requestor other than an A-ABORT request primitive.

7.1.3.2 AARQ APDU

7.1.3.2.1 The accepting ACPM receives an AARQ APDU from its peer as user data on a P-CONNECT indication primitive.

7.1.3.2.2 The ACPM determines if the AARQ APDU is acceptable based on the rules for extensibility (see 7.4). If the AARQ APDU is not acceptable, a protocol error results (see 7.3.3.4). The association establishment procedure is disrupted. An A-ASSOCIATE indication primitive is not issued. The association is not established.

7.1.3.2.3 The ACPM next inspects the value of the Protocol Version field[1] of the AARQ APDU. If the ACPM does not support a common protocol version, it forms an AARE APDU with the following assigned fields:

a) Protocol Version field (optional) with the value that indicates the protocol version(s) that it could support (see 7.1.5.1);

b) Application Context Name field with the same value as on the AARQ APDU;

c) Result field with the value "rejected(permanent)"; and

d) Result Source - Diagnostic field with the values "ACSE service-provider" and "no common ACSE version."

In this case, the ACPM sends the AARE APDU as user data on a P-CONNECT response primitive with a Result parameter that has the value "user rejection." The ACPM does not issue an A-ASSOCIATE indication primitive. The association is not established.

7.1.3.2.4 If the P-CONNECT indication primitive and its AARQ APDU are acceptable, the ACPM issues an A-ASSOCIATE indication primitive to the acceptor. The A-ASSOCIATE indication primitive parameters are derived from the AARQ APDU and the P-CONNECT indication primitive. The ACPM waits for a primitive from the acceptor.

7.1.3.3 ASSOCIATE response primitive

7.1.3.3.1 When the accepting ACPM receives the A-ASSOCIATE response primitive, the Result parameter specifies whether the service-user has accepted or rejected the association. The ACPM forms an AARE APDU using the A-ASSOCIATE response primitive parameters. The ACPM sets the Result Source Diagnostic field to "ACSE service-user" and the value derived from the Diagnostic parameter of the response primitive. The AARE APDU is sent as the User Data parameter on the P-CONNECT response primitive.

7.1.3.3.2 If the acceptor accepted the association request, the Result parameter on the related P-CONNECT response primitive specifies "acceptance", and the Result field of the outgoing AARE APDU specifies "accepted." The association is established.

7.1.3.3.3 If the acceptor rejected the association request, the Result parameter on the related P-CONNECT response primitive specifies "user-rejection", and the Result field of the AARE APDU contains the appropriate rejection value. The association is not established.

7.1.3.4 P-CONNECT confirm primitive

7.1.3.4.1 The requesting ACPM receives a P-CONNECT confirm primitive. The following situations are possible:

a) the association has been accepted;

b) the accepting ACPM or the acceptor has rejected the association; or

c) the presentation service-provider has rejected the related presentation connection.

7.1.3.4.2 If the association was accepted, the P-CONNECT confirm primitive Result parameter specifies "acceptance." The User Data parameter contains an AARE APDU. The Result field of the AARE APDU specifies "accepted." The requesting ACPM issues an A-ASSOCIATE confirm primitive

1 If the Protocol Version field is not present in the AARQ APDU, version 1 is assumed.

to the requestor derived from parameters from the P-CONNECT confirm primitive and the AARE APDU. The A-ASSOCIATE confirm primitive Result parameter specifies "accepted." The association is established.

7.1.3.4.3 If the association was rejected by either the accepting ACPM or by the acceptor, the related P-CONNECT confirm primitive Result parameter specifies "user-rejection." The User Data parameter contains an AARE APDU.

7.1.3.4.4 The requesting ACPM issues an A-ASSOCIATE confirm primitive to the requestor derived from parameters from the P-CONNECT confirm primitive and the AARE APDU. The A-ASSOCIATE confirm primitive Result parameter indicates "rejected(transient)" or "rejected(permanent)." The Result Source parameter indicates "ACSE service-user" or "ACSE service-provider." The association is not established.

7.1.3.4.5 If the presentation-connection was rejected by the presentation service-provider, the P-CONNECT confirm primitive Result parameter specifies "provider-rejection." In this situation, the User Data field is not used. The requesting ACPM issues an A-ASSOCIATE confirm primitive with the Result parameter indicating "rejected(permanent)." The Result Source parameter indicates "presentation service-provider."[1] The association is not established.

7.1.4 Use of the AARQ APDU fields

The AARQ APDU fields are used by the requesting and accepting ACPMs as specified below.

7.1.4.1 Protocol Version

For the requesting ACPM: The value assigned to this field is determined within the implementation of the ACPM. It is a bit string where each bit that is set to one indicates the version of ACSE protocol that this ACPM supports. Bit 0 represents version 1; bit 1 represents version 2; etc. Multiple bits may be set indicating support of multiple versions. No trailing bits higher than the highest version of this International Standard that the requesting ACPM supports are included. That is, the last bit of the string is set to one.

For the accepting ACPM: The ACPM ignores trailing bits of this field that are higher than the one indicating the latest version of this International Standard that it supports.

7.1.4.2 Application Context Name

For the requesting ACPM: This value is determined by the value of the Application Context Name parameter of the A-ASSOCIATE request primitive.

For the accepting ACPM: This value is used to determine the value of the Application Context Name parameter of the A-ASSOCIATE indication primitive, if issued.

7.1.4.3 Calling AP Title

For the requesting ACPM: This value is determined by the value of the Calling AP Title parameter of the A-ASSOCIATE request primitive.

For the accepting ACPM: This value is used to determine the value of the Calling AP Title parameter of the A-ASSOCIATE indication primitive, if issued.

7.1.4.4 Calling AE Qualifier

For the requesting ACPM: This value is determined by the value of the Calling AE Qualifier parameter of the A-ASSOCIATE request primitive.

For the accepting ACPM: This value is used to determine the value of the Calling AE Qualifier parameter of the A-ASSOCIATE indication primitive, if issued.

7.1.4.5 Calling AP Invocation-identifier

For the requesting ACPM: This value is determined by the value of the Calling AP Invocation-identifier parameter of the A-ASSOCIATE request primitive.

For the accepting ACPM: This value is used to derive the value of the Calling AP Invocation-identifier parameter of the A-ASSOCIATE indication primitive, if issued.

7.1.4.6 Calling AE Invocation-identifier

For the requesting ACPM: This value is determined by the value of the Calling AE Invocation-identifier parameter of the A-ASSOCIATE request primitive.

For the accepting ACPM: This value is used to derive the value of the Calling AE Invocation-identifier parameter of the A-ASSOCIATE indication primitive, if issued.

7.1.4.7 Called AP Title

For the requesting ACPM: This value is determined by the value of the Called AP Title parameter of the A-ASSOCIATE request primitive.

For the accepting ACPM: This value is used to determine the value of the Called AP Title parameter of the A-ASSOCIATE indication primitive, if issued.

1 The presentation-service (ISO 8822) currently does not define a Diagnostic parameter on the P-CONNECT response. However, work is still in progress to provide an integrated treatment of the "result" related parameters across all layers of the OSI Reference Model. As a consequence, an addendum may be added to this International Standard at a later time that reflects further developments and integration.

7.1.4.8 Called AE Qualifier

For the requesting ACPM: This value is determined by the value of the Called AE Qualifier parameter of the A-ASSOCIATE request primitive.

For the accepting ACPM: This value is used to determine the value of the Called AE Qualifier parameter of the A-ASSOCIATE indication primitive, if issued.

7.1.4.9 Called AP Invocation-identifier

For the requesting ACPM: This value is determined by the value of the Called AP Invocation-identifier parameter of the A-ASSOCIATE request primitive.

For the accepting ACPM: This value is used to determine the value of the Called AP Invocation-identifier parameter of the A-ASSOCIATE indication primitive, if issued.

7.1.4.10 Called AE Invocation-identifier

For the requesting ACPM: This value is determined by the value of the Called AE Invocation-identifier parameter of the A-ASSOCIATE request primitive.

For the accepting ACPM: This value is used to determine the value of the Called AE Invocation-identifier parameter of the A-ASSOCIATE indication primitive, if issued.

7.1.4.11 Implementation Information

For the requesting ACPM: The value assigned to this field is determined within the implementation of the ACPM. It contains information specific to the individual implementation of that ACPM. It is not used in negotiation.

For the accepting ACPM: This field does not affect the operation of the ACPM. Any use depends on a common understanding between the requesting and accepting ACPMs.

7.1.4.12 User Information

For the requesting ACPM: This value is determined by the value of the User Information parameter of the A-ASSOCIATE request primitive.

For the accepting ACPM: This value is used to determine the value of the User Information parameter of the A-ASSOCIATE indication primitive, if issued.

7.1.5 Use of the AARE APDU fields

The AARE APDU fields are used by the accepting and requesting ACPMs as specified below.

7.1.5.1 Protocol Version

For the accepting ACPM: The value of this field assigned by the ACPM depends on whether the association request is accepted or rejected by the ACPM and the acceptor, as specified below.

a) If the association is accepted, the value assigned by the ACPM is a variable length bit string that indicates the protocol version selected by the ACPM from those proposed in the AARQ APDU. Only the bit indicating the version selected is set to one. That bit is the last bit in the string.

b) If the association is rejected, the value assigned by the ACPM is a variable length bit string that indicates the protocol version(s) of this International Standard that could be supported by the ACPM.

For the requesting ACPM: The use of the value in this field depends on whether the association request is accepted or rejected.

a) If the association is accepted, this value defines the protocol version of this International Standard to be used for this association.

b) If the association is rejected, the use of this value is a local option.

7.1.5.2 Application Context Name

For the accepting ACPM: This value is determined by the value of the Application Context Name parameter of the A-ASSOCIATE response primitive.

For the requesting ACPM: This value is used to determine the value of the Application Context Name parameter of the A-ASSOCIATE confirm primitive.

7.1.5.3 Responding AP Title

For the accepting ACPM: This value is determined by the value of the Responding AP Title parameter of the A-ASSOCIATE response primitive.

For the requesting ACPM: This value is used to determine the value of the Responding AP Title parameter of the A-ASSOCIATE confirm primitive, if issued.

7.1.5.4 Responding AE Qualifier

For the accepting ACPM: This value is determined by the value of the Responding AE Qualifier parameter of the A-ASSOCIATE response primitive.

For the requesting ACPM: This value is used to determine the value of the Responding AE Qualifier parameter of the A-ASSOCIATE confirm primitive, if issued.

7.1.5.5 Responding AP Invocation-identifier

For the accepting ACPM: This value is determined by the value of the Responding AP Invocation-identifier parameter of the A-ASSOCIATE response primitive.

For the requesting ACPM: This value is used to determine the value of the Responding AP Invocation-identifier parameter of the A-ASSOCIATE confirm primitive, if issued.

7.1.5.6 Responding AE Invocation-identifier

For the accepting ACPM: This value is determined by the value of the Responding AE Invocation-identifier parameter of the A-ASSOCIATE response primitive.

For the requesting ACPM: This value is used to determine the value of the Responding AE Invocation-identifier parameter of the A-ASSOCIATE confirm primitive, if issued.

7.1.5.7 Result

For the accepting ACPM: The value is determined by the ACPM or by the acceptor as specified below.

a) If the AARQ APDU is rejected by the ACPM (i.e., an A-ASSOCIATE indication primitive is not issued to the acceptor), the value of "rejected(permanent)" or "rejected(transient)" is assigned by the ACPM.

b) Otherwise, the value is determined by the Result parameter of the A- ASSOCIATE response primitive.

For the requesting ACPM: This value is used to determine the value of the Result parameter of the A-ASSOCIATE confirm primitive.

7.1.5.8 Result Source - Diagnostic

This field contains both the Result Source value and the Diagnostic value.

7.1.5.8.1 Result Source value

For the accepting ACPM: This value is assigned by the ACPM as specified below.

a) If the AARQ APDU is rejected by the ACPM (i.e., an A-ASSOCIATE indication primitive is not issued to the acceptor), it assigns the value "ACSE service-provider."

b) Otherwise, the ACPM assigns the value "ACSE service-user."

For the requesting ACPM: This value is used to determine the value of the Result Source parameter of the A-ASSOCIATE confirm primitive.

7.1.5.8.2 Diagnostic value

For the accepting ACPM: This value is determined by the ACPM or by the acceptor as specified below.

a) If the AARQ APDU is rejected by the ACPM (i.e., an A-ASSOCIATE indication primitive is not issued to the acceptor), the appropriate value is assigned by the ACPM.

b) Otherwise, the value is determined by the value of the Diagnostic parameter of the A-ASSOCIATE response primitive. If the Diagnostic parameter is not included on the response primitive, the ACPM assigns the value of "null."

For the requesting ACPM: This value is used to determine the value of the Diagnostic parameter of the A-ASSOCIATE confirm primitive, unless it has the value of "null." In this case, a Diagnostic value is not included.

7.1.5.9 Implementation Information

For the accepting ACPM: The value assigned to this field is determined within the implementation of the ACPM. It contains information specific to the individual implementation of that ACPM. It is not used in negotiation.

For the requesting ACPM: This field does not affect the operation of the ACPM. Any use depends on a common understanding between the accepting and requesting ACPMs.

7.1.5.10 User Information

For the accepting ACPM: This value is determined by the value of the User Information parameter of the A-ASSOCIATE response primitive.

For the requesting ACPM: This value is used to determine the value of the User Information parameter of the A-ASSOCIATE confirm primitive.

7.1.6 Collisions and interactions

7.1.6.1 A-ASSOCIATE service

For a given ACPM, an A-ASSOCIATE collision cannot occur (see 6.4.6). For a given AE, two distinct ACPMs would be involved that represent the processing for two distinct associations:

a) an ACPM that processes the initial A-ASSOCIATE request primitive that results in the sending of an AARQ as user data on a P-CONNECT request primitive; and

b) an ACPM that processes the subsequently received AARQ APDU as user data on a P-CONNECT indication primitive.

7.1.6.2 A-ABORT, P-U-ABORT, or P-P-ABORT service

If an ACPM receives an A-ABORT request primitive, a P-U-ABORT indication primitive, or a P-P-ABORT indication primitive, it discontinues the normal association establishment procedure, and instead follows the abnormal release procedure.

7.2 Normal release of an association

7.2.1 Purpose

This procedure is used for the normal release of an association by an AE without loss of information in transit. It supports the A-RELEASE service.

7.2.2 APDUs used

The normal release procedure uses the A-RELEASE-REQUEST (RLRQ) APDU and the A-RELEASE-RESPONSE (RLRE) APDU. The fields of the RLRQ APDU are listed in table 4. The fields of the RLRE APDU are listed in table 5.

Table 4 - RLRQ APDU fields

Field name	Presence	Source	Sink
Reason	U	req	ind
User Information	U	req	ind

Table 5 - RLRE APDU fields

Field name	Presence	Source	Sink
Reason	U	rsp	cnf
User Information	U	rsp	cnf

7.2.3 Normal release procedure

This procedure is driven by the following events:

a) an A-RELEASE request primitive from the requestor;

b) an RLRQ APDU as user data on a P-RELEASE indication primitive;

c) an A-RELEASE response primitive from the acceptor; or

d) an RLRE APDU as user data on a P-RELEASE confirm primitive.

7.2.3.1 A-RELEASE request primitive

7.2.3.1.1 When an A-RELEASE request primitive is received, the ACPM sends an RLRQ APDU as user data on a P-RELEASE request primitive using the parameters from the A-RELEASE request primitive.

NOTE — The requestor is required to meet the presentation (and session) requirements in order to issue an A-RELEASE request primitive (see 6.2 and 6.3).

7.2.3.1.2 The requesting ACPM now waits for a primitive from the presentation service-provider. It does not accept any primitives from the requestor other than an A-ABORT request primitive.

7.2.3.2 RLRQ APDU

When the accepting ACPM receives the RLRQ APDU as user data on a P-RELEASE indication primitive, it issues an A-RELEASE indication primitive to the acceptor. It does not accept any ACSE primitives from its service-user other than an A-RELEASE response primitive or an A-ABORT request primitive.

7.2.3.3 A-RELEASE response primitive

The Result parameter on the A-RELEASE response primitive specifies whether the acceptor accepts or rejects the release of the association. The accepting ACPM forms an RLRE APDU from the response primitive parameters. The RLRE APDU is sent as user data on a P-RELEASE response primitive.

a) If the acceptor accepted the release, the Result parameter of the P-RELEASE response primitive has a Result parameter value of "affirmative." The association is released.

b) If the acceptor rejected the release, the Result parameter of the P-RELEASE response primitive has a Result parameter value of "negative." The association continues.

NOTE — To give a negative response, the acceptor is required to meet the related presentation (and session) requirements. (see 6.3)

7.2.3.4 RLRE APDU

The requesting ACPM receives a P-RELEASE confirm primitive containing an RLRE APDU from its peer. The Result parameter on the P-RELEASE confirm primitive specifies either that the acceptor agrees or disagrees that the association may be released. The requesting ACPM forms an A-RELEASE confirm primitive from the RLRE APDU fields.

a) If the Result parameter on the P-RELEASE confirm primitive specifies "affirmative", the association is released.

b) If the Result parameter on the P-RELEASE confirm primitive specifies "negative", the association continues. The requesting ACPM again accepts primitives from its service-user.

7.2.3.5 A-RELEASE service collision

7.2.3.5.1 An A-RELEASE service collision occurs when an ACPM has sent out an RLRQ APDU as the user data of a P-RELEASE request primitive (as a result of receiving an A-RELEASE request primitive from its service-user). Instead of receiving the expected RLRE APDU as user data on a P-RELEASE confirm primitive from its peer, it receives an RLRQ APDU as the user data of a P-RELEASE indication primitive.

7.2.3.5.2 The ACPM issues an A-RELEASE indication primitive to its service-user. The procedure then followed by an ACPM depends on whether its service-user was the association-initiator or the association-responder.

a) For the association-initiator:

1) The ACPM waits for an A-RELEASE response primitive from its service-user. When it receives the response primitive , it forms an RLRE APDU from the response primitive's parameters. The RLRE is sent as user data on a P-RELEASE response primitive. The association continues.

2) This ACPM now waits for an RLRE from its peer as user data on a P-RELEASE confirm primitive. It does not accept any primitive from its service-user other than an A-ABORT request primitive.

3) When the ACPM receives the RLRE, it forms an A-RELEASE confirm primitive from the RLRE fields and issues it to its service-user. The association is released.

In summary, the sequence of events that drive the ACPM of the association-initiator are:

—A-RELEASE request primitive;
—RLRQ APDU (causing the collision);
—A-RELEASE response primitive; and finally,
—RLRE APDU.

b) For the association-responder:

1) The ACPM waits for an RLRE from its peer as user data on a P-RELEASE confirm primitive. It does not accept a primitive from its service-user other than an A-ABORT request primitive.

2) When this ACPM receives the RLRE, it forms an A-RELEASE confirm primitive from the RLRE fields. The association continues.

3) The ACPM now waits for an A-RELEASE response primitive from its service-user. When it receives the response primitive , it forms a RLRE APDU from the response primitive's parameters. The RLRE is sent as user data on a P-RELEASE response primitive. The association is released.

In summary, the sequence of events that drive the ACPM of the association-responder are:

—A-RELEASE request primitive;
—RLRQ APDU (causing the collision);
—RLRE APDU; and finally
—A-RELEASE response primitive.

7.2.4 Use of the RLRQ APDU fields

The RLRQ APDU fields are used by the requesting and accepting ACPMs as specified below.

7.2.4.1 Reason

For the requesting ACPM: This value is determined by the value of the Reason parameter of the A-RELEASE request primitive.

For the accepting ACPM: This value is used to determine the value of the Reason parameter of the A-RELEASE indication primitive.

7.2.4.2 User Information

For the requesting ACPM: This value is determined by the value of the User Information parameter of the A-RELEASE request primitive.

For the accepting ACPM: This value is used to determine the value of the User Information parameter of the A-RELEASE indication primitive.

7.2.5 Use of the RLRE APDU fields

The RLRE APDU fields are used by the accepting and requesting ACPMs as specified below.

7.2.5.1 Reason

For the accepting ACPM: This value is determined by the value of the Reason parameter of the A-RELEASE response primitive.

For the requesting ACPM: This value is used to determine the value of the Reason parameter of the A-RELEASE confirm primitive.

7.2.5.2 User Information

For the accepting ACPM: This value is determined by the value of the User Information parameter of the A-RELEASE response primitive.

For the requesting ACPM: This value is used to determine the value of the User Information parameter of the A-RELEASE confirm primitive.

7.2.6 Collisions and interactions

7.2.6.1 A-RELEASE service

For a given ACPM, an A-RELEASE service collision can occur. The processing for such a collision is described in 7.2.3.5.

NOTE — An A-RELEASE service collision can only occur if no session tokens were selected for the association.

7.2.6.2 A-ABORT service, P-U-ABORT, or P-P-ABORT service

If an ACPM receives an A-ABORT request primitive, a P-U-ABORT indication primitive, or a P-P-ABORT indication primitive, it disrupts the normal association release procedure, and instead follows the abnormal release procedure.

7.3 Abnormal release of an association

7.3.1 Purpose

The Abnormal Release procedure can be used at any time to force the abrupt release of the association by a requestor in either AE, by either ACPM or by the presentation service-provider. When the abnormal release procedure is applied during an attempt to establish an association, the association is not established. The abnormal release procedure supports the A-ABORT and A-P-ABORT services.

7.3.2 APDUs used

The abnormal release procedure uses the A-ABORT (ABRT) APDU. The fields of the ABRT APDU are listed in Table 6.

NOTE — No APDUs are defined for the A-P-ABORT service since it is directly mapped from the P-P-ABORT service.

Table 6 - ABRT APDU fields

Field name	Presence	Source	Sink
Abort Source	M	sp	ind
User Information	U	req	ind

7.3.3 Abnormal release procedure

This procedure is driven by the following events:

a) an A-ABORT request primitive from the requestor;

b) a P-U-ABORT indication primitive;

c) a P-P-ABORT indication primitive; or

d) a protocol error detected by an ACPM.

7.3.3.1 A-ABORT request primitive

When an ACPM receives an A-ABORT request primitive from its service-user, the processing that it performs depends on the version of the underlying session-protocol (ISO 8327) that supports the association as specified below.

a) For version 1, the ACPM does not send any of its APCI to its peer. It simply issues a P-U-ABORT request primitive. If user information is included on the A-ABORT request primitive, that user information is passed as user data on the P-U-ABORT request primitive. The association is released.

b) For other versions, the ACPM sends an ABRT APDU as user data on a P-U-ABORT request primitive. The Abort Source field is specified as "ACSE service-user." If the User Information parameter is included on the A-ABORT request primitive, it is included in the ABRT APDU. The association is released.

7.3.3.2 P-U-ABORT indication primitive

When an ACPM receives a P-U-ABORT indication primitive, the User Data parameter may contain [1] an ABRT APDU.

a) If the indication primitive does not contain an ABRT APDU, the ACPM issues an A-ABORT indication primitive with the Abort Source parameter specified as "ACSE service-user." If user data is contained on the P-U-ABORT indication primitive, it is included as the User Information parameter of the A-ABORT indication primitive. The association is released.

b) If the indication primitive does contain an ABRT APDU, the ACPM issues an A-ABORT indication primitive using the Abort Source field of the ABRT APDU. If a User Information field is contained in the ABRT APDU, it is included on the A-ABORT indication primitive. The association is released.

7.3.3.3 P-P-ABORT indication primitive

When an ACPM receives a P-P-ABORT indication primitive, the ACPM issues an A-P-ABORT indication primitive to the acceptor. The association is released.

7.3.3.4 Protocol errors

7.3.3.4.1 Two types of ACSE protocol errors are possible:

a) for a particular ACPM state, an unexpected APDU is received; or

b) an invalid field is encountered during the processing of an incoming APDU (see 7.4).

1 If an association is supported by version 1 of the session-protocol (ISO 8327), the User Data parameter does not contain an ABRT APDU (see 7.3.3.1). The absence of an APDU in this situation does not imply that the application is operating in the X.410-1984 mode.

7.3.3.4.2 If an unexpected APDU is received, the abnormal release procedure is invoked. If an invalid field is detected by an ACSE procedure, that procedure is disrupted and the abnormal release procedure is invoked.

7.3.3.4.3 As part of the abnormal release procedure, the ACPM issues an A-ABORT indication primitive to its service-user, unless the error occurred during the association establishment procedure[1] as the result of receiving an invalid AARQ (see 7.4). If an indication primitive is issued, the value of the Abort Source is "ACSE service-provider." The User Information parameter is not used as specified below.

7.3.3.4.4 The subsequent ACPM processing performed depends on the version of the underlying session-protocol (ISO 8327) that supports the association as specified below.

a) For version 1, the ACPM issues a P-U-ABORT request primitive. No user information is included.

b) For other versions, the ACPM sends an ABRT APDU as user data on a P-U-ABORT request primitive. The Abort Source field is specified as "ACSE service-provider." The User Information field is not used.

7.3.3.4.5 In either case, the association is released.

7.3.4 Use of the ABRT APDU fields

The ABRT APDU fields are used by the requesting and accepting ACPMs as specified below.

7.3.4.1 Abort Source

For the requesting ACPM: This value is assigned by the ACPM as specified below.

a) If the ACPM initiated the abort procedure, the ACPM assigns the value of "ACSE service-provider."

b) Otherwise, the ACPM assigns the value of "ACSE service-user."

For the accepting ACPM: This value is used to determine the value of the Abort Source parameter of the A-ABORT indication primitive.

7.3.4.2 User Information

For the requesting ACPM: This value is determined by the value of the User Information parameter of the A-ABORT request primitive.

For the accepting ACPM: This value is used to determine the value of the User Information parameter of the A-ABORT indication primitive.

7.3.5 Collisions and interactions

The abnormal release procedure may be used whenever an association is established, is in the process of being established, or is being normally released. This procedure disrupts any other currently active procedure. A P-P-ABORT indication primitive can disrupt the A-ABORT procedure with loss of the A-ABORT information. Collisions of ABRT APDUs are governed by the P-U-ABORT services (ISO 8822).

7.4 Rules for extensibility

7.4.1 When processing an incoming AARQ, the accepting ACPM shall:

a) ignore all tagged values that are not defined in the abstract syntax of this International Standard; and

b) ignore all unknown bit name assignments within a bit string.

7.4.2 After the association has been established or during the establishment of an association, only those ACSE APDUs and related APDU fields defined in the ASN.1 description of the negotiated version of this International Standard shall be issued.

7.4.3 A received APDU or field within an APDU which is not defined in the ASN.1 description of the negotiated version of this International Standard shall be treated as a protocol error.

8 Mapping to the presentation-service

This clause specifies how the presentation service primitives are used by the ACPM. This usage depends on the mode selected (see 6.2) for the association.

a) For the requesting ACPM: The mode for the association is determined by the value of the Mode parameter of the invoking A-ASSOCIATE request primitive. If the Mode parameter is not included on the request primitive, the default value of "normal" is used.

b) For the accepting ACPM: The mode is determined by the value of the Mode parameter of the incoming P-CONNECT indication primitive.

1 Since an A-ASSOCIATE indication primitive will not be issued, an A-ABORT indication primitive would have no meaning, and, therefore, it is not issued.

Table 7 - Mapping Overview

ACSE primitive	APDU *	Presentation Primitive
A-ASSOCIATE request/indication A-ASSOCIATE response/confirm	AARQ AARE	P-CONNECT request/indication P-CONNECT response/confirm
A-RELEASE request/indication A-RELEASE response/confirm	RLRQ RLRE	P-RELEASE request/indication P-RELEASE response/confirm
A-ABORT request/indication A-P-ABORT indication	ABRT —	P-U-ABORT request/indication P-P-ABORT indication
* — ACSE APDUs are not used in the X.410-1984 mode.		

Subclauses 8.1 to 8.3 specify the usage of the presentation services for the normal mode. Subclauses 8.4 to 8.6 specify the usage for the X.410-1984 mode. Table 7 summarizes, for both modes, the mapping of ACSE primitives and their related APDUs (normal mode) to the presentation primitives used.

8.1 Association establishment (normal mode)

The association establishment procedure uses the P-CONNECT service. Association establishment takes place concurrently with the establishment of the underlying presentation-connection.

8.1.1 Directly mapped parameters

For the P-CONNECT primitives: The following parameters are not referenced by the ACPM and are mapped directly onto the corresponding parameters of the A-ASSOCIATE primitives:

a) Calling Presentation Address;

b) Called Presentation Address;

c) Responding Presentation Address;

d) Presentation Context Definition List;

e) Presentation Context Definition Result List;

f) Default [Presentation] Context Name;

g) Default [Presentation] Context Result;

h) Quality of Service;

i) Presentation Requirements;

j) Session Requirements;

k) Initial Synchronization Point Serial Number;

l) Initial Assignment of Tokens; and

m) Session-connection Identifier.

8.1.2 Use of other P-CONNECT request and indication parameters

The Mode and User Data parameters of the P-CONNECT request and indication primitives are referenced by the ACPM.

8.1.2.1 Mode

8.1.2.1.1 For the P-CONNECT request primitive: The Mode parameter is set to the value of the Mode parameter of the A-ASSOCIATE request primitive. For the normal mode of ACSE operation, this parameter has the value of "normal." This indicates to the presentation-service that it is to operate in the normal mode for this presentation-connection.

8.1.2.1.2 For the P-CONNECT indication primitive: This parameter has the value of "normal" for the normal mode of ACSE operation. The value indicates that the accepting ACPM is to operate in the normal mode for this association. The Mode parameter of the A-ASSOCIATE indication primitive is set to the value of "normal."

8.1.2.2 User Data

For both the P-CONNECT request and indication primitives: The User Data parameter is used to carry the AARQ APDU as specified below.

a) The APCI of the AARQ APDU is expressed using the ACSE abstract syntax of this International Standard. This abstract syntax must be included as the value of a presentation context definition parameter specified by the requestor on the A-ASSOCIATE request primitive.

NOTE — The requesting and accepting ACPMs are aware of the presentation context that contains their abstract syntax by a local mechanism.

b) User information (if any) from the A-ASSOCIATE request primitive is included in the AARQ APDU and is expressed using one or more presentation contexts

specified by the requestor on the A-ASSOCIATE request primitive.

8.1.3 Use of other P-CONNECT response and confirm parameters

The User Data and Result parameters of the P-CONNECT response and confirm primitive are referenced by the ACPM.

8.1.3.1 Result[1]

8.1.3.1.1 For the P-CONNECT response primitive: The Result parameter is set by the accepting ACPM as specified below.

a) If the accepting ACPM itself rejects the association, it is set as "user-rejection."

b) If the accepting ACPM accepts the request, the value is set as "acceptance", or "user-rejection" as determined by the value of the corresponding Result parameter on the A-ASSOCIATE response primitive.

8.1.3.1.2 For the P-CONNECT confirm primitive: The Result parameter is used by the requesting ACPM to determine if the P-CONNECT confirm primitive User Data parameter contains an AARE APDU as specified below.

a) If the Result parameter has the value "provider-rejection", the request is rejected by the presentation service-provider. The intended accepting ACPM never received the AARQ APDU. The User Data parameter does not contain an AARE APDU.

b) Otherwise, the Result parameter has the value of "acceptance" or "user rejection." The accepting ACPM received the AARQ APDU and has returned an AARE APDU that is contained in the User Data parameter.

8.1.3.2 User Data

8.1.3.2.1 The User Data field only has relevance if the P-CONNECT request primitive was not rejected by the presentation service-provider (see 8.1.3.1).

8.1.3.2.2 For both the P-CONNECT response and confirm primitives: The User Data parameter is used to carry the AARE APDU as specified below.

a) The APCI of the AARE APDU is expressed using the ACSE abstract syntax of this International Standard. This abstract syntax must be included as the value of a presentation context definition parameter selected by the acceptor on the A-ASSOCIATE response primitive.

b) User information (if any) from the A-ASSOCIATE response primitive is included in the AARE APDU and is expressed using one or more presentation contexts selected by the acceptor on the A-ASSOCIATE response primitive.

8.2 Normal release of an association (normal mode)

The normal release procedure uses the P-RELEASE service. The normal release of an association takes place simultaneously with the normal release of the underlying presentation-connection.

8.2.1 Use of P-RELEASE request and indication parameters

The User Data parameter of the P-RELEASE request and indication primitives is referenced by the ACPM.

For both the P-RELEASE request and indication primitives: The User Data parameter is used to carry the RLRQ APDU as specified below.

a) The APCI of the RLRQ APDU is expressed using the ACSE abstract syntax of this International Standard. This abstract syntax must be one of the available presentation contexts.

b) User information (if any) from the A-RELEASE request primitive is included in the RLRQ APDU and is expressed using one or more available presentation contexts.

8.2.2 Use of P-RELEASE response and confirm parameters

The Result and User Data parameters of the P-RELEASE response and confirm primitives are referenced by the ACPM.

8.2.2.1 Result

8.2.2.1.1 For the P-RELEASE response primitive: The Result parameter is set to the value of the Result parameter of the A-RELEASE response primitive (i.e., "affirmative" or "negative"). This value indicates to the presentation service-provider whether the underlying presentation-connection is to be released or if it is to be continued.

8.2.2.1.2 For the P-RELEASE confirm primitive: The value of the Result parameter on the A-ASSOCIATE confirm primitive is set to the value of the Result parameter. This value indicates to the requesting ACPM whether the association is released or if it continues.

8.2.2.2 User Data

For both the P-RELEASE response and confirm primitives: The User Data parameter is used to carry the RLRE APDU as specified below.

1 The AARE APDU also has a Result field that must correspond to the value of this presentation parameter. The Result parameter of the A-ASSOCIATE confirm primitive is determined by the Result field of the AARE APDU.

a) The APCI of the RLRE APDU is expressed using the ACSE abstract syntax of this International Standard. This abstract syntax must be one of the available presentation contexts.

b) User information (if any) from the A-RELEASE response primitive is included in the RLRE APDU and is expressed using one or more available presentation contexts.

8.3 Abnormal release of an association (normal mode)

The abnormal release procedure uses the P-U-ABORT and P-P-ABORT services. The abnormal release of an association takes place simultaneously with the abnormal release of the underlying presentation-connection.

8.3.1 Use of P-U-ABORT request and indication parameters

The User Data parameter of the P-U-ABORT request and indication primitives is referenced[1] by the ACPM.

For both the P-U-ABORT request and indication primitives: The User Data parameter is used to carry the ABRT APDU as specified below.

a) The APCI of the ABRT APDU is expressed using the ACSE abstract syntax of this International Standard. This abstract syntax must be one of the available presentation contexts.

b) User information (if any) from the A-ABORT request primitive is expressed using one or more available presentation contexts.

8.3.2 Use of P-P-ABORT indication parameter

The Reason parameter of the provider-initiated P-P-ABORT indication primitive is mapped directly to the corresponding parameter of the A-P-ABORT indication.

8.4 Association establishment (X.410-1984 mode)

The association establishment procedure uses the P-CONNECT service.

8.4.1 Directly mapped parameters

The following parameters are not referenced by the ACPM and are mapped directly onto corresponding parameters of the A-ASSOCIATE primitives:

a) User data;[2]

b) Calling Presentation Address;

c) Called Presentation Address;

d) Responding Presentation Address;

e) Quality of Service;

f) Session Requirements;

g) Initial Synchronization Point Serial Number;

h) Initial Assignment of Tokens; and

i) Session-connection identifier.

8.4.2 Use of other P-CONNECT request and indication parameters

The Mode parameter of the P-CONNECT request and indication primitives is referenced by the ACPM.

For the P-CONNECT request primitive: The Mode parameter is set to the value of the Mode parameter of the A-ASSOCIATE request primitive. For the X.410-1984 mode of ACSE operation, this parameter has the value of "X.410-1984." This indicates to the presentation-service that it is to operate in the X.410-1984 mode for this presentation-connection.

For the P-CONNECT indication primitive: This parameter has the value of "X.410-1984" for the X.410-1984 mode of ACSE operation. This value indicates that the accepting ACPM is to operate in the X.410-1984 mode for this association. The Mode parameter of the A-ASSOCIATE indication primitive is set to the value of "X.410-1984."

8.4.3 Use of other P-CONNECT response and confirm parameters

The Result parameter of the P-CONNECT response and confirm primitives is used by the ACPM when operating in the X.410-1984 mode.

1 If an association is supported by version 1 of the session-protocol (ISO 8327), the User Data parameter is not referenced by the ACPM (because of length constraints) and is mapped directly onto the User Information parameter of the A-ABORT primitives (see 7.3.3.1)

2 User Data is mapped directly onto the A-ASSOCIATE User Information parameter. No explicit presentation context is available for it.

For the P-CONNECT response primitive: The value of the Result parameter is mapped from the Result parameter of the A-ASSOCIATE Result parameter as shown in table 8.

For the P-CONNECT confirm primitive: The Result and Result Source parameters of the A-ASSOCIATE confirm primitive are mapped from the Result parameter as shown in table 9.

Table 8 - Mapping ACSE Result

A-ASSOCIATE's Result	P-CONNECT's Result
accepted	acceptance
rejected(permanent)	user-rejection
rejected(transient)	user-rejection

Table 9 - Mapping Presentation Result Parameter

P-CONNECT's Result	A-ASSOCIATE's Result	A-ASSOCIATE's Result Source
acceptance	accepted	ACSE service-user
user-rejection	rejected (permanent)	ACSE service-user
provider-rejection	rejected (permanent)	presentation service-provider

8.5 Normal release of an association (X.410-1984 mode)

The normal release procedure uses the P-RELEASE service. The following parameters are not referenced by the ACPM and are mapped directly onto corresponding parameters of the A-RELEASE primitives:

a) Result; and

b) User Data.

8.6 Abnormal release of an association (X.410-1984 mode)

The abnormal release procedure uses the P-U-ABORT and P-P-ABORT services.

8.6.1 Use of P-U-ABORT request and indication parameters

For both the P-U-ABORT request and indication primitives: The User Data parameter is not referenced by the ACPM and is mapped directly onto the User Information parameter of the corresponding A-ABORT primitives.

8.6.2 Use of P-P-ABORT indication parameter

For the P-P-ABORT indication primitive: The Reason parameter is not referenced by the ACPM and is mapped directly onto the corresponding parameter of the A-P-ABORT indication primitive.

9 Structure and encoding of ACSE APDUs

9.1 The abstract syntax of each of the ACSE APDUs is specified in this clause using ASN.1 (ISO 8824).

```
ACSE-1 DEFINITIONS  ::=

BEGIN

-- ACSE-1 refers to ACSE version 1


ACSE-apdu  ::=  CHOICE

  { aarq  AARQ-apdu,
    aare  AARE-apdu,
    rlrq  RLRQ-apdu,
    rlre  RLRE-apdu,
    abrt  ABRT-apdu
  }


AARQ-apdu  ::=  [ APPLICATION 0 ]  IMPLICIT SEQUENCE

  { protocol-version                  [0]  IMPLICIT BIT STRING
                                             { version1 (0) }
                                             DEFAULT { version1 },
    application-context-name          [1]  Application-context-name,
    called-AP-title                   [2]  AP-title
                                             OPTIONAL,
    called-AE-qualifier               [3]  AE-qualifier
                                             OPTIONAL,
    called-AP-invocation-identifier   [4]  AP-invocation-identifier
                                             OPTIONAL,
    called-AE-invocation-identifier   [5]  AE-invocation-identifier
                                             OPTIONAL,
    calling-AP-title                  [6]  AP-title
                                             OPTIONAL,
    calling-AE-qualifier              [7]  AE-qualifier
                                             OPTIONAL,
    calling-AP-invocation-identifier  [8]  AP-invocation-identifier
                                             OPTIONAL,
    calling-AE-invocation-identifier  [9]  AE-invocation-identifier
                                             OPTIONAL,
    implementation-information        [29] IMPLICIT Implementation-data
                                             OPTIONAL,
    user-information                  [30] IMPLICIT Association-information
                                             OPTIONAL
  }
```

```
AARE-apdu  ::=  [APPLICATION 1 ]  IMPLICIT SEQUENCE

  { protocol-version                        [0]  IMPLICIT BIT STRING
                                                   { version1 (0) }
                                                   DEFAULT { version1 },
    application-context-name                [1]  Application-context-name,

    result                                  [2]  Associate-result,

    result-source-diagnostic                [3]  Associate-source-diagnostic,

    responding-AP-title                     [4]  AP-title
                                                   OPTIONAL,
    responding-AE-qualifier                 [5]  AE-qualifier
                                                   OPTIONAL,
    responding-AP-invocation-identifier     [6]  AP-invocation-identifier
                                                   OPTIONAL,
    responding-AE-invocation-identifier     [7]  AE-invocation-identifier
                                                   OPTIONAL,
    implementation-information              [29] IMPLICIT Implementation-data
                                                   OPTIONAL,
    user-information                        [30] IMPLICIT Association-information
                                                   OPTIONAL
  }

RLRQ-apdu  ::=  [ APPLICATION 2 ] IMPLICIT SEQUENCE

  { reason                                  [0]  IMPLICIT Release-request-reason
                                                   OPTIONAL,
    user-information                        [30] IMPLICIT Association-information
                                                   OPTIONAL
  }

RLRE-apdu  ::=  [ APPLICATION 3 ] IMPLICIT SEQUENCE

  { reason                                  [0]  IMPLICIT Release-response-reason
                                                   OPTIONAL,
    user-information                        [30] IMPLICIT Association-information
                                                   OPTIONAL
  }

ABRT-apdu  ::=  [ APPLICATION 4 ] IMPLICIT SEQUENCE

  { abort-source                            [0]  IMPLICIT ABRT-source,

    user-information                        [30] IMPLICIT Association-information
                                                   OPTIONAL
  }
```

```
ABRT-source  ::=  INTEGER

  { acse-service-user      (0),
    acse-service-provider  (1)
  }


Application-context-name ::= OBJECT IDENTIFIER


AP-title ::= ANY
      -- The exact definition and values used for AP-title
      -- should be chosen taking into account the ongoing
      -- work in areas of naming, the Directory, and the
      -- Registration Authority procedures for AP titles,
      -- AE-titles and AE qualifiers.


AE-qualifier ::= ANY
      -- The exact definition and values used for AE-qualifier
      -- should be chosen taking into account the ongoing
      -- work in areas of naming, the Directory, and the
      -- Registration Authority procedures for AP titles,
      -- AE-titles and AE qualifiers.


-- As defined in ISO 7498-3, an application-entity title is composed of
-- an application-process title and an application-entity qualifier.
-- The ACSE protocol provides for the transfer of an application-entity
-- title value by the transfer of its component values.  However, the
-- following data type is provided for reference by other International
-- Standards that require a single syntactic structure for AE titles.

AE-title ::= SEQUENCE {AP-title,
                       AE-qualifier
                      }

AE-invocation-identifier ::= INTEGER


AP-invocation-identifier ::= INTEGER


Associate-result  ::= INTEGER

  { accepted (0),
    rejected-permanent (1),
    rejected-transient (2)
  }
```

```
Associate-source-diagnostic  ::=  CHOICE

  { acse-service-user [1] INTEGER
    { null (0),
      no-reason-given (1),
      application-context-name-not-supported (2),
      calling-AP-title-not-recognized (3),
      calling-AP-invocation-identifier-not-recognized (4),
      calling-AE-qualifier-not-recognized (5),
      calling-AE-invocation-identifier-not-recognized (6),
      called-AP-title-not-recognized (7),
      called-AP-invocation-identifier-not-recognized (8),
      called-AE-qualifier-not-recognized (9),
      called-AE-invocation-identifier-not-recognized (10)
    },

    acse-service-provider [2] INTEGER
    { null (0),
      no-reason-given (1),
      no-common-acse-version (2)
    }
  }


Association-information ::=  SEQUENCE OF EXTERNAL


Implementation-data     ::=  GraphicString


Release-request-reason  ::=  INTEGER

  { normal       (0),
    urgent       (1),
    user-defined (30)
  }


Release-response-reason  ::=  INTEGER

  { normal       (0),
    not-finished (1),
    user-defined (30)
  }


END
```

9.2 The following name, that has the ASN.1 type of OBJECT IDENTIFIER, applies to the ACSE abstract-syntax-definition, specified in this clause.

```
{joint-iso-ccitt  association-control(2)  abstract-syntax(1)
  apdus(0)  version1(1)
}
```

9.3 The set of encoding rules named

```
{ joint-iso-ccitt asn1(1) basic-encoding(1) }
```

and specified in ISO 8825 is applicable to the ACSE abstract syntax definition.