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DATA COMMUNICATION NETWORKS

SERVICE DEFINITION FOR THE ASSOCIATION CONTROL SERVICE ELEMENT

Recommendation X.217

FOREWORD

The CCITT (the International Telegraph and Telephone Consultative Committee) is a permanent organ of the International Telecommunication Union (ITU). CCITT is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The Plenary Assembly of CCITT which meets every four years, establishes the topics for study and approves Recommendations prepared by its Study Groups. The approval of Recommendations by the members of CCITT between Plenary Assemblies is covered by the procedure laid down in CCITT Resolution No. 2 (Melbourne, 1988).

Recommendation X.217 was prepared by Study Group VII and was approved under the Resolution No. 2 procedure on the 10th of September 1992.

CCITT NOTE

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

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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 (CCITT Rec. X.200 | ISO 7498). 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 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 § 9 of this Service Definion, 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.

Recommendation X.217

SERVICE DEFINITION FOR THE ASSOCIATION CONTROL SERVICE ELEMENT[1)]

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 (CCITT Rec. X.227 | ISO/IEC 8650) in conjunction with the connection-oriented presentation-service (CCITT Rec. X.216 | ISO 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 (CCITT Rec. X.237 | ISO/IEC 10035) in conjunction with the connectionless presentation-service (P-UNIT-DATA).

Two functional units are defined in the ACSE. The mandatory Kernel functional unit is used to establish and release application-associations. The optional Authentication functional unit provides additional facilities for exchanging information in support of authentication during association establishment without adding services. The ACSE authentication facilities may be used to support a limited class of authentication methods.

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 CCITT Recommendations and International Standards contain provisions which, through reference in this text, constitute provisions of this Service Definition. At the time of publication, the editions indicated were valid. All Recommendations and Standards are subject to revision, and parties to agreements based on this Service Definition are encouraged to investigate the possibility of applying the most recent editions of the Recommendations and Standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards. The CCITT Secretariat maintains a list of currently valid CCITT Recommendations.

2.1 *Paired Recommendations | International Standards equivalent in technical content*

– CCITT Recommendation X.200 (1984), *Reference Model of Open Systems Interconnection for CCITT Applications*.

  ISO 7498:1984, *Information processing systems – Open Systems Interconnection – Basic Reference Model*.

– CCITT Recommendation X.210 (1988), *Open Systems Interconnection Layer Service Definition Conventions*.

  ISO/TR 8509:1987, *Information processing systems – Open Systems Interconnection Service Conventions.*

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1) Recommendation X.217 and ISO/IEC 8649 (Information technology – Open Systems Interconnection – Service Definition for the Association Control Service Element) are technically equivalent.

– CCITT Recommendation X.215 (1988), *Session service definition for Open Systems Interconnection for CCITT applications*.

  ISO 8326:1987, *Information processing systems – Open Systems Interconnection – Basic connection oriented session service definition.*

  ISO 8326/Amd.2: 1990, *Information processing systems – Open Systems Interconnection – Connection oriented session service definition – Amendment 2: Covering unlimited user data.*

– CCITT Recommendation X.216 (1988), *Presentation service definition for Open Systems Interconnection for CCITT applications*.

  ISO 8822:1988, *Information processing systems – Open Systems Interconnection – Connection oriented presentation service definition.*

– CCITT Recommendation X.227 (1992), *Connection-oriented protocol specification for the Association Control Service Element.*

  ISO/IEC 8650:1993, *Information technology – Open Systems Interconnection – Protocol specification for the Association Control Service Element.*

– CCITT Recommendation X.237 (1992), *Connectionless protocol specification for the Association Control Service Element.*

  ISO/IEC 10035:1993, *Information technology – Open Systems Interconnection – Connectionless Protocol specification for the Association Control Service Element.*

– 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.660 (1992), *Information technology – Open Systems Interconnection – Procedures for the operation of OSI Registration Authorities – General procedures*.

  ISO/IEC 9834-1:1991, *Information technology – Open Systems Interconnection – Procedures for the operation of OSI Registration Authorities – Part 1: General procedures*.

– 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.*

2.2 *Additional references*

– CCITT Recommendation X.410 (1984), *Message Handling Systems: Remote Operation and Reliable Transfer Server*.

  ISO 7498:1984/Add.1:1990, *Information Processing Systems – Open Systems Interconnection – Addendum 1: Covering connectionless-mode*.

  ISO 8822/Amd.1:1991, *Information Processing Systems – Open Systems Interconnection – Addendum to ISO 8822 Covering Connectionless Mode*.

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

  ISO/IEC 9545/Amd.1:. . . [2)], *Information technology – Open Systems Interconnection – Application Layer Structure – Amendment 1: Extended Application Layer Structure*.

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2) Presently at the stage of draft.

3 Definitions

3.1 *Reference model definitions*

3.1.1 *Basic Reference Model definitions*

This Service Definition is based on the concepts developed in CCITT Rec. X.200 | ISO 7498-1 and ISO 7498-1/Add.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;[3)]

d) application-process invocation-identifier;

e) application-entity invocation-identifier; and

f) presentation address.

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3) 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.

3.2 *Service conventions definitions*

This Service Definition makes use of the following terms defined in CCITT Rec. X.210 | 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).

3.3 *Presentation service definitions*

This ServiceDefinition makes use of the following terms defined in CCITT Rec. X.216 | ISO 8822 and ISO 8822/Amd.1:

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].

3.4 *Application Layer Structure definitions*

This Service Definition makes use of the following terms defined in ISO/IEC 9545 and ISO/IEC 9545/Amd.1:

a) application-context;

b) application-entity invocation;

c) control function; and

d) application-service object.

3.5 *ACSE service definitions*

For the purpose 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 CCITT 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

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 CCITT Rec. X.210 | ISO/TR 8509. 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 CCITT Rec. X.216 | ISO 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 (CCITT Rec. X.200 | ISO 7498) 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.

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 CCITT Rec. X.200 | ISO 7498) 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 CCITT Rec. X.227 | ISO/IEC 8650 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 CCITT Rec. X.227 | ISO/IEC 8650 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 § 12 of CCITT Rec. X.227 | ISO/IEC 8650).

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 AEI's 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/X.217 lists all of the ACSE services. It indicates the communication mode and type of service.

TABLE 1/X.217

ACSE services

Communication mode	Service	Type
Connection-oriented	A-ASSOCIATE A-RELEASE A-ABORT A-P-ABORT	Confirmed Confirmed Non-confirmed 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 (CCITT Rec. X.216 | ISO 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 (CCITT Rec. X.216 | ISO 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 CCITT 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. Two functional units are defined:

a) Kernel functional unit; and

b) Authentication 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.

Table 2/X.217 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.

TABLE 2/X.217

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
	A-ABORT	Diagnostic

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 neither use nor constrain the use of any other presentation service.

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.

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 (CCITT Rec. X.216 | ISO 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 CCITT Rec. X.227 | ISO/IEC 8650 for the ACSE application-protocol-data-units.

Note – 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 (CCITT Rec. X.216 | ISO 8822).

Note – Table 3/X.217 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 (CCITT Rec. X.215 | ISO 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 (CCITT Rec. X.227 | ISO/IEC 8650) 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/X.217 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.

9.1.1.2 *Application Context Name*

This parameter identifies the application context proposed by the requestor. The acceptor returns either the same or a different name. The returned name specifies the application context to be used for this association.

Note – The offer of an alternate application context 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 acceptor's application context, it may issue an A-ABORT request 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 and 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.

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.

TABLE 3/X.217

A-ASSOCIATE parameters

Parameter Name	Req	Ind	Rsp	Cnf
Mode	U	M		
Application Context Name[a)]	M	M(=)	M	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.

9.1.1.8 *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 takes on the following symbolic value:

authentication

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.

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

Note 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.

Note – 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.

9.1.1.19 *Result*

This parameter[4] 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[5] 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[5] 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;

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4) It is recognized that, with respect to this parameter, work is still in progress to provide an integrated treatment across all layers of the OSI Reference Model. As a consequence, an addendum may be added to this Service Definition at a later time that reflects further developments and integration.

5) 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.

– Authentication-mechanism Name required;
– Authentication failure; or
– Authentication required.

9.1.1.22 *Calling Presentation Address*

This parameter is as defined in CCITT Rec. X.216 | ISO 8822.

9.1.1.23 *Called Presentation Address*

This parameter is as defined in CCITT Rec. X.216 | ISO 8822.

9.1.1.24 *Responding Presentation Address*

This parameter is as defined in CCITT Rec. X.216 | ISO 8822.

9.1.1.25 *Presentation Context Definition List*

This parameter is as defined in CCITT Rec. X.216 | ISO 8822.

9.1.1.26 *Presentation Context Definition Result List*

This parameter is as defined in CCITT Rec. X.216 | ISO 8822.

9.1.1.27 *Default Presentation Context Name*

This parameter corresponds to the Default Context Name parameter defined in CCITT Rec. X.216 | ISO 8822.

9.1.1.28 *Default Presentation Context Result*

This parameter corresponds to the Default Context Result parameter defined in CCITT Rec. X.216 | ISO 8822.

9.1.1.29 *Quality of Service*

This parameter is as defined in CCITT Rec. X.216 | ISO 8822.

9.1.1.30 *Presentation Requirements*

This parameter is as defined in CCITT Rec. X.216 | ISO 8822.

9.1.1.31 *Session Requirements*

This parameter is as defined in CCITT Rec. X.216 | ISO 8822.

9.1.1.32 *Initial Synchronization Point Serial Number*

This parameter is as defined in CCITT Rec. X.216 | ISO 8822.

9.1.1.33 *Initial Assignment of Tokens*

This parameter is as defined in CCITT Rec. X.216 | ISO 8822.

9.1.1.34 *Session Connection Identifier*

This parameter is as defined in CCITT Rec. X.216 | ISO 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 CCITT Rec. X.216 | ISO 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/X.217 lists the A-RELEASE parameters.

TABLE 4/X.217

A-RELEASE parameters

Parameter Name	Req	Ind	Rsp	Cnf
Reason[a)]	U	C(=)	U	C(=)
User Information[a)]	U	C(=)	U	C(=)
Result			M	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 – 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 – 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 CCITT Rec. X.216 | ISO 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.

The association is released when both ACSE service-users have received an A-RELEASE confirm primitive.

9.3 *A-ABORT service*

The A-ABORT service is used by a requestor in either AE to cause the abnormal release of the association. It is a non-confirmed service. However, because of the possibility of an A-ABORT service procedure collision (see § 10.3.5), the delivery of the indication primitive is not guaranteed. However, both AEs are aware that the association has been released.

9.3.1 *A-ABORT parameters*

Table 5/X.217 lists the A-ABORT parameters.

TABLE 5/X.217

A-ABORT parameters

Parameter Name	Req	Ind
Abort Source[a)]		M
Diagnostic[a)]	U	C(=)
User Information	U	C(=)

a) Not used in X.410-mode.

9.3.1.1 *Abort Source*

This parameter indicates the initiating source of this abort. It takes one of the following symbolic values:

– ACSE service-user; or

– ACSE service-provider.

9.3.1.2 *Diagnostic*

The requestor may optionally include diagnostic information on the request primitive. It takes one of the following symbolic values:

– No reason given;

– Protocol error;

– Authentication-mechanism Name not recognized;

– Authentication-mechanism Name required;

– Authentication failure; or

– Authentication required.

9.3.1.3 *User Information*

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

Note – When ACSE is supported with version 1 of the session-protocol (CCITT Rec. X.225 | ISO 8327), this parameter is subject to length restrictions mentioned in § 8.3. For use with version 1, the A-ABORT service procedure does not transfer any of its own semantics, thus allowing the maximum possible length for presentation data value(s) of the User Information parameter. In this situation, the Abort Source parameter of the A-ABORT indication primitive always indicates "ACSE service-user."

9.3.2 *A-ABORT service procedure*

The A-ABORT service procedure has a one-to-one correspondence with the P-U-ABORT service defined in CCITT Rec. X.216 | ISO 8822. When the A-ABORT service is used, the association is abnormally released simultaneously with the abnormal release of the underlying presentation-connection.

An ACSE service-user that desires to abnormally release the association issues the A-ABORT request primitive. This requestor cannot issue any further primitives for the association.

The ACSE service-provider issues an A-ABORT indication primitive to the acceptor. The ACSE service-provider assigns the value of "ACSE service-user" for the Abort Source parameter. The association and the underlying presentation-connection have been released.

The ACSE service-provider may itself cause the abnormal release of the association because of internal errors detected by it. In this case, the ACSE service-provider issues A-ABORT indication primitives to acceptors in both AEs. The ACSE service-provider assigns the value of "ACSE service-provider" to the Abort Source parameter. The User Information parameter is not used.

9.4 *A-P-ABORT service*

The A-P-ABORT service is used by the ACSE service-provider to signal the abnormal release of the association due to problems in services below the Application Layer. This occurrence indicates the possible loss of information in transit. A-P-ABORT is a provider-initiated service.

9.4.1 *A-P-ABORT parameter*

Table 6/X.217 lists the A-P-ABORT parameter

Provider Reason: This parameter is as defined in CCITT Rec. X.216 | ISO 8822.

TABLE 6/X.217

A-P-ABORT parameter

Parameter Name	Ind
Provider Reason	P

9.4.2 *A-P-ABORT service procedure*

When a P-P-ABORT indication primitive is issued by the presentation service provider, a corresponding A-P-ABORT indication primitive is issued to the ACSE service-user. The association is abnormally released.

9.5 *A-UNIT-DATA service*

The A-UNIT-DATA service is used to transfer information between AEIs using the connectionless-mode presentation service. It is a non-confirmed service.

9.5.1 *A-UNIT-DATA Parameters*

Table 7/X.217 lists the A-UNIT-DATA service parameters. In addition, the following groups of parameters are defined for reference by other ASEs.

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.

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

9.5.1.1 *Application Context Name*

This parameter identifies the application context to be used, nominated by the requestor.

9.5.1.2 *Calling AP Title*

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

TABLE 7/X.217

A-UNIT-DATA parameters

Parameter Name	Req	Ind
Application Context Name	M	M(=)
Calling AP Title	U	C(=)
Calling AE Qualifier	U	C(=)
Calling AP Invocation-identifier	U	C(=)
Calling AE Invocation-identifier	U	C(=)
Called AP Title	U	C(=)
Called AE Qualifier	U	C(=)
Called AP Invocation-identifier	U	C(=)
Called AE Invocation-identifier	U	C(=)
User Information	M	M(=)
Calling Presentation Address	P	P
Called Presentation Address	P	P
Presentation Context Definition List	P	P
Quality of Service	P	

9.5.1.3 *Calling AE Qualifier*

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

9.5.1.4 *Calling AP Invocation-identifier*

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

9.5.1.5 *Calling AE Invocation-identifier*

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

9.5.1.6 *Called AP Title*

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

9.5.1.7 *Called AE Qualifier*

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

9.5.1.8 *Called AP Invocation-identifier*

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

9.5.1.9 *Called AE Invocation-identifier*

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

9.5.1.10 *User Information*

The user information parameter is mandatory. The meaning of this parameter depends on the application context that accompanies the primitive.

9.5.1.11 *Calling Presentation Address*

This parameter is as defined in ISO 8822/Amd.1.

9.5.1.12 *Called Presentation Address*

This parameter is as defined in ISO 8822/Amd.1.

9.5.1.13 *Presentation Context Definition List*

This parameter is as defined in ISO 8822/Amd.1.

9.5.1.14 *Quality Of Service*

This parameter is as defined in ISO 8822/Amd.1.

9.5.2 *A-UNIT-DATA Procedure*

The A-UNIT-DATA procedure is directly related to that defined for P-UNIT-DATA service.

The requestor issues an A-UNIT-DATA request primitive. The called AEI is identified by parameters on the request primitive. Use of the A-UNIT-DATA service is restricted to connectionless mode operation.

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

The acceptor receives the A-UNIT-DATA indication primitive. No response primitive is returned.

10 Sequencing information

This clause defines the interaction among the ACSE service procedures for a particular association.

10.1 *A-ASSOCIATE*

10.1.1 *Type of service*

A-ASSOCIATE is a confirmed service.

10.1.2 *Usage restrictions*

The A-ASSOCIATE service is not used on an established association.

10.1.3 *Disrupted service procedures*

The A-ASSOCIATE service procedure does not disrupt any other service procedure.

10.1.4 *Disrupting service procedures*

The A-ASSOCIATE service procedure is disrupted by the A-ABORT and the A-P-ABORT service procedures.

10.1.5 *Collisions*

An A-ASSOCIATE service procedure collision results when requestors in both AEs simultaneously issue an A-ASSOCIATE request primitive for each other. Both ACSE service-users are issued A-ASSOCIATION indication primitives that represent distinct associations. Both can choose to accept or reject the indicated association by issuing an A-ASSOCIATE response primitive with the appropriate value for its Result parameter. This will result in the establishment of none, one or two associations.

Note – If an AE has several concurrent associations, a local mechanism is needed to distinguish between them.

10.2 *A-RELEASE*

10.2.1 *Type of service*

A-RELEASE is a confirmed service.

10.2.2 *Usage restrictions*

The A-RELEASE service is only used on an established association.

10.2.3 *Disrupted service procedures*

The A-RELEASE service procedure does not disrupt any other service procedure.

10.2.4 *Disrupting service procedures*

The A-RELEASE service procedure is disrupted by the A-ABORT or A-P-ABORT service procedures.

10.2.5 *Collisions*

An A-RELEASE service procedure collision results when requestors in both AEs simultaneously issue an A-RELEASE request primitive. The processing of A-RELEASE service procedure collisions is described in § 9.2.2.

10.2.6 *Further sequencing information*

The use of the A-RELEASE service is subject to the constraints on the S-RELEASE service defined in CCITT Rec. X.215 | ISO 8326 (see § 8.3.1).

10.3 *A-ABORT*

10.3.1 *Type of service*

A-ABORT is an non-confirmed service.

10.3.2 *Usage restrictions*

The A-ABORT service has effect only when used on an association in the process of establishment, on an established association, or on an association in the process of being released.

10.3.3 *Disrupted service procedures*

The A-ABORT service procedure disrupts the A-ASSOCIATE and A-RELEASE service procedures.

10.3.4 *Disrupting service procedures*

The A-ABORT service procedure is disrupted by the A-P-ABORT service procedure.

10.3.5 *Collisions*

An A-ABORT service procedure collision results when requestors in both AEs simultaneously issue the A-ABORT request primitive. The collision processing is governed by the P-U-ABORT service defined in CCITT Rec. X.216 | ISO 8822. In this situation, neither A-ABORT indication primitive is issued.

10.3.6 *Further sequencing information*

Any use of the A-ABORT service results in the abnormal release of the association, or the abnormal termination of the A-ASSOCIATE service procedure or the A-RELEASE service procedure with possible loss of information.

10.4 *A-P-ABORT*

10.4.1 *Type of service*

A-P-ABORT is a provider-initiated service.

10.4.2 *Usage restrictions*

No restrictions are placed on the occurrence of this service.

10.4.3 *Disrupted service procedures*

The A-P-ABORT service procedure disrupts all other service procedures.

10.4.4 *Disrupting service procedures*

The A-P-ABORT service procedure is not disrupted by any other service procedure.

10.5 *A-UNIT-DATA*

10.5.1 *Type Of Service*

A-UNIT-DATA service is a non-confirmed service.

10.5.2 *Usage Restrictions*

The A-UNIT-DATA service is not used on an established association.

10.5.3 *Disrupted Services*

The A-UNIT-DATA service does not disrupt any services.

10.5.4 *Disrupting Services*

The A-UNIT-DATA service is not disrupted by any services.

10.5.5 *Collisions*

The simultaneous issuing of A-UNIT-DATA request from two AEIs to each other results in the acceptance of both A-UNIT-DATA indication primitives. No collision situation results.