**Recommendation X.226**

PRESENTATION PROTOCOL SPECIFICATION FOR OPEN

**SYSTEMS INTERCONNECTION FOR CCITT APPLICATIONS**[1]

*(Melbourne, 1988)*

The CCITT,

*considering*

(a) that Recommendation X.200 defines the Reference Model of Open System Interconnection for CCITT Applications;

(b) that Recommendation X.208 specifies Abstract Syntax Notation One (ASN.1) for the specification of the Abstract Syntax of Protocols;

(c) that Recommendation X.209 specifies the Basic Encoding Rules for Abstract Syntax Notation One;

(d) that Recommendation X.210 defines the Open Syntax Interconnection (OSI) Layer Service Definition Conventions;

(e) that Recommendation X.215 defines the Session Service Definition for Open Systems Interconnection for CCITT Applications;

(f) that Recommendation X.216 defines the Presentation Service Definition for Open Systems Interconnection for CCITT Applications;

(g) that Recommendation X.410-1984 specifies the protocol for Remote Operation and Reliable Transfer Server for Message Handling Systems,

*unanimously declares*

that this Recommendation defines the Presentation Protocol of Open Systems Interconnection for CCITT Applications as given in the Scope and Field of Application.

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[1] Recommendation X.226 and ISO 8823 [Information processing systems - Open Systems Intrconnection - Connection oriented presentation protocol specification] were developed in close collaboration and are technically aligned, except for the differences noted in Appendix I

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**0 Introduction**

This Recommendation is one of a set of Recommendations produced to facilitate the interconnection of information processing systems. It is related to other Recommendations in the set as defined by the Reference Model for Open Systems Interconnection (Recommendation X.200). The Reference Model subdivides the area of standardization for interconnection into a series of layers of specification, each of manageable size.

This Recommendation specifies a common encoding and a number of functional units of presentation protocol procedures to be used to meet the needs of presentation-service-users. It is intended that the presentation protocol should be simple but general enough to cater for the total range of presentation-service-user needs without restricting future extensions.

The primary aim of this Recommendation is to provide a set of rules for communication expressed in terms of the procedures to be carried out by peer entities at the time of communication. These rules for communication are intended to provide a sound basis for development in order to serve a variety of purposes:

a) as a guide for implementors and designers;

b) for use in the testing and procurement of equipment;

c) as part of an agreement for the admittance of systems into the open systems environment;

d) as a refinement of the understanding of OSI.

It is expected that the inifial users of this Recommendation will be designers and implementors of equipment and therefore it contains, in notes or in annexes, guidance on the implementation of its procedures.

It has not been possible as yet to prepare a product standard containing a set of objective tests for conformance to this Recommendation but it does contain a section on conformance of equipment claiming to implement the procedures it specifies. Attention is drawn to the fact that this Recommendation does not contain any test to demonstrate this conformance and cannot, therefore, be considered as a complete product standard.

The variations and options available within this Recommendation are essential to enable a presentation-service to be provided for a wide variety of applications. Thus, a minimally conforming implementation will not be suitable for use in all possible circumstances. It is necessary, therefore, to qualify all references to this Recommendation with statements of the options provided or required, or with statements of the intended purpose of provision or use.

## 1 Scope and field of application[2]

1.1 This Recommendation specifies:

a) procedures for the transfer of data and control information from one presentation-entity to a peer presentation-entity;

b) the means of selecting, by means of functional units, the procedures to be used by the presentation-entities;

c) the structure and encoding of the presentation-protocol-data-units used for the transfer of data and control information.

The procedures are defined in terms of:

d) the interactions between peer presentation-entities through the exchange of presentation-protocol-data-units;

e) the interactions between a presentation-entity and the presentation-service-user in the same system through the exchange of presentation-service primitives;

f) the interactions between a presentation-entity and the session-service-provider through the exchange of session-service primitives.

1.2 These procedures are defined in the main text of this Recommendation supplemented by state tables in annex A.

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[2] The implementation and use of this Recommendation for Open Systems Interconnection requires the public assignment of values of ASN.1 type OBJECT IDENTIFIER to specifications of abstract syntaxes and transfer syntaxes. Public specification and naming of abstract syntaxes and transfer syntaxes can occur in ISO standards or CCITT Recommendations, or under the mechanisms identified in the Registration Authority procedures. A Registration Authority procedures specification is under development.

1.3 These procedures are applicable to instances of communication between systems which support the Presentation Layer of the OSI Reference Model and which wish to interconnect in an OSI environment.

1.4 This Recommendation also specifies conformance criteria for systems implementing these procedures. It does not contain tests which can be used to demonstrate this conformance.

## 2 References

Recommendation X.200 - Reference Model of Open Systems Interconnection for CCITT Applications. (See also ISO 7498).

Recommendation X.210 - OSI Layer Service Definition Conventions (see also ISO TR 8509).

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

Recommendation X.215 - Session Service Definition for Open Systems Interconnection for CCITT Applications (see also ISO 8326 and ISO 8326 addendum 2).

Recommendation X.208 - Specification of Abstract Syntax Notation One (ASN.1) for CCITT Applications (see also ISO 8824).

Recommendation X.209 - Specification of Basic Encoding Rules for Abstract Syntax Notation One. (See also ISO 8825).

Recommendation X.216 - Presentation Service Definition for Open Systems Interconnection for CCITT Applications (see also ISO 8822).

Recommendation X.410-1984 - 1984 Message Handling Systems: Remote Operation and Reliable Transfer Server.

## 3 Definitions

3.1 *Reference Model definitions*

This Recommendation is based on the concepts developed in Recommendation X.200 and makes use of the following terms derived from it:

a) presentation-connection;

b) Presentation Layer;

c) presentation-protocol-data-unit;

d) presentation-service;

e) presentation-service-access-point;

f) presentation-service-data-unit;

g) presentation-protocol-control-information;

h) session-connection;

i) Session Layer;

j) session-service-acces-point;

k) session-service-data-unit;

l) session-service-provider;

m) transfer syntax.

3.2 *Service conventions definitions*

This Recommendation makes use of the following terms defined in Recommendation X.210 as they apply in the Presentation Layer:

a) service-user;

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[3] At present at the stage of draft.

b) service-provider;

c) service primitive;

d) request;

e) indication;

f) response;

g) confirm;

h) non-confirmed-service;

i) confirmed-service;

j) provider-initiated-service.

3.3 *Naming and Addressing definitions*

This Recommendation makes use of the following terms defined in ISO 7498-3:

a) session-address;

b) presentation-address;

c) presentation-selector.

3.4 *Presentation Service definitions*

This Recommendation is also based on concepts developed in Recommendation X.216 and makes use of the following terms defined in that Recommendation:

a) abstract syntax;

b) abstract syntax name;

c) transfer syntax name;

d) presentation data value;

e) presentation context;

f) defined context set;

g) inter-activity defined context set;

h) default conext;

i) functional unit;

j) X.410-1984 mode;

k) normal mode.

3.5 *Presentation protocol definitions*

For the purpose of this Recommendation, the following definitions apply:

3.5.1 **çlocal matterç**

A decision made by a system concerning its behaviour in the Presentation Layer that is not subject to the requirements of this Recommendation.

3.5.2 **valid presentation-protocol-data-unitç**

A presentation-protocol-data-unit which complies with the requirements of this Recommendation for structure and encoding.

3.5.3 **çinvalid presentation-protocol-data-unitç**

A presentation-protocol-data-unit which does not comply with the requirements of this Recommendation for structure and encoding.

3.5.4 **çprotocol errorç**

A situation occuring when a presentation-protocol-data-unit is used in a way which does not comply with the procedures defined in this Recommendation.

3.5.5 **ςoriginal activity identifierς**

An attribute of an activity in progress. If the activity was started by use of the P-ACTIVITY-START service, the Activity identifier parameter value of the request and indication service primitives; if the activity was resumed by use of the P-ACTIVITY-RESUME service the Old activity identifier parameter value of the request and indication service primitives.

3.5.6 **ςself-delimitingς**

An attribute of a transfer syntax which indicates that the end of each value in that syntax can be determined by means provided by the syntax.

3.5.7 **ςpresentation context identifierς**

An identifier for a specific presentation context. The identifier is unique within a presentation-connection and known to both presentation protocol machines. The default context does not have a presentation context identifier associated with it.

3.5.8 **ςsyncpoint identifierς**

A synchronization point serial number if the session activity management functional unit has not been selected; or a pair of synchronization point serial number and original activity identifier of the activity in progress if the session activity management functional unit has been selected. The order of syncpoint identifiers is defined as the order of their synchronization point serial number components.

3.5.9 **ςinitiatorς**

The presentation protocol machine that initiates the presentation-connection establishment.

3.5.10 **ςresponderς**

The presentation protocol machine that responds to a presentation-connection establishment proposal.

3.5.11 **ςrequestorς**

The presentation protocol machine that initiates a particular action.

3.5.12 **ςacceptorς**

The presentation protocol machine that accepts a particular action.

## 4 Abbreviations

4.1 *Data Units*

ςPPDU presentation-protocol-data-unit

ςPSDU presentation-service-data-unit

ςSSDU session-service-data-unit

4.2 *Types of presentation-protocol-data-units*

ςAC PPDU Alter Context PPDU

ςACA PPDU Alter Context Acknowledge PPDU

ςARP PPDU Abnormal Release Provider PPDU

ςARU PPDU Abnormal Release User PPDU

ςCP PPDU Connect Presentation PPDU

ςCPA PPDU Connect Presentation Accept PPDU

ςCPR PPDU Connect Presentation Reject PPDU

ςRS PPDU Resynchronize PPDU

ςRSA PPDU Resynchronize Acknowledge PPDU

ςTC PPDU Capacility Data PPDU

ςTCC PPDU Capability Data Acknowledge PPDU

ςTD PPDU Presentation Data PPDU

ςTE PPDU Expedited Data PPDU

ςTTD PPDU Presentation typed Data PPDU

4.3 *Other abbreviations*

ςASN.1 Abstract Syntax Notation One (see Recommendation X.208)

ςDCS defined context set

ςPPCI presentation-protocol-control-information

ςPPM presentation protocol machine

ςPS presentation-service

ςPSAP presentation-service-access-point

ςPS-user presentation-service-user

ςSS session-service

ςSSAP session-service-access-point

## 5 Overview of the presentation protocol

5.1 *Service provided by the Presentation Layer*

The protocol specified in this Recommendation supports the presentation-service defined in Recommendation X.216.

5.2 *Service assumed from the Session Layer*

The protocol specified in this Recommendation assumes the use of the session-service defined in Recommendation X.215.

5.3 *Functions of the Presentation Layer*

The functions of the Presentation Layer are described in the Reference Model, Recommendation X.200, and are further expanded in the Presentation Service Definition, Recommendation X.216.

5.4 *Presentation functional units*

Functional units are logical groupings of elements of procedure defined by this Recommendation for the purpose of:

a) negotiation during presentation-connection establishment for subsequent use on the presentation-connection;

b) specification of conformance requirements.

The selection of the presentation functional units does not constrain the selection of session functional units to be available to the PS-user. Selection of a particular session functional unit to be available to the PS-user implies the rules of interaction of that session functional unit with whatever presentation functional units are selected, as pecified by this Recommendation.

5.4.1 *Kernel functional unit*

This functional unit, which is always available, supports the basic protocol elements of procedure required to establish a presentation-connection, transfer data, and release the presentation-connection.

*Note* - This is the presentation kernel functional unit; it supports data transfer on whatever session functional units are selected for those presentation-service primitives which allow User data parameters.

5.4.2 *Context management functional unit*

This functional unit supports the context addition and deletion services. This functional unit is optional, and its use is negotiable.

5.4.3 *Context restoration functional unit*

This functional unit adds further Presentation Layer functions when the session activity management functional unit is selected or when both the session synchronization (major or minor) and the session resynchronization functional units are selected. The context restoration functional unit is optional, and its use is negotiable; it is available only when the context management functional is selected.

5.5 *Model of the Presentation Layer*

The presentation protocol machine (PPM), see the note, within the presentation-entity communicates with the PS-user through a PSAP by means of presentation-service primitives as defined by the Presentation Service Definition (Recommendation X.216). Presentation-service primitives will cause or be the result of presentation-protocol-data-unit (PPDU) exchanges between the peer PPMs using a session-connection. These protocol exchanges are effected using the services of the Session Layer as defined by the Session Service Definition (Recommendation X.215). In some cases, presentation-service primitives will directly cause or be the result of session-service primitives.

Presentation-connection-endpoints are identified in end systems by an internal, implementation dependent, mechanism so that the PS-user and the presentation-entity can refer to each presentation-connection.

The reception of a service primitive and the generation of dependent actions are considered to be an indivisible action. The reception of a PPDU and the generation of dependent actions are considered to be an indivisible action.

The model of the Presentation Layer for a single presentation-connection is illustrated in Figure 1/X.226.

*Note* - A presentation entity is comprised of one or more PPMs.

Figure 1/X.226

## 6 Elements of procedure

For the purpose of description, this specification of elements of procedure employs an integrated treatment of PPDU parameters and session-service primitive parameters. This section does not identity a parameter as either a PPDU parameter or a session-service primitive parameter. Such a distinction is specified in ¤ 7. For further information on the use of parameters, refer to the Presentation Service Definition (Recommendation X.216).

6.1 *User data parameters*

Most of the PPDUs used in the procedures of the presentation protocol carry User data parameters containing one or more presentation data values. The remainder of the section gives the rules for determining the presentation contexts from which these presentation data values (including any embedded presentation data values) shall be taken.

*Note* - If the underlying session-service-provider imposes a restriction on the length of certain SS-user data parameters, the PPM shall reject any presentation-service request or response primitive (with the exception of a P-U-ABORT request primitive, see ¤ 6.4.2.2) carrying a User data parameter which does not fit into the SS-user data parameter of the corresponding session-service primitive. The way in which the PPM is made aware of this is a local matter.

6.1.1 The presentation data values (including any embedded presentation data values) which may be transferred in the User data parameter of the TE PPDU shall always be from the default context.

6.1.2 The presentation data values (including any embedded presentation data values) in User data parameters except for the TE PPDU shall be from presentation contexts determined by the following rules:

a) If the DCS is empty and (d) does not apply, then each presentation data value (including any embedded presentation data values) shall be from the default context.

b) If the DCS is not empty and no procedure is in progress which can amend the contents of the DCS, then each presentation data value (including any embedded presentation data values) shall be from a presentation context of the DCS.

c) If the element of procedure itself amends the DCS, then each presentation data value (including any embedded presentation data values) shall be from a presentation context of the DCS which results from this amendment, or from the default context if this amendment leaves the DCS empty.

d) If a PPM is awaiting a PPDU which will confirm a proposed amendment to the DCS, then each presentation data value (including any embedded presentation data values) shall be from a presentation context of the DCS which was not proposed for deletion from the DCS. If this leaves no presentation contexts available, then the User data parameter shall not be present.

## 6.2 Connection establishment

### 6.2.1 *Purpose*

The connection establishment procedure is used to establish a presentation-connection between two presentation-entities. It is used by a PPM which has received a P-CONNECT request service primitive.

The procedure uses the following PPDUs:

a) CP PPDU;

b) CPA PPDU;

c) CPR PPDU.

### 6.2.2 *CP PPDU associated parameters*

#### 6.2.2.1 *Mode selector*

This shall be the Mode parameter from the P-CONNECT request service primitive and shall identify the mode of operation of the PPM for this presentation-connection. It shall appear as the Mode parameter of the P-CONNECT indication service primitive, if issued.

#### 6.2.2.2 *Protocol version*

This shall identify each version of the presentation protocol that the initiating PPM supports. The version of the protocol defined in this Recommendation shall be version-1.

See also ¤ 6.2.6.4.

#### 6.2.2.3 *Calling-presentation-selector*

This shall be the presentation-selector part of the Calling-presentation-address parameter from the P-CONNECT request service primitive and shall appear as the calling-presentation-selector part of the Calling-presentation-address parameter of the P-CONNECT indication service primitive, if issued.

#### 6.2.2.4 *Calling-session-address*

This shall be the session-address part of the Calling-presentation-address parameter from the P-CONNECT request service primitive and shall appear as the session-address part of the Calling-presentation-address parameter of the P-CONNECT indication service primitive, if issued.

#### 6.2.2.5 *Called-presentation-selector*

This shall be the presentation-selector part of the Called-presentation-address parameter from the P-CONNECT request service primitive and shall appear as the called-presentation-selector part of the Called-presentation-address parameter of the P-CONNECT indication service primitive, if issued.

#### 6.2.2.6 *Called-session-address*

This shall be the session-address part of the Called-presentation-address parameter from the P-CONNECT request service primitive and shall appear as the session-address part of the Called-presentation-address parameter of the P-CONNECT indication service primitive, if issued.

#### 6.2.2.7 *Presentation context definition list*

This shall be a list containing one or more items. Each item represents one item of the Presentation context definition list parameter from the P-CONNECT request service primitive and shall appear as one item of the Presentation context definition list parameter of the P-CONNECT indication service primitive, if issued. Each item contains three components: a presentation context identifier, an abstract syntax name and a transfer syntax list.

The transfer syntax list contains the names of those transfer syntaxes (or the names of specifications producing such transfer syntaxes) that the initiating PPM is capable of supporting for the named abstract syntax on the presentation-connection (at least one transfer syntax name for each proposed presentation context).

All presentation context identifiers contained in this parameter shall be different and shall be odd integers.

*Note* - The presentation context identifiers are specified here to be odd integers so that they are chosen from a separate number space from those identifiers allocated by the responding PPM (see also ¤ 6.5).

See also ¤ 6.2.6.1.

6.2.2.8 *Default context name*

This shall be the Default context name parameter from the P-CONNECT request service primitive and shall appear as the Default context name parameter of the P-CONNECT indication service primitive, if issued. It contains two components: an abstract syntax name and a transfer syntax name (or the name of a specification producing such a transfer syntax). The transfer syntax name component identifies the transfer syntax required by the initiating PPM for the default context to be used on the presentation-connection.

See also ¤ 6.2.6.2.

6.2.2.9 *Quality of service*

This shall be the Quality of service parameter from the P-CONNECT request service primitive and shall appear as the Quality of service parameter of the P-CONNECT indication service primitive, if issued.

6.2.2.10 *Presentation requirements*

This shall be the Presentation requirements parameter from the P-CONNECT request service primitive and shall identify the presentation functional units proposed by the initiating PS-user in the P-CONNECT request service primitive. It shall appear as the Presentation requirements parameter of the P-CONNECT indication service primitive, if issued, unless the responding PPM does not support all of them, in which case only those functional units supported by the responding PPM shall appear.

See also ¤ 6.2.6.3.

6.2.2.11 *User session requirements*

This shall be the Session requirements parameter from the P-CONNECT request service primitive and shall identify the requirements to the underlying session-service proposed by the PS-user. It shall appear as the Session requirements parameter of the P-CONNECT indication service primitive, if issued.

6.2.2.12 *Revised session requirements*

This shall be the Session requirements parameter from the P-CONNECT request service primitive, supplemented by such additional requirements as are needed to support the presentation protocol.

6.2.2.13 *Initial synchronization point serial number*

This shall be the Initial synchronization point serial number parameter from the P-CONNECT request service primitive, and shall appear as the Initial synchronization point serial number parameter of the P-CONNECT indication service primitive, if issued.

6.2.2.14 *Initial assignment of tokens*

This shall be the Initial assignment of tokens parameter from the P-CONNECT request service primitive, and shall appear as the Initial assignment of tokens parameter of the P-CONNECT indication service primitive, if issued.

6.2.2.15 *Session connection identifier*

This shall be the Session connection identifier parameter from the P-CONNECT request service primitive, and shall appear as the Session connection identifier parameter of the P-CONNECT indication service primitive, if issued.

6.2.2.16 *User data*

This shall represent the User data parameter from the P-CONNECT request service primitive, and shall appear as the User data parameter of the P-CONNECT indication service primitive, if issued. If the Presentation context definition list parameter is not present, then it shall be a list of presentation data values (including any embedded presentation data values) from the default context. Otherwise it shall be a list of presentation data values

(including any embedded presentation data values) from presentation contexts proposed in the Presentation context definition list parameter.

6.2.3 *CPA PPDU associated parameters*

An instance of a CPA PPDU need not contain values for all possible parameters; in addition to the Responding-presentation-selector and Responding-session-address parameters, it should only contain values for equivalent parameter value present in the CP PPDU for which it is a reply.

6.2.3.1 *Mode selector*

This shall be the Mode selector parameter from the CP PPDU.

6.2.3.2 *Protocol version*

This shall identify the version of the presentation protocol selected for use on this presentation-connection. The version of the protocol defined in this Recommendation shall be version-1.

6.2.3.3 *Responding-presentation-selector*

This shall be the presentation-selection part of the Responding-presentation-address parameter from the P-CONNECT response service primitive and shall appear as the responding-presentation-selector part of the Responding-presentation-address parameter of the P-CONNECT confirm service primitive.

6.2.3.4 *Responding-session-address*

This shall be the session-address part of the Responding-presentation-address parameter from the P-CONNECT response service primitive and shall appear as the session-address part of the Responding-presentation-address parameter of the P-CONNECT confirm service primitive.

See also ¤ 6.2.6.4.

6.2.3.5 *Presentation context definition result list*

This shall represent the Presentation context definition result list parameter of the P-CONNECT response service primitive and shall appear as the Presentation context definition result list parameter of the P-CONNECT confirm service primitive. It consists of a list containing the same number of items as the Presentation context definition list parameter of the CP PPDU. Each item shall be a reply to the corresponding item in the CP PPDU and contains one or two components, a presentation context definition result and an optional component which is either a transfer syntax name (or the name of a specification producing such a transfer syntax) or a provider reason.

The presentation context definition result shall take one of the values:

- ÒacceptanceÓ;
- Òuser-rejectionÓ;
- Òprovider rejectionÓ.

The transfer syntax name shall be present if the presentation context definition result takes the value ÒacceptanceÓ. It shall be one of the names proposed by the initiating PPM as possible transfer syntaxes for the identified presentation context, and shall determine the transfer syntax which the responding PPM has selected.

The provider reason shall be present if the presentation context definition result component takes the value Òprovider-rejectionÓ. It specifies the reason for rejection of the presentation context definition by the responding PPM and shall take one of the values:

- reason not specified;
- abstract syntax requirements not supported;
- proposed transfer syntaxes not supported;
- local limit on DCS exceeded.

See also ¤ 6.2.6.1.

6.2.3.6 *Quality of service*

This shall be the Quality of service parameter from the P-CONNECT response service primitive and shall appear as the Quality of service parameter of the P-CONNECT confirm service primitive.

6.2.3.7 *Presentation requirements*

This shall be the Presentation requirements parameter from the P-CONNECT response service primitive. It shall appear as the Presentation requirements parameter of the P-CONNECT confirm service primitive.

See also ¤ 6.2.3.6.

6.2.3.8 *User session requirements*

This shall be the Session requirements parameter from the P-CONNECT response service primitive and shall appear as the Session requirements parameter of the P-CONNECT confirm service primitive.

6.2.3.9 *Revised session requirements*

This shall be the Session requirements parameter from the P-CONNECT response service primitive, supplemented by such additional requirements as are needed to support the presentation protocol.

6.2.3.10 *Initial synchronization point serial number*

This shall be the initial synchronization point serial number parameter from the P-CONNECT response service primitive, and shall appear as the Initial synchronization point serial number parameter of the P-CONNECT confirm service primitive.

6.2.3.11 *Initial assignment of Tokens*

This shall be the Initial assignment of tokens parameter from the P-CONNECT response service primitive, and shall appear as the Initial assignment of tokens parameter of the P-CONNECT confirm service primitive.

6.2.3.12 *Session Connection Identifier*

This shall be the Session connection identifier parameter from the P-CONNECT response service primitive, and shall appear as the Session connection identifier parameter of the P-CONNECT confirm service primitive.

6.2.3.13 *User data*

This shall be the User data parameter from the P-CONNECT response service primitive, and shall appear as the User data parameter of the P-CONNECT confirm service primitive. The rules of ¤ 6.1.2 shall apply.

6.2.4 *CPR PPDU associated parameters*

An instance of a CPR PPDU need not contain values for all possible parameters; in addition to presentation-selector parameters it should only contain values for corresponding parameter values present in the CP PPDU for which it is a reply.

6.2.4.1 *Protocol version*

This shall identify each version of the presentation protocol that the responding PPM supports. The version of the protocol defined in this Recommendation shall be version-1.

See also ¤ 6.2.6.4.

6.2.4.2 *Responding-presentation-selector*

This shall be the presentation-selector part of the Responding-presentation-address parameter from the P-CONNECT response service primitive and shall appear as the responding-presentation-selector part of the Responding-presentation-address parameter of the P-CONNECT confirm service primitive.

6.2.4.3 *Responding-session-address*

This shall be the session-address part of the Responding-presentation-address parameter from the P-CONNECT response service primitive and shall appear as the session-address part of the Responding-presentation-address parameter of the P-CONNECT confirm service primitive.

6.2.4.4 *Presentation context definition result list*

This shall be the Presentation context definition result list parameter of the P-CONNECT response service primitive and shall appear as the Presentation context definition result list parameter of the P-CONNECT confirm service primitive. It consists of a list containing the same number of items as the Presentation context definition list parameter of the CP PPDU. Each item shall be a reply to the corresponding item in the CP PPDU and contains one or two components, a presentation context definition result and an optional component which is either a transfer syntax name (or the name of a specification producing such a transfer syntax) or a provider reason.

See also ¤ 6.2.6.1.

The presentation context definition result shall take one of the values:

- ÒacceptanceÓ;
- Òuser-rejectionÓ;
- Òprovider-rejectionÓ.

The transfer syntax name shall be present if the presentation context definition result takes the value ÒacceptanceÓ. It shall be one of the names proposed by the initiating PPM as possible transfer syntaxes for the identified presentation context, and shall determine the transfer syntax which the responding PPM has selected.

The provider reason shall be present if the presentation context definition result takes the value Òprovider-rejectionÓ. It specifies the reason for rejection of the presentation context definition by the responding PPM and shall take one of the values:

- reason not specified;
- abstract syntaxt requirements not supported;
- proposed transfer syntaxes not supported;
- local limit on DCS exceeded.

6.2.4.5 *Default context result*

This shall be the Default context result parameter of the P-CONNECT response service primitive and shall appear as the Default context result parameter of the P-CONNECT confirm service primitive. It may take the value ÒacceptanceÓ, Òprovider-rejectionÓ or Òuser-rejectionÓ.

See also ¤ 6.2.6.2.

6.2.4.6 *Quality of service*

This shall be the Quality of service parameter from the P-CONNECT response service primitive, or if the CPR PPDU is initiated by the responding PPM on receipt of a CP PPDU it shall be supplied by the responding PPM. In either case it shall appear as the Quality of service parameter of the P-CONNECT confirm service primitive. It shall identify a quality of service required by the responding PS-user or presentation-service-provider.

6.2.4.7 *Session requirements*

This shall be the Session requirements parameter from the P-CONNECT response service primitive, or if the CPR PPDU is initiated by the responding PPM on receipt of a CP PPDU it shall be supplied by the responding PPM. In either case it shall appear as the Session requirements parameter of the P-CONNECT confirm service primitive. It shall identify those session functional units required by the responding PS-user or presentation-service-provider.

*Note* - If the presentation-connection establishment proposal is rejected by the PS-user, this parameter shall represent the session requirements of the PS-user as indicated in the response primitive; there is no Revised session requirements parameter in this PPDU.

6.2.4.8 *Session connection identifier*

This shall be the Session connection identifier parameter from the P-CONNECT response service primitive, and shall appear as the Session connection identifier parameter of the P-CONNECT confirm service primitive.

6.2.4.9 *Provider reason*

If present, this shall indicate that the rejection is by the responding presentation-service-provider; if absent, this shall indicate that the rejection is by the responding PS-user. This parameter shall indicate the reason for the rejection of the presentation-connection establishment proposal and shall appear as the Provider reason parameter of the P-CONNECT confirm service primitive. It shall take one of the following values:

- reason not specified (transient);
- temporary congestion (transient);
- local limit exceeded (permanent);
- called-presentation-address unknown (permanent);

- protocol version not supported (permanent);
- default context not supported (permanent);
- user data not readable (permanent);
- no PSAP available from the set of PSAPs identified by the called-presentation-address (transient).

6.2.4.10 *User data*

This shall be the User data parameter from the P-CONNECT response service primitive, and shall appear as the User data parameter of the P-CONNECT confirm service primitive. This parameter shall contain encodings of presentation data values (including any embedded presentation data values) from transfer syntaxes contained in the Presentation context definition result list parameter of this CPR PPDU, if present, or otherwise according to the default context. It is not present if the presentation-connection establishment proposal is rejected by the presentation-service-provider.

6.2.5 *Procedure*

6.2.5.1 When a P-CONNECT request service primitive is received by a PPM (the initiator), it shall initiate the establishment of a presentation-connection by sending a CP PPDU containing the presentation data values and proposed parameters necessary for the operation of the presentation-connection (see ¤ 6.2.2).

6.2.5.2 As an initiator's option, the presentation data values contained in a CP PPDU may be encoded more than once to allow the transfer of the same presentation data values using a number of different transfer syntaxes.

6.2.5.3 The responding PPM is not required to examine more than one encoding for each presentation data value received. If, for any presentation data value received, all its examined encodings are expressed according to transfer syntaxes not supported by the responding PPM, then the responding PPM shall refuse the proposed presentation-connection by sending a CPR PPDU with a Provider reason parameter value of Òuser data not readableÓ.

6.2.5.4 If the initiating PPM is unable to establish a presentation-connection due to an inability to establish a session-connection, it shall issue a P-CONNECT confirm service primitive with a Result parameter value of a Òprovider-rejectionÓ and the presentation-connection shall not be established.

6.2.5.5 The responding PPM may refuse the proposed presentation-connection (if, for example, the parameter values of the CP PPDU are unacceptable; see also ¤ 6.2.6), in which case it shall send a CPR PPDU with a Provider reason parameter included (see ¤ 6.2.4). Alternatively, if not refusing, it shall issue a P-CONNECT indication service primitive.

6.2.5.6 If the responding PPM then receives a P-CONNECT response service primitive with a Result parameter value of Òuser-rejectionÓ, it shall send a CPR PPDU (see ¤ 6.2.4), but if it receives a P-CONNECT response service primitive with a Result parameter value of ÒacceptanceÓ, it shall send a CPA PPDU (see ¤ 6.2.3).

6.2.5.7 If the initiating PPM receives CPR PPDU refusing the presentation-connection, then it shall issue a P-CONNECT confirm service primitive with a Result parameter value of Òuser-rejectionÓ (if the Provider reason parameter is not present) or Òprovider-rejectionÓ (if the Provider reason parameter is present), and the presentation-connection shall not be established.

6.2.5.8 If the initiating PPM receives a CPA PPDU accepting the presentation-connection, then it shall issue a P-CONNECT confirm service primitive with a Result parameter value of ÒacceptanceÓ, and the presentation-connection shall be established.

6.2.5.9 If the presentation-connection is established, the DCS of each PPM is set according to the parameters of the CPA PPDU.

6.2.6 *Negotiation*

6.2.6.1 *Presentation context negotiation*

The DCS determined during presentation-connection establishment is negotiated between the peer PPMs and the PS-users.

The initiating PPM provides for each abstract syntax requested by its PS-user a list of transfer syntaxes it is capable of supporting for the presentation-connection. The responding PPM indicates in the P-CONNECT indication service primitive to its PS-user those abstract syntaxes it cannot support using one of the proposed transfer syntaxes, marking them as refused (Òprovider-rejectionÓ). The responding PS-user indicates those abstract syntaxes it accepts or refuses in the P-CONNECT response service primitive. The responding PPM selects one item of the transfer syntax list as the transfer syntax to be used on the presentation-connection for each accepted presentation context.

A presentation context is identified by a presentation context identifier provided by the initiating PPM.

6.2.6.2 *Default context negotiation*

If the Default context name parameter is not present in the P-CONNECT request service primitive, then the interpretation of presentation data values from the default context is specified in a manner which is outside the scope of this Recommendation.

If the Default context name parameter is present and the responding PPM does not support the named default context, it shall send a CPR PPDU with a Provider reason parameter value of Òdefault context not supportedÓ and a Default context result parameter of value Òprovider-rejectionÓ.

If the responding PPM supports the named default context but receives a P-CONNECT response service primitive with a Default context result parameter value of Òuser-rejectionÓ, then it shall send a CPR PPDU with a Default context result parameter of Òuser-rejectionÓ.

6.2.6.3 *Functional units negotiation*

Presentation functional units are negotiated between the two PS-users. The presentation functional units selected for the presentation-connection are those which are required by both PS-users and are supported by both PPMs. The negotiation of session functional units is subject to the rules of the Session Service Definition (Recommendation X.215).

6.2.6.4 *Protocol version negotiation*

Presentation protocol version is negotiated between the two PPMs.

In the CP PPDU, the initiating PPM provides a list of versions that it is capable of supporting. In the CPA PPDU, the responding PPM indicates the version of the presentation protocol used on the presentation-connection; this shall be one of the versions proposed by the initiating PPM. In the CPR PPDU, the responding PPM may indicate a list of versions that it is capable of supporting; the use of this list is a local matter.

6.2.7 *Collisions and interactions*

6.2.7.1 *P-U-ABORT*

If the initiating PPM receives a P-U-ABORT request service primitive after it has sent a CP PPDU but before it has issued a P-CONNECT confirm service primitive, it shall send an ARU PPDU and the presentation-connection shall not be established.

6.7.7.2 *ARU PPDU, ARP PPDU and S-P-ABORT*

If the initiating PPM receives an S-P-ABORT indication service primitive or an ARP PPDU, it shall issue a P-P-ABORT indication service primitive and the presentation-connection shall not be established.

If the initiating PPM receives an ARU PPDU, it shall issue a P-U-ABORT indication service primitive and the presentation-connection shall not be established.

The responding PPM shall react to ARU PPDUs, ARP PPDUs and S-P-ABORT indication service primitives as above, once it has issued a P-CONNECT indication service primitive.

6.3 Normal release of connection

6.3.1 *Purpose*

The procedure for the normal release of a presentation-connection is used by a PPM to release the presentation-connection without loss of data in transit.

6.3.2 *Procedure*

6.3.2.1 Normal release of the presentation-connection takes place concurrently with the release of the underlying session-connection. PPDUs are not explicitly defined, but implicitly given by the description of mapping in Section 7.

6.3.2.2 The SS-user data parameters of session-service primitives used shall represent or be represented by the User data parameters of the associated presentation-service primitives and shall be from presentation contexts as specified in ¤ 6.1.2.

6.4 Abnormal release of connection

6.4.1 *Purpose*

The procedure for the abnormal release of a presentation-connection is used at any time to force the release of the presentation-connection. It is invoked by the P-U-ABORT service or in response to a protocol error or the reception of an invalid PPDU.

The procedure uses the following PPDUs:

a) ARU PPDU;

b) ARP PPDU.

6.4.2 *ARU PPDU associated parameters*

6.4.2.1 *Presentation context identifier list*

This parameter shall be present if the User data parameter is present in the ARU PPDU and if the context management functional unit has been selected, or if the Presentation context definition list parameter was present in the CP PPDU. For each presentation context used in the ARU PPDU User data parameter, this parameter identifies the transfer syntax used.

It consists of a list, each item of which contains two components, a presentation context identifier and an associated transfer syntax name (or the name of a specification producing such a transfer syntax).

*Note* - If the DCS is empty, this parameter shall be empty.

6.4.2.2 *User-data*

This parameter shall represent the User data parameter from the P-U-ABORT request service primitive and shall be represented by the User data parameter of the P-U-ABORT indication service primitive. The parameter shall be from presentation contexts as defined in ¤ 6.1.2.

*Note* - If the length restrictions imposed by the underlying session-service prevent the inclusion of the presentation data values of the User data parameter in the SS-user data parameter of the S-U-ABORT request session-service primitive, the User data parameter will not be included in the ARU PPDU sent. The way in which the PPM is made aware of this is a local matter.

6.4.3 *ARP PPDU associated parameters*

6.4.3.1 *Provider Reason*

This parameter shall indicate one of the following reasons:

a) reason not specified;

b) unrecognized PPDU;

c) unexpected PPDU;

d) unexpected session-service primitive;

e) unrecognized PPDU parameter;

f) unexpected PPDU parameter;

g) invalid PPDU parameter value.

In cases c), d), e), f) and g), the Event identifier parameter shall also be present.

6.4.3.2 *Event identifier*

This parameter shall identify the PPDU or the session-service primitive which triggered the abort procedure.

6.4.4 *Procedure*

The procedure shall depend on the stimulus as follows:

6.4.4.1 *P-U-ABORT*

When a PPM receives a P-U-ABORT request service primitive and either:

a) a presentation-connection has been established; or

b) a CP PPDU has been sent, and neither a CPA PPDU nor a CPR PPDU has been received,

it shall send an ARU PPDU and the presentation-connection shall be released.

6.4.4.2 *Protocol error*

When a PPM receives an unrecognized or unexpected PPDU, or an unexpected session-service primitive, it shall issue a P-P-ABORT indication service primitive and, if possible, send an ARP PPDU. The presentation-connection shall be released.

6.4.4.3 *Invalid PPDU*

When a PPM receives a PPDU, containing an invalid PPDU parameter value or an unrecognized or unexpected PPDU parameter, including a PPDU with an unexpected presentation context identifier, or one for which the received bitstring does not represent a valid presentation data value (including any embedded presentation data value) in the corresponding abstract syntax, it shall issue a P-P-ABORT indication service primitive and send an ARP PPDU, if possible. The presentation-connection shall be released.

6.4.4.4 *S-P-ABORT*

When a PPM receives an S-P-ABORT indication session-service primitive, it shall issue a P-P-ABORT indication service primitive and the presentation-connection shall be released.

6.4.4.5 *ARU PPDU*

When a PPM receives an ARU PPDU it shall issue a P-U-ABORT indication service primitive and the presentation-connection shall be released.

6.4.4.6 *ARP PPDU*

When a PPM receives an ARP PPDU, it shall issue a P-P-ABORT indication service primitive and the presentation-connection shall be released.

*Note* - When the abnormal release procedure is applied during an attempt to establish a presentation-connection, the presentation-connection shall not be established.

6.4.5 *Collisions and Interactions*

The abnormal release procedure may be used at any time when a presentation-connection has been established or during presentation-connection establishment.

6.5 Context Alteration

6.5.1 *Purpose*

The context alteration procedure is used to modify the DCS. It negotiates the definition of one or more new presentation contexts to be added to the DCS, and also the deletion of presentation contexts which are members of the DCS. It is used by a requesting entity which has received a P-ALTER-CONTEXT request service primitive.

The procedure uses the following PPDUs:

a) AC PPDU,

b) ACA PPDU.

6.5.2 *AC PPDU associated parameters*

6.5.2.1 *Presentation context addition list*

This consists of a list containing one or more items. Each item represents one item of the Presentation context addition list parameter from the P-ALTER-CONTEXT request service primitive and shall be represented by one item of the Presentation context addition list parameter of the P-ALTER-CONTEXT indication service primitive. Each item contains three components, a presentation context identifier, an abstract syntax name, and a transfer syntax list. The transfer syntax list contains those transfer syntax names (or the names of specifications producing such transfer syntaxes) the requesting PPM is capable of supporting for the named abstract syntax. All presentation context identifiers contained in this parameter shall be different from the presentation context identifiers of all presentation contexts in the DCS or previously used in any PPDU on the presentation-connection. If the sending PPM is the initiator, all presentation context identifiers shall be odd integers, otherwise all shall be even integers.

6.5.2.2 *Presentation context deletion list*

This shall be the Presentation context deletion list parameter from the P-ALTER-CONTEXT request service primitive and shall appear as the Presentation context deletion list parameter of the P-ALTER-CONTEXT indication service primitive.

6.5.2.3 *User data*

This parameter shall represent the User data parameter of the P-ALTER-CONTEXT request service primitive and shall be represented by the User data parameter of the P-ALTER-CONTEXT indiction service primitive. This parameter shall be from presentation contexts as specified in ¤ 6.1.2.

6.5.3 *ACA PPDU associated parameters*

6.5.3.1 *Presentation context addition result list*

This shall represent the Presentation context addition result list parameter of the P-ALTER-CONTEXT response service primitive and shall be represented by the Presentation context addition result list parameter of the P-ALTER-CONTEXT confirm service primitive. It consists of a list containing the same number of items as the Presentation context addition list parameter of the AC PPDU. Each item shall be a reply to the corresponding item in the AC PPDU and contains one or two components, a presentation context addition result and an optional component which is either a transfer syntax name (or the name of a specification producing such a transfer syntax) or a provider reason.

The presentation context addition result shall take one of the values:

- ÒacceptanceÓ;
- Òuser-rejectionÓ;
- Òprovider-rejectionÓ.

The transfer syntax name shall be present if the presentation context addition result takes the value ÒacceptanceÓ. It shall be one of the names proposed by the requesting PPM as possible transfer syntaxes for the identified presentation context, and shall determine the transfer syntax which the accepting PPM has selected.

The provider reason shall be present if the presentation context addition result takes the value Òprovider-rejectionÓ. It specifies the reason for rejection of the presentation context addition by the accepting PPM and shall take one of the values:

- reason not specified;
- abstract syntax not supported;
- proposed transfer syntaxes not supported;
- local limit on DCS exceeded.

6.5.3.2 *Presentation context deletion result list*

This shall be the Presentation context deletion result list parameter of the P-ALTER-CONTEXT response service primitive and shall appear as the Presentation context deletion result list parameter of the P-ALTER-CONTEXT confirm service primitive. It consists of a list containing the same number of items as the Presentation context deletion list parameter of the AC PPDU. Each item shall refer to the corresponding item in the AC PPDU and shall take one of the values:

- ÒacceptanceÓ;
- Òuser-rejectionÓ.

6.5.3.3 *User data*

This parameter shall represent the User data parameter of the P-ALTER-CONTEXT response service primitive and shall be represented by the user data parameter of the P-ALTER-CONTEXT confirm service primitive. This parameter shall be from presentation contexts as specified in ¤ 6.1.2.

6.5.4 *Procedure*

6.5.4.1 When a P-ALTER-CONTEXT request service primitive is received by a PPM (the requestor), it shall send an AC PPDU.

*Note* - Those presentation contexts proposed for deletion are still available for presentation data values in the User data parameter of the AC PPDU.

6.5.4.2 When an AC PPDU is received by a PPM (the acceptor). It may itself refuse some or all of the proposed presentation context additions. It shall issue a P-ALTER-CONTEXT indication service primitive in which it shall mark refused addition proposals with the value Òprovider-rejectionÓ.

6.5.4.3 When a P-ALTER-CONTEXT response service primitive is received by the accepting PPM, it shall send an ACA PPDU indicating the acceptance or rejection of each proposed presentation context addition and of each proposed presentation context deletion.

6.5.4.4 When a P-ALTER-CONTEXT response service primitive is received by the accepting PPM, the presentation contexts proposed for addition and marked with ÒacceptanceÓ shall be added to the DCS and be available for use from the time of receipt of the response, and may also be used for presentation data values contained in the User data parameter of the ACA PPDU. The presentation contexts proposed for deletion and marked with ÒacceptanceÓ shall be deleted from the DCS and no longer available for use from the time of receipt of the response, and shall not be used for presentation data values contained in the User data parameter of the ACA PPDU.

6.5.4.5 When an ACA PPDU is received by the requesting PPM, it shall issue a P-ALTER-CONTEXT confirm service primitive.

6.5.4.6 When an ACA PPDU is received by the requesting PPM, the presentation contexts accepted in the ACA PPDU shall be added to the DCS and be available for use from the time of receipt of the ACA PPDU, and shall be accepted for presentation data values contained in the User data parameter of the ACA PPDU itself. The presentation contexts accepted for deletion in the ACA PPDU shall be deleted from the DCS and no longer be available for use from the time of receipt of the ACA PPDU.

6.5.5 *Collisions and interactions*

6.5.5.1 *AC PPDU*

Simultaneous P-ALTER-CONTEXT request service primitives by both PS-users shall be treated independently by the PPMs. Independent treatment of the simultaneous deletion requests applies even if the two PS-users have specified the same presentation context for removal from the DCS.

As a result of the independent treatment of the two requests, and the freedom of each PS-user to either accept or reject a proposal for presentation context deletion by the peer PS-user, a PPM must be prepared for the following cases, which shall not be treated as errors:

a) Receipt of a P-ALTER-CONTEXT response service primitive specifying deletion of a presentation context which is not a member of the DCS, but responding to a P-ALTER-CONTEXT indication service primitive; in this case, the PPM shall send an ACA PPDU using the value of the Presentation context deletion result list parameter of the P-ALTER-CONTEXT response service primitive;

b) Receipt of an ACA PPDU specifying deletion of a presentation context which is not a member of the DCS, but responding to an AC PPDU; in this case, the PPM shall issue a P-ALTER-CONTEXT confirm service primitive with the corresponding Presentation context deletion result list parameter value.

6.5.5.2 *P-U-ABORT, ARU PPDU, ARP PPDU and S-P-ABORT*

See ¤ 6.4.

6.5.5.3 *Destructive session services*

If the sender of an AC PPDU receives an RS PPDU, or an S-U-EXCEPTION-REPORT, S-P-EXCEPTION-REPORT, S-ACTIVITY-DISCARD or S-ACTIVITY-INTERRUPT indication service primitive before it has received an ACA PPDU, it shall not issue a P-ALTER-CONTEXT confirm service primitive, and the PPM shall continue with the procedure as specified for the disrupting service or RS PPDU.

6.6 Information transfer

6.6.1 *Purpose*

The information transfer procedure is used to convey presentation data values (including any embedded presentation data values) originating from P-DATA, P-TYPED-DATA, P-CAPABILITY-DATA and P-EXPEDITED-DATA request service primitives, and P-CAPABILITY-DATA response service primitives.

The procedure uses the following PPDUs:

a) TD PPDU;

b) TTD PPDU;

c) TE PPDU;

d) TC PPDU;

e) TCC PPDU.

6.6.2 *PPDU associated parameters*

Each of the PPDUs used by this procedure has a single parameter.

6.6.2.1 *User data*

This parameter shall represent the User data parameter from the corresponding request or response service primitive and shall appear as the User data parameter of the corresponding indication or confirm service primitive, as appropriate. For the TE PPDU, the parameter contains presentation data values from the default context. For the TD, TTD, TC and TCC PPDUs, the parameter contains presentation data values (including any embedded presentation data values) from presentation contexts specified in ¤ 6.1.2.

6.6.3 *Procedure*

6.6.3.1 When a P-DATA request service primitive is received by a PPM, it shall send a TD PPDU to transmit according to the agreed transfer syntaxes the presentation data values (including any embedded presentation data values) expressed in the P-DATA request service primitive. When a PPM receives a TD PPDU, it shall issue a P-DATA indication service primitive containing these presentation data values (including any embedded presentation data values).

6.6.3.2 When a P-TYPED-DATA request service primitive is received by a PPM, it shall send a TTD PPDU to transmit according to the agreed transfer syntaxes the presentation data values (including any embedded presentation data values) expressed in the P-TYPED-DATA request service primitive. When a PPM receives a TTD PPDU, it shall issue a P-TYPED-DATA indication service primitive containing these presentation data values (including any embedded presentation data values).

The TTD PPDU shall only be available if the session typed data functional unit has been proposed and selected in the User session requirements parameters of both the CP and CPA PPDUs.

6.6.3.3 When a P-EXPEDITED-DATA request service primitive is received by a PPM, it shall send a TE PPDU to transmit, according to the transfer syntax of the default context, the presentation data values (including any embedded presentation data values) expressed in the P-EXPEDITED-DATA request service primitive. When a PPM receives a TE PPDU, it shall issue a P-EXPEDITED-DATA indication service primitive containing these presentation data values (including any embedded presentation data values).

6.6.3.4 When a P-CAPABILITY-DATA request service primitive is received by a PPM, it shall send a TC PPDU to transmit according to the agreed transfer syntaxes the presentation data values (including any embedded presentation data values) expressed in the P-CAPABILITY-DATA request service primitive. When a PPM receives a TC PPDU, it shall issue a P-CAPABILITY-DATA indication service primitive containing these presentation data values (including any embedded presentation data values). If the accepting PPM then receives a P-CAPABILITY-DATA response service primitive, it shall send a TCC PPDU to transmit according to the agreed transfer syntaxes the presentation data values (including any embedded presentation data values) expressed in the P-CAPABILITY-DATA response primitive. When a PPM receives a TCC PPDU, it shall issue a P-CAPABILITY- DATA confirm service primitive containing these presentation data values (including any embedded presentation data values).

6.6.4 *Collisions and interactions*

6.6.4.1 *P-U-ABORT, ARU PPDU, ARP PPDU and S-P-ABORT*

See ¤ 6.4.

6.7 Token handling

6.7.1 *Purpose*

The token handling procedure is used to make available to PS-users the token handling facilities of the session-service. It is used by a PPM to support the P-TOKEN-GIVE, P-TOKEN-PLEASE and P-CONTROL- GIVE request and indication service primitives.

6.7.2 *Procedure*

6.7.2.1 PPDUs are not explicitly defined, but implicitly given by the description of mapping in ¤ 7.

6.7.2.2 The User data parameters of session-service primitives used shall represent or be represented by the User data parameters of the associated presentation-service primitives and shall be from presentation contexts as specified in ¤ 6.1.2.

6.8 *Synchronization and resynchronization*

6.8.1 *Purpose*

The synchronization and resynchronization procedure are used to make available to PS-users the synchronization and resynchronization facilities of the session-service. They are used by a PPM to support the P-SYNC-MINOR, P-SYNC-MAJOR and P-RESYNCHRONIZE service primitives. The resynchronization procedure has influence on the DCS when the context restoration functional unit has been selected.

The procedure uses the following PPDUs:

a) RS PPDU;

b) RSA PPDU.

6.8.2 *RS PPDU associated parameters*

6.8.2.1 *Resynchronize type*

This shall be the Resynchronize type parameter from the P-RESYNCHRONIZE request service primitive and shall appear as the Resynchronize type parameter of the P-RESYNCHRONIZE indication service primitive.

6.8.2.2 *Synchronization point serial number*

This shall be the Synchronization point serial number parameter from the P-RESYNCHRONIZE request service primitive and shall appear as the Synchronization point serial number parameter of the P-RESYNCHRONIZE indication service primitive.

6.8.2.3 *Tokens*

This shall be the Tokens parameter from the P-RESYNCHRONIZE request service primitive and shall appear as the Tokens parameter of the P-RESYNCHRONIZE indication service primitive.

6.8.2.4 *Presentation context identifier list*

This consists of a list, each entry of which has two components, a presentation context identifier and an associated transfer syntax name. The list shall specify the DCS which results from the RS PPDU.

6.8.2.5 *User data*

This parameter shall represent the User data parameter of the P-RESYNCHRONIZE request service primitive and shall be represented by the User data parameter of the P-RESYNCHRONIZE indication service primitive. This parameter shall be from presentation contexts as specified in ¤ 6.1.2.

6.8.3 *RSA PPDU associated parameters*

6.8.3.1 *Synchronization point serial number*

This shall be the Synchronization point serial number parameter from the P-RESYNCHRONIZE response primitive and shall appear as the Synchronization point serial number parameter of the P-RESYNCHRONIZE confirm service primitive.

6.8.3.2 *Tokens*

This shall be the Tokens parameter from the P-RESYNCHRONIZE response service primitive and shall appear as the Tokens parameter of the P-RESYNCHRONIZE confirm service primitive.

6.8.3.3 *Presentation context identifier list*

This consists of a list, each entry of which has two components, a presentation context identifier and an associated transfer syntax name. The list shall specify the DCS which results from the RSA PPDU.

6.8.3.4 *User data*

This parameter shall represent the User data parameter of the P-RESYNCHRONIZE response service primitive and shall be represented by the User data parameter of the P-RESYNCHRONIZE confirm service primitive. This parameter shall be from presentation contexts as specified in ¤ 6.1.2.

6.8.4 *Procedure*

6.8.4.1 The syncpoint identifier of a service primitive is a syncpoint identifier where the value of the synchronization point serial number is equal to that of the corresponding parameter of that service primitive.

The resync identifier of a service primitive is a syncpoint identifier where the value of the synchronization point serial number is equal to that of the corresponding parameter of that service primitive minus one.

6.8.4.2 If a PPM receives a P-SYNC-MINOR request service primitive or issues a P-SYNC-MINOR indication service primitive and the context restoration functional unit has been selected, then it shall associate the current DCS with the syncpoint identifier of the request or indication service primitive.

6.8.4.3 If a PPM receives a P-SYNC-MAJOR response service primitive or issues a P-SYNC-MAJOR confirm service primitive and the context restoration functional unit has been selected, then it shall associate the current DCS with the syncpoint identifier of the response or confirm service primitive.

The PPM shall eliminate any associations between syncpoint identifiers and DCSs which it had previously made.

6.8.4.4 If a PPM receives a P-RESYNCHRONIZE request service primitive and the context management functional unit is not selected then it shall send a RS PPDU.

6.8.4.5 If a PPM receives a P-RESYNCHRONIZE request service primitive and the context management functional unit is selected but the context restoration functional unit is not selected then it shall send a RS PPDU. The Presentation context identifier list parameter shall correspond to the DCS known to the PPM.

6.8.4.6 If a PPM receives a P-RESYNCHRONIZE request primitive and the context restoration functional unit is selected then it shall set the DCS as follows:

a) If the resynchronize type is ÒabandonÓ, then the DCS is unchanged;

b) if the resynchronize type is ÒrestartÓ or ÒsetÓ, then:

i) if the resync identifier of the primitive is associated with a DCS, then the DCS is restored to that associated with the resync identifier;

ii) if the resync identifier of the primitive is less than each syncpoint identifier associated with a DCS, then the DCS is restored to that of the presentation-connection establishment;

iii) in all other cases, the DCS is unchanged.

The PPM shall then send a RS PPDU with the Presentation context identifier list parameter value corresponding to the DCS.

6.8.4.7 If a PPM receives a RS PPDU and the context management functional unit is not selected, then it shall issue a P-RESYNCHRONIZE indication service primitive.

6.8.4.8 If a PPM receives a RS PPDU and the context management functional unit is selected, but the context restoration functional unit is not selected, then it shall, if an ACA PPDU is awaited, replace the DCS by that specified in the Presentation context identifier list parameter of the RS PPDU. It shall then (regardless of whether an ACA is awaited) issue a P-RESYNCHRONIZE indication service primitive.

6.8.4.9 If a PPM receives a RS PPDU and the context restoration functional unit is selected, then it shall set the DCS as follows:

a) if the resynchronize type is ÒabandonÓ, then:

i) if an ACA PPDU is awaited, then the DCS is replaced by that specified in the Presentation context identifier list parameter of the RS PPDU;

ii) if an ACA PPDU is not awaited, then the DCS is unchanged;

b) if the resynchronize type is ÒrestartÓ or ÒsetÓ, then:

i) if the resync identifier of the service primitive is associated with a DCS, then the DCS is restored to that associated with the resync identifier;

ii) if the resync identifier of the service primitive is less than each syncpoint identifier associated with a DCS, then the DCS is restored to that of the presentation-connection establishment;

iii) in all other cases, the DCS is set as per (a) above.

The PPM shall then issue a P-RESYNCHRONIZE indication service primitive.

6.8.4.10 If a PPM receives a P-RESYNCHRONIZE response service primitive and the context management functional unit is not selected, it shall send a RSA PPDU.

6.8.4.11 If a PPM receives a P-RESYNCHRONIZE response service primitive and the context management functional unit is selected then it shall send a RSA PPDU. The Presentation context identifier list parameter shall correspond to the DCS known to the PPM.

6.8.4.12 If a PPM receives a RSA PPDU and the context management functional unit is not selected, then it shall issue a P-RESYNCHRONIZE confirm service primitive.

6.8.4.13 If a PPM receives a RSA PPDU and the context management functional unit is selected but the context restoration functional unit is not selected, then it shall replace the DCS by that specified in the Presentation context identifier list parameter of the PPDU. It shall then issue a P-RESYNCHRONIZE confirm primitive.

6.8.4.14 If a PPM receives a RSA PPDU and the context restoration functional unit is selected, then it shall set the DCS as follows:

a) if the resynchronize type is ÒabandonÓ, then the DCS is replaced by that specified in the Presentation context identifier list parameter of the PPDU;

b) if the resynchronize type is ÒrestartÓ or ÒsetÓ, and either there is no syncpoint identifier associated with a DCS or the resync identifier is not associated with a DCS and is greater than the lowest syncpoint identifier associated with a DCS, the DCS is replaced by that specified in the Presentation context identifier list parameter of the PPDU;

c) in all other cases, the DCS is unchanged.

The PPM shall then issue a P-RESYNCHRONIZE confirm service primitive.

*Note* - When receiving a RSA PPDU, the resynchronize type relevant (for the procedures described above) is the resynchronize type of the associated RS PPDU.

6.8.5 *Collisions and Interactions*

6.8.5.1 *P-U-ABORT, ARU PPDU, ARP PPDU, and S-P-ABORT*

See ¤ 6.4.

6.8.5.2 *P-ALTER-CONTEXT, AC-PPDU and ACA PPDU*

See ¤ 6.5.

6.9 Exception reporting

6.9.1 *Purpose*

The exception reporting procedure is used to make available to PS-users the exception reporting facilities of the session-service. It is used by a PPM to support the P-U-EXCEPTION-REPORT request and indication service primitive and the P-P-EXCEPTION-REPORT indication service primitive.

6.9.2 *Procedure*

6.9.2.1 PPDUs are not explicitly defined, but implicitly given by the description of mapping in ¤ 7.

6.9.2.2 The User data parameters of session-service primitives used shall represent or be represented by the User data parameters of the associated presentation-service primitives and shall be from presentation contexts as specified in ¤ 6.1.2.

6.10 Activity management

6.10.1 *Purpose*

The activity management procedure is used to make available to PS-users the activity management facilities of the session-service. It is used by a PPM to support the P-ACTIVITY-START and P-ACTIVITY-RESUME request and indication service primitives and the P-ACTIVITY-END, P-ACTIVITY-INTERRUPT and P-ACTIVITY-DISCARD request, indication, response and confirm service primitives.

When the context restoration functional unit is selected, the activity management procedure has influence on the DCS as defined by ¤ 6.10.2.

6.10.2 *Procedure*

6.10.2.1 PPDUs are not explicitly defined, but implicitly given by the description of mapping in ¤ 7.

6.10.2.2 The User data parameters of session-service primitives used shall represent or be represented by the User data parameters of the associated presentation-service primitives and shall be from presentation contexts as specified in ¤ 6.1.2.

6.10.2.3 If a PPM receives a P-ACTIVITY-INTERRUPT response service primitive or issues a P-ACTIVITY-INTERRUPT confirm service primitive when an activity is in progress and the context restoration functional unit has been selected, then it shall replace the DCS with the inter-activity DCS.

6.10.2.4 If a PPM receives a P-ACTIVITY-DISCARD response service primitive, or issues a P-ACTIVITY-DISCARD confirm service primitive when an activity is in progress, and the context restoration functional unit has been selected, then it shall replace the DCS with the inter-activity DCS. It shall also eliminate any associations between syncpoint identifiers and DCSs which it had previously made.

6.10.2.5 If a PPM receives a P-ACTIVITY-END response service primitive, or issues a P-ACTIVITY-END confirm service primitive, and the context restoration functional unit has been selected, then it shall replace the DCS with the inter-activity DCS. It shall also eliminate any associations between syncpoint identifiers and DCSs which it had previously made.

6.10.2.6 If a PPM receives a P-ACTIVITY-RESUME request service primitive or issues a P-ACTIVITY-RESUME indication service primitive, where the Old session connection identifier parameter is absent in the request or indication service primitive, then it shall take the following actions:

a) it shall eliminate any associations between DCSs and pairs composed of the Old activity identifier parameter value of the request or indication service primitive and any synchronization point serial number greater than the value of the Synchronization point serial number parameter.

b) if the pair composed of the Old activity identifier and Synchronization point serial number parameter values and has a DCS associated with it, then it shall restore the DCS by that one.

## **7** Mapping of PPDUS onto the session-service

### 7.1 *Connection establishment*

#### 7.1.1 *CP PPDU*

The CP PPDU shall be conveyed from the initiating PPM to the responding PPM in the S-CONNECT request and indication session-service primitives.

##### 7.1.1.1 *CP PPDU associated parameters*

Table 1/X.226 defines the mapping of the CP PPDU associated parameters onto S-CONNECT parameters.

TABLE 1/X.226

**Mapping of CP PPDU associated parameters onto S-CONNECT parameters**

| CP PPDU associated parameter | S-CONNECT parameter | m/nm/s |
|---|---|---|
| Mode selector | SS-user data | m |
| Protocol version | SS-user data | nm |
| Calling-presentation-selector | SS-user data | nm |
| Calling-session-address | Calling SSAP address | s |
| Called-presentation-selector | SS-user data | nm |
| Called-session-address | Called SSAP address | s |
| Presentation context definition list | SS-user data | nm |
| Default context name | SS-user data | nm |
| Quality of service | Quality of service | s |
| Presentation requirements | SS-user data | nm |
| User session requirements | SS-user data | nm |
| Revised session requirements | Session requirements | s |
| Initial synchronization point serial number | Initial synchronization point serial number | s |
| Initial assignment of tokens | Initial assignment of tokens | s |
| Session connection identifier | Session connection identifier | s |
| User data | SS-user data | nm |

m: mandatory.

nm: non-mandatory.

s: as defined in the Session Service Definition (Recommendation X.215).

7.1.2 *CPA PPDU*

The CPA PPDU shall be conveyed from the responding PPM to the initiating PPM in the S-CONNECT response and confirm session-serivce primitive.

7.1.2.1 *CPA PPDU associated parameters*

Table 2/X.226 defines the mapping of the CPA PPDU associated parameters onto S-CONNECT parameters.

TABLE 2/X.226

**Mapping of CPA PPDU associated parameters onto S-CONNECT parameters**

| CPA PPDU associated parameter | S-CONNECT parameter | m/nm/s |
|---|---|---|
| Mode selector | SS-user data | m |
| Protocol version | SS-user data | nm |
| Responding-presentation-selector | SS-user data | nm |
| Responding-session-address | Responding SSAP address | s |
| Presentation context definition result list | SS-user data | nm |
| Quality of service | Quality of service | s |
| Presentation requirements | SS-user data | nm |
| User session requirements | SS-user data | nm |
| Revised session requirements | Session requirements | s |
| Initial synchronization point serial number | Initial synchronization point serial number | s |
| Initial assignment of tokens | Initial assignment of tokens | s |
| Session connection identifier | Session connection identifier | s |
| User data | SS-user data | nm |

m: mandatory.

nm: non-mandatory.

s: as defined in the Session Service Definition (Recommendation X.215).

7.1.2.2 *S-CONNECT Result parameter*

This parameter shall have the value ÒacceptÓ.

7.1.3 *CPR PPDU*

The CPR PPDU shall be conveyed from the responding PPM to the initiating PPM in the S-CONNECT response and confirm session-service primitive.

However, when the session-service-provider rejects the session-connection establishment proposal, there is no explicit S-CONNECT response session-service primitive and corresponding CPR PPDU.

7.1.3.1 *CPR PPDU associated parameters*

Table 3/X.226 defines the mapping of the CPR PPDU associated parameters onto S-CONNECT parameters.

TABLE 3/X.226

**Mapping of CPR PPDU associated parameters onto S-CONNECT parameters**

| CPR PPDU associated parameter | S-CONNECT parameter | m/nm/s |
|---|---|---|
| Protocol version | SS-user data | nm |
| Responding-presentation-selector | SS-user data | nm |
| Responding-session-address | Responding SSAP address | s |
| Presentation context definition result list | SS-user data | nm |
| Default context result | SS-user data | nm |
| Quality of service | Quality of service | s |
| Session requirements | Session requirements | s |
| Session connection identifier | Session connection identifier | s |
| Provider reason | SS-user data | nm |
| User data | SS-user data | nm |

m: mandatory.

nm: non-mandatory.

s: as defined in the Session Service Definition (Recommendation X.215).

7.1.3.2 *S-CONNECT Result parameter*

This parameter may take the values:

- Òreject by SS-providerÓ (a whole class of values);
- Òreject by called SS-userÓ with SS-user data.

The former case arises when rejection is initiated by the session-service-provider; the Provider reason parameter is absent even though rejection is initiated by the presentation-service-provider. The latter case arises when rejection is initiated by the responding PPM or PS-user; the Provider reason parameter is present only if rejection is initiated by the responding PPM. The User data parameter of the PPDU may only be present when rejection is initiated by the responding PS-user.

7.2 *Normal release of connection*

Normal release of the presentation-connection takes place concurrently with normal release of the session-connection. Presentation-service primitives are mapped onto the corresponding session-service primitives. Table 4/X.226 defines the mapping.

TABLE 4/X.226

**Mapping of normal release service primitives**

| Presentation primitive | Session primitive |
|---|---|
| P-RELEASE request | S-RELEASE request |
| P-RELEASE indication | S-RELEASE indication |
| P-RELEASE response | S-RELEASE response |
| P-RELEASE confirm | S-RELEASE confirm |

7.3 *Abnormal release of connection*

7.3.1 *ARU PPDU*

The ARU PPDU shall be conveyed from the requesting PPM to the accepting PPM in the S-U-ABORT request and indication session-service primitives.

7.3.1.1 *ARU PPDU associated parameters*

Table 5/X.226 defines the mapping of the ARU PPDU associated parameters onto S-U-ABORT parameters.

TABLE 5/X.226

**Mapping of ARU PPDU associated parameters onto S-U-ABORT parameters**

| ARU PPDU associated parameter | S-U-ABORT parameter | m/nm/s |
|---|---|---|
| Presentation context identifier list | SS-user data | nm |
| User data | SS-user data | nm |

m: mandatory.

nm: non-mandatory.

s: as defined in the Session Service Definition (Recommendation X.215).

7.3.2 *ARP PPDU*

The ARP PPDU shall be conveyed from the requesting PPM to the accepting PPM in the S-U-ABORT request and indication session-service primitives.

7.3.2.1 *ARP PPDU associated parameters*

Table 6/X.226 defines the mapping of the ARP PPDU associated parameters onto S-U-ABORT parameters.

TABLE 6/X.226

**Mapping of ARP PPDU associated parameters onto S-U-ABORT parameters**

| ARP PPDU associated parameter | S-U-ABORT parameter | m/nm/s |
|---|---|---|
| Provider reason | SS-user data | nm |
| Event identifier | SS-user data | nm |

m: mandatory.

nm: non-mandatory.

s: as defined in the Session Service Definition (Recommendation X.215).

7.4 *Context Alteration*

7.4.1 *AC PPDU*

The AC PPDU shall be conveyed from the requesting PPM to the accepting PPM in the S-TYPED- DATA request and indication session-service primitives.

7.4.1.1 *AC PPDU associated parameters*

Table 7/X.226 defines the mapping of the AC PPDU associated parameters onto S-TYPED-DATA parameters.

7.4.2 *ACA PPDU*

The ACA PPDU shall be conveyed from the accepting PPM to the requesting PPM in the S-TYPED- DATA response and confirm session-service primitives.

7.4.2.1 *ACA PPDU associated parameters*

Table 8/X.226 defines the mapping of the ACA PPDU associated parameters onto S-TYPED-DATA parameters.

TABLE 7/X.226

**Mapping of AC PPDU associated parameters onto S-TYPED-DATA parameters**

| AC PPDU associated parameter | S-TYPED-DATA parameter | m/nm/s |
|---|---|---|
| Presentation context addition list | SS-user data | nm |
| Presentation context deletion list | SS-user data | nm |
| User data | SS-user data | nm |

m: mandatory.

nm: non-mandatory.

s: as defined in the Session Service Definition (Recommendation X.215).

TABLE 8/X.226

**Mapping of ACA PPDU associated parameters onto S-TYPED-DATA parameters**

| ACA PPDU associated parameter | S-TYPED-DATA parameter | m/nm/s |
|---|---|---|
| Presentation context addition result list | SS-user data | nm |
| Presentation context deletion result list | SS-user data | nm |
| User data | SS-user data | nm |

m: mandatory.

nm: non-mandatory.

s: as defined in the Session Service Definition (Recommendation X.215).

7.5 *Information Transfer*

7.5.1 *TTD PPDU*

The TTD PPDU shall be conveyed from the requesting PPM to the accepting PPM in the S-TYPED- DATA request and indication session-service primitives.

7.5.1.1 *TTD PPDU associated parameters*

Table 9/X.226 defines the mapping of the TTD PPDU associated parameters onto S-TYPED-DATA parameters.

TABLE 9/X.226

**Mapping of TTD PPDU associated parameters onto S-TYPED-DATA parameters**

| TTD PPDU associated parameter | S-TYPED-DATA parameter | m/nm/s |
|---|---|---|
| User data | SS-user data | nm |

m: mandatory.

nm: non-mandatory.

s: as defined in the Session Service Definition (Recommendation X.215).

7.5.2 *TD PPDU*

The User data parameter of a TD PPDU shall form the SS-user data parameter of an S-DATA request service primitive and corresponding indication service primitive.

7.5.3 *TE PPDU*

The User data parameter of a TE PPDU shall form the SS-user data parameter of an S-EXPEDITED- DATA request service primitive and corresponding indication service primitive.

7.5.4 *TC PPDU*

The User data parameter of the TC PPDU shall form the SS-user data parameter of an S-CAPABILITY-DATA request service primitive and corresponding indication service primitive.

7.5.5 *TCC PDU*

The User data parameter of the TCC PPDU shall form the SS-user data parameter of an S-CAPABILITY-DATA response service primitive and corresponding confirm service primitive.

7.6 *Token Handling*

Token handling services are provided by the underlying session-service. Presentation-service primitives are mapped onto the corresponding session-service primitives. Table 10/X.226 defines the mapping.

7.7 *Synchronization*

Synchronization services are provided by the underlying session-service. The presentation-service primitives are mapped onto the corresponding session-service primitives. Table 11/X.226 defines the mapping.

TABLE 10/X.226

**Mapping of token handling service primitives**

| Presentation primitive | Session primitive |
|---|---|
| P-TOKEN-GIVE request | S-TOKEN-GIVE request |
| P-TOKEN-GIVE indication | S-TOKEN-GIVE indication |
| P-TOKEN-PLEASE request | S-TOKEN-PLEASE request |
| P-TOKEN-PLEASE indication | P-TOKEN-PLEASE indication |
| P-CONTROL-GIVE request | S-CONTROL-GIVE request |
| P-CONTROL-GIVE indication | S-CONTROL-GIVE indication |

TABLE 11/X.226

**Mapping of synchronization service primitives**

| Presentation primitive | Session primitive |
|---|---|
| P-SYNC-MINOR request | S-SYNC-MINOR request |
| P-SYNC-MINOR indication | S-SYNC-MINOR indication |
| P-SYNC-MINOR response | S-SYNC-MINOR response |
| P-SYNC-MINOR confirm | S-SYNC-MINOR confirm |
| P-SYNC-MAJOR request | S-SYNC-MAJOR request |
| P-SYNC-MAJOR indication | P-SYNC-MAJOR indication |
| P-SYNC-MAJOR response | S-SYNC-MAJOR response |
| P-SYNC-MAJOR confirm | S-SYNC-MAJOR confirm |

7.8 *Resynchronization*

7.8.1 *RS PPDU*

The RSA PPDU shall be conveyed from the requesting PPM to the accepting PM in the S-RESYNCHRONIZE request and indication session-service primitives.

7.8.1.1 *RS PPDU associated parameters*

Table 12/X.226 defines the mapping of the RS PPDU associated parameters onto S-RESYNCHRONIZE parameters.

TABLE 12/X.226

**Mapping of RS PPDU associated parameters onto S-RESYNCHRONIZE parameters**

| RS PPDU associated parameter | S-RESYNCHRONIZE parameter | m/nm/s |
|---|---|---|
| Resynchronize type | Resynchronize type | s |
| Synchronization point serial number | Synchronization point serial number | s |
| Tokens | Tokens | s |
| Presentation context identifier list | SS-user data | nm |
| User data | SS-user data | nm |

m: mandatory.

nm: non-mandatory.

s: as defined in the Session Service Definition (Recommendation X.215).

7.8.2 *RSA PPDU*

The RSA PPDU shall be conveyed from the accepting PPM to the requesting PPM in the S-RESYNCHRONIZE response and confirm session-service primitives.

7.8.2.1 *RSA PPDU associated parameters*

Table 13/X.226 defines the mapping of the RSA PPDU associated parameters onto S-RESYNCHRONIZE parameters.

7.9 *Exception Reporting*

Exception reporting services are provided by the underlying session-service. Presentation-service primitives are mapped onto the corresponding session-service primitives. Table 14/X.226 defines the mapping.

TABLE 13/X.226

**Mapping of RSA PPDU associated parameters onto S-RESYNCHRONIZE parameters**

| RSA PPDU associated parameter | S-RESYNCHRONIZE parameter | m/nm/s |
|---|---|---|
| Synchronization point serial number | Synchronization point serial number | s |
| Tokens | Tokens | s |
| Presentation context identifier list | SS-user data | nm |
| User data | SS-user data | nm |

m: mandatory.

nm: non-mandatory.

s: as defined in the Session Service Definition (Recommendation X.215).

TABLE 14/X.226

**Mapping of Exception reporting service primitives**

| Presentation primitive | Session primitive |
|---|---|
| P-P-EXCEPTION-REPORT indication | S-P-EXCEPTION-REPORT indication |
| P-U-EXCEPTION-REPORT request | S-U-EXCEPTION-REPORT request |
| P-U-EXCEPTION-REPORT indication | S-U-EXCEPTION-REPORT indication |

7.10 *Activity Management*

Activity management services are provided by the underlying session-service. Presentation-service primitives are mapped onto the corresponding session-service primitives. Table 15/X.226 defines the mapping.

TABLE 15/X.226

**Mapping of Activity management service primitives primitives**

| Presentation primitive | Session primitive |
|---|---|
| P-ACTIVITY-START request | S-ACTIVITY-START request |
| P-ACTIVITY-START indication | S-ACTIVITY-START indication |
| P-ACTIVITY-RESUME request | S-ACTIVITY-RESUME request |
| P-ACTIVITY-RESUME indication | S-ACTIVITY-RESUME indication |
| P-ACTIVITY-INTERRUPT request | S-ACTIVITY-INTERRUPT request |
| P-ACTIVITY-INTERRUPT indication | S-ACTIVITY-INTERRUPT indication |
| P-ACTIVITY-INTERRUPT response | S-ACTIVITY-INTERRUPT response |
| P-ACTIVITY-INTERRUPT confirm | S-ACTIVITY-INTERRUPT confirm |
| P-ACTIVITY-DISCARD request | S-ACTIVITY-DISCARD request |
| P-ACTIVITY-DISCARD indication | S-ACTIVITY-DISCARD indication |
| P-ACTIVITY-DISCARD response | S-ACTIVITY-DISCARD response |
| P-ACTIVITY-DISCARD confirm | S-ACTIVITY-DISCARD confirm |
| P-ACTIVITY-END request | S-ACTIVITY-END request |
| P-ACTIVITY-END indication | S-ACTIVITY-END indication |
| P-ACTIVITY-END response | P-ACTIVITY-END response |
| P-ACTIVITY-END confirm | S-ACTIVITY-END confirm |

## 8 Structure and encoding of PPDUs

8.1 *General*

8.1.1 The struture of PPDUs (whether explicity defined or implicitly given) shall be defined by:

a) the mapping onto parameters of session-service primitives;

b) the structure of session-service primitive SS-user data parameter values.

8.1.2 The structure of SS-user data parameter values is specified using:

a) the notation ASN.1 (Recommendation X.208);

b) additional comments contained in the ASN.1 description;

*Note* - ASN.1 comments in ¤ 8.2 are an integral part of this Recommendation, and frequently express requirements.

c) rules of extensibility as specified in ¤ 8.5 when operating in normal mode.

8.1.3 The encoding of SS-user data parameter values is specified in ¤ 8.3.

8.2 *Structure of SS-user data parameter values*

X.226-PRESENTATION DEFINITIONS :: =

BEGIN

--

*-- In X.410-1984 mode, the value of the SS-user data parameter of*

*-- the S-CONNECT request and indication session-service primitives*

*-- shall be a CP-type value.*

--

*-- In normal mode, the value of the SS-user data parameter of the*

*-- S-CONNECT request and indication session-service primitives shall*

*-- be a CP-type value, followed as a requestor's option by zero or*

*-- more CPC-type values.*

**CP-type :: = SET**

**{ [0] IMPLICIT Mode-selector**

**[1] IMPLICIT SET**

**{ COMPONENTS OF Reliable-Transfer-APDUs.RTORQapdu }OPTIONAL**

ASN.1 module Reliable-Transfer-APDUs is defined in Recommendation X.228. *-- Shall be used for X.410 mode only. Shall be bitwise*

*-- compatible with CCITT Recommendation X.410-1984.*

*-- This shall be the User data parameter of*

*-- the CP PPDU --*,

**[2] IMPLICIT SEQUENCE**

**{ [0] IMPLICIT Protocol-version DEFAULT {version-1},**

**[1] IMPLICIT Calling-presentation-selector OPTIONAL,**

**[2] IMPLICIT Called-presentation-selector OPTIONAL,**

**[4] IMPLICIT Presentation-context-definition-list OPTIONAL,**

**[6] IMPLICIT Default-context-name OPTIONAL,**

**[8] IMPLICIT Presentation-requirements OPTIONAL,**

**[9] IMPLICIT User-session-requirements OPTIONAL,**

*-- shall not be present if equal to the Revised session*

*-- requirements parameter --,*

**User-data OPTIONAL**

**} OPTIONAL**

*-- Shall be used for normal mode only.*

*-- Shall be the parameters of the CP PPDU.*

*-- As an initiator's option, the presentation data values*

*-- contained in a CP PPDU may be encoded more than once,*

*-- using CPC-type values, to allow the transfer of the same*

*-- presentation data values using a number of different*

*-- transfer syntaxes.*

**}**

--

**CPC-type :: = User-data**

*-- Shall be used for normal mode only.*

*-- Shall not be present if the Presentation context definition list*

*-- parameter is not present in the CP PPDU.*

*-- Each instance of this data type shall contain all of the presentation*

*-- data values which were contained in the User data parameter of*

*-- the CP PPDU*

*-- This shall be the same set of presentation data values which were*

*-- contained in the CP-type.*

*-- The SS-user data parameter value of the S-CONNECT*

*-- response and confirm session-service primitives shall be*

*-- a CPA-PPDU value when the Result parameter value*

*-- is ÒacceptÓ.*

--

**CPA-PPDU :: = SET**

**{ [0] IMPLICIT Mode-selector**

**[1] IMPLICIT SET**

**{ COMPONENTS OF Reliable-Transfer-APDUs.RTOACapdu } OPTIONAL**

*-- Shall be used for X.410 mode only. Shall be bitwise*

*-- compatible with CCITT Recommendation X.410-1984.*

*-- This shall be the User data parameter of*

*-- the CPA PPDU --,*

**[2] IMPLICIT SEQUENCE**

```
        {     [0] IMPLICIT       Protocol-version DEFAULT {version-1},
        [3] IMPLICIT  Responding-presentation-selector OPTIONAL,
        [5] IMPLICIT  Presentation-context-definition-result-list OPTIONAL,
        [8] IMPLICIT  Presentation-requirements OPTIONAL,
        [9] IMPLICIT  User-session-requirementsOPTIONAL,
        -- shall not be present if equal to the Revised session
-- requirements parameter --
        User-data OPTIONAL
        } OPTIONAL
        -- Shall be used for normal mode only
}
--
--
-- The SS-user data parameter value of
-- the S-CONNECT response and confirm
-- session-service primitives shall be
-- a CPR-PPDU value when the Result parameter
-- value is Òreject by SS-providerÓ
-- or Òreject by called SS-userÓ.
--
CPR-PPDU :: = CHOICE
{       SET {  COMPONENTS OF Reliable-Transfer-APDUs.RTORJapdu }
        -- Shall be used for X.410 mode only. Shall be bitwise
-- compatible with CCITT Recommendation X.410-1984.
-- This shall be the User data parameter of
-- the CPR PPDU --,
        SEQUENCE {
        [0] IMPLICIT  Protocol-version DEFAULT {version-1},
        [3] IMPLICIT  Responding-presentation-selector OPTIONAL,
        [5] IMPLICIT  Presentation-context-definition-result-list OPTIONAL,
        [7] IMPLICIT  Default-context-result OPTIONAL,
        [10] IMPLICITProvider-reason OPTIONAL,
        User-data OPTIONAL ,
        SET}
        -- Shall be used for normal mode only. --
}
--
--
```

*-- The S-user data parameter of the S-U-ABORT*

*-- request and indication service primitives shall be*

*-- an Abort-type value.*

--

**Abort-type :: = CHOICE {  ARU-PPDU -- for a P-U-ABORT--,**

**Abort-type :: = CHOICE {  ARP-PPDU -- for a P-P-ABORT** --

**Abort-type :: = CHOICE }**

--

**ARU-PPDU :: = CHOICE**

**{ SET {  COMPONENTS OF Reliable-Transfer-APDUs.RTABapdu }**

*-- Shall be used for X.410 mode only. Shall be bitwise*

*-- compatible with CCITT Recommendation X.410-1984.*

*-- This shall be the User data parameter of*

*-- the ARU PPDU. --*,

**[0]  IMPLICIT SEQUENCE**

**{  [0] IMPLICIT  Presentation-context-identifier-list OPTIONAL,**

**User-data OPTIONAL** ,

**}**

*-- Shall be used for normal mode only.*

**}**

--

**ARP-PPDU :: = SEQUENCE**

**{ provider-reason**

**[0] IMPLICIT  Abort-reason OPTIONAL,**

**[1] IMPLICIT  Event-identifier OPTIONAL** ,

**}**

--

--

*-- The SS-user data parameter value of*

*-- the S-TYPED-DATA request and*

*-- indication service primitives shall be*

*-- a Typed-data-type value*

--

**Typed-data-type :: = CHOICE**

**{  acPPDU**

**[0] IMPLICIT AC-PPDU**

*-- P-ALTER-CONTEXT*

*-- request and indication --*

**acaPPDU**

**[1] IMPLICIT ACA-PPDU**

*-- P-ALTER-CONTEXT*

*-- response and confirm --*

**ttdPPDU**

**User-data**

*-- P-TYPED-DATA*

*-- request and indication --*

**}**

--

**AC-PPDU :: = SEQUENCE**

**{ [0] IMPLICIT Presentation-context-addition-list OPTIONAL,**

**[1] IMPLICIT Presentation-context-deletion-list OPTIONAL,**

**User-data OPTIONAL** ,

**}**

--

**ACA-PPDU :: = SEQUENCE**

**{ [0] IMPLICIT Presentation-context-addition-result-list OPTIONAL,**

**[1] IMPLICIT Presentation-context-deletion-result-list OPTIONAL,**

**User-data OPTIONAL** ,

**}**

--

*-- The SS-user data parameter value of*

*-- the S-RESYNCHRONIZE request and*

*-- indication service primitives shall be*

*-- an RS-PPDU value.*

--

**RS-PPDU :: = SEQUENCE**

**{ [0] IMPLICIT Presentation-context-identifier-list OPTIONAL,**

**User-data OPTIONAL** ,

**}**

--

*-- The SS-user data parameter value of*

*-- the S-RESYNCHRONIZE response and*

*-- confirm service primitives shall be*

*-- an RSA-PPDU value.*

--

**RSA-PPDU :: = SEQUENCE**

```
        {     [0] IMPLICIT       Presentation-context-identifier-list OPTIONAL,
        User-data OPTIONAL ,
        }
--
--
-- The SS-user data parameter values of
-- the S-DATA, S-CAPABILITY-DATA,
-- S-EXPEDITED-DATA request and
-- indication session-service primitives and
-- S-CAPABILITY-DATA
-- response and confirm session-service
-- primitives shall be of type User-data.
--
-- The SS-user data parameter values of
-- all other session-service
-- primitives not described above shall
-- be of type User-data.
--
--
--
Abort-reason :: = INTEGER {
        reason-not-specified (0),  }
unrecognized-ppdu (1),  }
unexpected-ppdu (2),  }
unexpected-session-service-primitive (3),  }
unrecognized-ppdu-parameter (4),  }
unexpected-ppdu-parameter (5),  }
invalid-ppdu-parameter-value (6)  }
Abstract-syntax-name :: = OBJECT IDENTIFIER
Called-presentation-selector :: = Presentation Selector
Calling-presentation-selector :: = Presentation Selector
Context-list :: = SEQUENCE OF SEQUENCE {
        Presentation-context-identifier,
Abstract-syntax-name,
SEQUENCE OF Transfer-syntax-name }
Default-context-name :: = SEQUENCE
        [0] IMPLICIT   Abstract-syntax-name,
[1] IMPLICIT   Transfer-syntax-name }
```

**Default-context-result :: = Result**

**Event-identifier :: = INTEGER {**

**cp-PPDU ( 0), }**

**cpa-PPDU ( 1), }**

**cpr-PPDU ( 2), }**

**aru-PPDU ( 3), }**

**arp-PPDU ( 4), }**

**ac-PPDU ( 5), }**

**aca-PPDU ( 6), }**

**td-PPDU ( 7), }**

**ttd-PPDU ( 8), }**

**te-PPDU ( 9), }**

**tc-PPDU (10), }**

**tcc-PPDU (11), }**

**rs-PPDU (12), }**

**rsa-PPDU (13), }**

**s-release-indication (14), }**

**s-release-confirm (15), }**

**s-token-give-indication (16), }**

**s-token-please-indication (17), }**

**s-control-give-indication (18), }**

**s-sync-minor-indication (19), }**

**s-sync-minor-confirm (20), }**

**s-sync-major-indication (21), }**

**s-sync-major-confirm (22), }**

**s-p-exception-report-indication(23), }**

**s-u-exception-report-indication (24), }**

**s-activity-start-indication (25), }**

**s-activity-resume-indication (26), }**

**s-activity-interrupt-indication (27), }**

**s-activity-interrupt-confirm (28), }**

**s-activity-discard-indication (29), }**

**s-activity-discard-confirm (30), }**

**s-activity-end-indication (31), }**

**s-activity-end-confirm (32) }**

**Mode-Selector :: = SET {**

**[0] IMPLICIT INTEGER {x410-1984-mode (0), normal-mode (1) } }**

**Presentation-context-addition-list :: = Context-list**

**Presentation-context-addition-result-list :: = Result-list**

**Presentation-context-definition-list :: = Context-list**

**Presentation-context-definition-result-list :: = Result-list**

**Presentation-context-deletion-list :: = SEQUENCE OF**

**Presentation-context-identifier**

**Presentation-context-deletion-result-list :: = SEQUENCE OF INTEGER {**

**Acceptance (0), user-rejection (1) }**

**Presentation-context-identifier :: = INTEGER**

**Presentation-context-identifier-list :: = SEQUENCE OF SEQUENCE {**

**Presentation-context-identifier,**

**Transfer-syntax-name }**

**Presentation-requirements :: = BIT STRING {**

**Context-management (0), restoration (1) }**

**Presentation-selector :: = OCTET STRING**

**Protocol-version :: = BIT STRING {version-1 (0) }**

**Provider-reason :: = INTEGER {**

**reason-not-specified (0), }**

**temporary-congestion (1), }**

**local-limit-exceeded (2), }**

**called-presentation-address-unknown (3), }**

**protocol-version-not-surprised (4), }**

**default-context-not-supported (5), }**

**user-data-not-readable (6), }**

**no-PSAP-available (7) }**

**Responding-presentation-selector :: = Presentation-selector**

**Result :: = INTEGER {**

**acceptance (0), }**

**user-rejection (1), }**

**provider-rejection (2) }**

**Result-list :: = SEQUENCE OF SEQUENCE {**

**[0] IMPLICIT Result,**

**[1] IMPLICIT Transfer-syntax-nameOPTIONAL,**

**[2] IMPLICIT INTEGER**

**provider-reason**

**{ reason-not-specified (0),**

**abstract-syntax-not-supported (1),**

**proposed-transfer-syntaxes-not-supported (2),**

**local-limit-on-DCS-exceeded (3) OPTIONAL,**

**}**

**}**

**Transfer-syntax-name :: = OBJECT IDENTIFIER**

**User-data :: = CHOICE {**

**[APPLICATION 0] IMPLICIT Simply-encoded-data**

**[APPLICATION 1] IMPLICIT Fully-encoded-data }**

*-- ¤ 8.4 defines when each of the two alternatives shall be used.*

**Simply-encoded-data :: = OCTET STRING**

*-- See ¤ 8.4.1.*

**Fully-encoded-data :: = SEQUENCE OF PVD-list**

*-- Contains one or more PDV-list values.*

*-- See ¤ 8.4.2.*

**PDV-list :: = SEQUENCE {**

**Transfer-syntax-name OPTIONAL,**

**Presentation-context-identifier,**

**presentation-data-values :: = CHOICE {**

**single-ASN.1-type [0] ANY,**

**octet-aligned [1] IMPLICIT OCTET STRING,**

**arbitrary [2] IMPLICIT BIT STRING**

**}**

*-- Contains one or more presentation data values from the same*

*-- presentation context.*

*-- See ¤ 8.4.2.*

**}**

**User-session-requirements :: = BIT STRING {**

**half-duplex ( 0), }**

**duplex ( 1), }**

**expedited-data ( 2), }**

**minor-synchronize ( 3), }**

**major-synchronize ( 4), }**

**resynchronize ( 5), }**

**activity-management ( 6), }**

**negotiated-release ( 7), }**

**capability-data ( 8), }**

**exceptions ( 9), }**

**typed-data (10) }**

**END**

8.3 *Encoding of SS-user data parameter values*

8.3.1 Except for type User-data, ASN.1 datatypes specified in ¤ 8.2 shall be encoded according to the Basic Encoding Rules for ASN.1 (Recommendation X.209).

8.3.2 The encoding of values of type User-data is specified in ¤ 8.4.

8.3.3 The encoding of the SS-user data parameter of the S-CONNECT request and indication service primitives shall be the concatenation of the encodings of the CP-type value and the CPC-type values, if any.

8.4 *Encoding of values of type User-data*

8.4.1 *Simple encoding*

8.4.1.1 This encoding shall be used when the User-data value is of type Simply-encoded-data.

8.4.1.2 The User-data value shall be of type Simply-encoded-data when the default context is used.

8.4.1.3 The User-data value shall be of type Simply-encoded-data when the DCS contains only one member and the context management functional unit is not selected.

*Note* - This implies that simple encoding cannot be used in the User data parameter of the CP PPDU, except as in ¤ 8.4.1.2.

8.4.1.4 Simple encoding shall be as follows:

If the transfer syntax is not self-delimiting, then there is a danger that concatenated presentation data values will be ambiguous. a) The contents of the Simply-encoded-data value shall be the concatenation of the bitstrings resulting from the encoding of the presentation data values forming the PS-user data value according to the appropriate transfer syntax.

b) Whenever User-data appears as an element of some other ASN.1 type in ¤ 8.2, the encoding of the User-data value shall be according to the Basic Encoding Rules for ASN.1 (Recommendation X.209).

c) If (b) does not apply, the encoding of the User-data value shall be the contents octets of the Simply-encoded-data value (i.e. no identfier octets and no length octets) as specified in (a) above.

*Note* - When using simple encoding, the transfer syntax used shall either produce octet-aligned encodings or self-delimiting bitstrings (this is not the general case with transfer syntaxes).

8.4.2 *Full encoding*

8.4.2.1 This encoding shall be used when the User-data value is of type Fully-encoded-data.

8.4.2.2 The User-data value shall be of type Fully-encoded-data when the default context is not in use and:

a) the DCS contains more than one member; or

b) the context management functional unit has been selected.

8.4.2.3 The User-data value shall be of type Fully-encoded-data in the CP-type and CPC-type, except when the default context is in use.

8.4.2.4 Full encoding shall be the application of the Basic Encoding Rules for ASN.1 (Recommendation X.209) to the Fully-encoded-data value. The structure and contents of the presentation-data-values component of a PDV-list value shall be as specified in ¤ 8.4.2.5.

8.4.2.5 The presentation-data-values component of a PDV-list value shall be encoded according to the Basic Encoding Rules for ASN.1 (Recommendation X.209). The various options for the presentation-data-values component of the PDV-list value shall be used as follows:

a) If the PDV-list value contains exactly one presentation data value which is a single ASN.1 type encoded according to the Basic Encoding Rules for ASN.1 (Recommendation X.209), then the option Òsingle-ASN1-typeÓ shall be used.

b) If the encodings of the presentation data values contained in the PDV-list value are each an integral number of octets and (a) does not apply, then the option Òoctet-alignedÓ shall be used. In this case, the contents octets of the OCTET STRING shall be the concatenation of the bitstrings resulting from the encoding of the presentation data values contained in that PDV-list value according to the appropriate transfer syntax.

c) If neither (a) nor (b) applies, the option ÒarbitraryÓ shall be used. The contents octets of the BIT STRING shall be the concatenation of the bitstrings resulting from the encoding of the presentation data values contained in that PDV-list value according to the appropriate transfer syntax.

8.4.2.6 The presentation-context-identifier component of a PDV-list value in a CP PPDU shall identify the presentation context of the presentation data values.

8.4.2.7 The transfer-syntax-name component of a PDV-list value in a CP PPDU shall be present when more than one transfer syntax name was proposed for the presentation context of the presentation-data-values.

8.4.3 *Encoding of presentation data values in X.410-1984 mode*

8.4.3.1 Except for the S-DATA request and indication service primitives, presentation data values in type User-data shall be encoded according to Basic Encoding Rules for ASN.1 (Recommendation X.209).

8.4.3.2 For the S-DATA request and indication service primitives, presentation data values in type User-data shall be encoded as the contents octets (i.e. no identifier octets and no length octets) of the primitive encoding of a value of type OCTET STRING, according to the Basic Encoding Rules for ASN.1 (Recommendation X.209).

8.5 *Rules of extensibility for normal mode*

8.5.1 For the CP-PPDU, a receiving PPM shall:

a) ignore any undefined element;

b) where named bits are used in ¤ 8.2, treat any bit as insignificant when no name is assigned to it.

8.5.2 Except as specified in ¤ 8.5.1, where named numbers or named bits are used in ¤ 8.2, presence of a number or bit shall be invalid when no name is assigned to it.

**9** Conformance

9.1 *Dynamic Conformance*

A system claiming conformance to this Recommendation shall exhibit external behaviour consistent with having implemented:

a) a PPM as defined by Section 6 and Annex A of this Recommendation;

b) use of the session-service as defined by Section 7 of this Recommendation;

c) encoding of PPDUs as defined by Section 8 of this Recommendation.

9.2 *Static Conformance*

A system claiming conformance to this Recommendation shall be capable of:

a) supporting normal mode, X.410-1984 mode, or both. A system claiming to implement the procedures specified in this Recommendation supports the procedures specified in CCITT Recommendation X.410-1984 when operating in X.410-1984 mode. A system claiming to implement the procedures specified in this Recommendation other than in support of the procedures specified in CCITT Recommendation X.410-1984 shall operate in normal mode.

b) initiating a presentation-connection (by sending a CP PPDU) or responding to a CP PPDU or both;

c) following all the remaining procedures in the presentation kernel functional unit;

d) following all the Presentation Layer procedures for each presentation functional unit that the system claims to implement and for each session functional unit which the system claims to support;

e) supporting the mapping onto the session-service defined in Section 7 of this Recommendation;

f) in normal mode, following the procedures of the rules of extensibility (¤ 8.5).

9.3 *Protocol implementation conformance statement*

The Protocol Implementation Conformance Statement accompanying a system for which conformance to this Recommendation is claimed shall include statements of the following:

a) which session functional units are supported;

b) which presentation functional units are implemented;

c) whether it supports initiating a presentation-connection, responding to a CP-PPDU or both;

d) which transfer syntaxes it supports;

e) whether there is any resource-dependent limit which can cause provider rejection of a service primitive and if so, how this limit is specified;

f) whether it supports normal mode, X.410-1984 mode or both.

ANNEX A

(to Recommendation X.226)

**State tables**

A.1. *General*

This annex describes the presentation protocol in terms of state tables. The state tables show the state of a presentation-connection, the events that occur in the protocol, the action taken and the resultant state.

These State Tables do not constitute a formal definition of the presentation protocol; they are included to provide a more precise specification of the elements of procedure described in Section 6.

Table A-1/X.226 specifies the abbreviated name, category and name of each incoming event. The categories are PS-user event, SS-provider event and valid PPDU event.

Table A-2/X.226 specifies the abbreviated name and name of each state.

Table A-3/X.226 specifies the abbreviated name, category and name of each outgoing event. The categories are PS-provider event, SS-user event and PPDU event.

Table A-4/X.226 specifies the specific actions.

Table A-5/X.226 specifies the predicates.

Tables A-6/X.226 to A-14/X.226 specify the state tables.

A.2 *Notation for State Tables*

A.2.1 Incoming events, states and outgoing events are represented by their abbreviated names.

A.2.2 Specific actions are represented by the notation [*n*], where *n* is the number of the specific action in Table A-4/X.226.

A.2.3 Predicates are represented by the notation *pnn*, where *nn* is the number of the predicate in Table A-5/X.226.

A.2.4 Boolean operators are represented by the following notation:

& AND

™ NOT

OR OR

A.3 *Conventions for entries in State Tables*

A.3.1 The intersection of each state and incoming event which is invalid is left blank.

A.3.2 The intersection of each state and incoming event which is valid contains entries which are either

a) an action list which

i) may contain outgoing events and/or specific actions;

ii) always contains the resultant state;

or

b) one or more conditional action lists, each consist of

i) a predicate expression comprising predicates and boolean operators;

ii) an action list (as in ¤ A.3.2 a)).

*Note* - The action lists and conditional action lists use the notation in ¤ A.2.

A.4 *Actions to be taken by the PPM*

The state tables define the actions to be taken by the PPM.

A.4.1 *Invalid intersections*

If the intersection of the state and an incoming event is invalid, one of the following actions shall be taken.

A.4.1.1 If the incoming event comes from the PS-user, any action taken by the PPM is a local matter.

*Note* - One reason for the request or response service primitive being invalid is that the resulting SS-user data parameter exceeds a length limit imposed by the underlying session-service. This occurrence and its resolution are local matters.

A.4.1.2 If the incoming event is related to a received PPDU or SS-provider event, the PPM shall issue an ARP PPDU (if there is an underlying session-connection) and a P-P-ABORT indication.

A.4.2 *Valid intersections*

If the intersection of the state and incoming event is valid, one of the following actions shall be taken.

A.4.2.1 If the intersection contains an action list, the PPM shall take the specific actions in the order specified in the state table.

A.4.2.2 If the intersection contains one or more conditional action lists, for each predicate expression that is true the PPM shall take the specific actions in the order given in the action list associated with the predicate expression. If none of the predicate expressions are true, the PPM shall take one of the actions defined in ¤ A.4.1. The order of evaluation of the predicate expressions in different conditional action lists is determined by the order of the conditional action lists.

A.4.3 *Receipt of PPDUs*

A.4.3.1 *Valid PPDUs*

The PPM shall process valid PPDUs as specified in Tables A-6/X.226 to A-14/X.226. See also ¤ 8.5.

A.4.3.2 *Invalid PPDUs*

If an invalid PPDU is received, the PPM shall take the actions defined in ¤ A.4.1.2.

A.5 *Definition of sets and variables*

The following sets and variables are specified.

A.5.1 *Functional units*

A set of functional units used in the procedures specified in this annex is defined as

fu-dom = (CM, CR)

where

CM = Context management functional unit

CR = Context restoration functional unit

A boolean function FU is defined over fu-dom as follows

for f in fu-dom

FU(f) = true if and only if the functional unit f has been selected during the presentation-connection establishment phase.

A.5.2 *Context sets*

In addition to the defined context set (DCS), which is implicitly used for information transfer operations, the presentation-entity needs to be aware of the following context sets:

a) presentation contexts proposed for addition, initiated locally;

b) presentation contexts proposed for addition, initiated remotely;

c) presentation contexts proposed for deletion, initiated locally;

d) presentation contexts proposed for deletion, initiated remotely;

e) the DCS agreed during presentation-connection establishment;

f) the inter-activity DCS;

g) the contents of the DCS at synchronization points.

A.5.3 *Variables*

A.5.3.1 *aep*

aep is a boolean variable having the following values:

aep = true: Activity end pending.

aep = false: Activity end not pending.

aep is set as follows:

a) aep is set true when an S-ACTIVITY-END response service primitive has been issued but while it is still possible to receive an S-ACTIVITY-INTERRUPT indication service primitive;

b) aep is set false during the presentation-connection establishment phase, or on receipt of any session-service indication primitive after an S-ACTIVITY-END response service primitive has been issued.

A.5.3.2 *rl*

rl is a boolean variable having the following values:

rl = true: Release phase started.

rl = false: Release phase not started or release has been rejected.

rl is set as follows:

a) rl is set false during the presentation-connection establishment phase or when a P-RELEASE response or confirm negative service primitive is issued;

b) rl is set true when a P-RELEASE request or indication service primitive has been issued.

A.5.3.3 *cr*

cr is a boolean variable having the following values:

cr = true: A collision of release requests is detected.

cr = false: There has not been a collision of release requests or the collision has been resolved.

cr is set as follows:

a) cr is set false during the presentation-connection establishment phase, or when rl is true and a P-RELEASE response or confirm service primitive is issued;

b) cr is set true if rl is true and a P-RELEASE request or indication service primitive is issued.

A.6 *Relationship to session-service*

In general, the behaviour of the PPM is specified independently of the behaviour of the session-service. That invocations of presentation-service primitives are acceptable to the PPM does not imply that the resulting session-service primitives will be acceptable to the session-service-provider.

Events shown in the Tables as generated by the session-service-provider or issued to the session-service-provider are implicitly conditional on the appropriate session functional unit being agreed at session-connection establishment.

TABLE A-1/X.226

**Incoming Event List**

| Abbreviated Name | Category | Name and Description |
|---|---|---|
| AC | PPDU | ALTER CONTEXT |
| ACA | PPDU | ALTER CONTEXT ACKNOWLEDGE |
| ARP | PPDU | PROVIDER ABORT |
| ARU | PPDU | USER ABORT |
| CP | PPDU | PRESENTATION CONNECT |
| CPA | PPDU | PRESENTATION CONNECT ACCEPT |
| CPR | PPDU | PRESENTATION CONNECT REJECT |
| P-ACTDreq | PS primitive | P-ACTIVITY-DISCARD request |
| P-ACTDrsp | PS primitive | P-ACTIVITY-DISCARD response |
| P-ACTEreq | PS primitive | P-ACTIVITY-END request |
| P-ACTErsp | PS primitive | P-ACTIVITY-END response |
| P-ACTIreq | PS primitive | P-ACTIVITY-INTERRUPT request |
| P-ACTIrsp | PS primitive | P-ACTIVITY-INTERRUPT response |
| P-ACTRreq | PS primitive | P-ACTIVITY-RESUME request |
| P-ACTSreq | PS primitive | P-ACTIVITY-START request |
| P-ALTERreq | PS primitive | P-ALTER-CONTEXT request |
| P-ALTERrsp | PS primitive | P-ALTER-CONTEXT response |
| P-CDreq | PS primitive | P-CAPABILITY-DATA request |
| P-CDrsp | PS primitive | P-CAPABILITY-DATA response |
| P-CGreq | PS primitive | P-CONTROL-GIVE request |
| P-CONreq | PS primitive | P-CONNECT request |
| P-CONrsp+ | PS primitive | P-CONNECT response accept |
| P-CONrsp- | PS primitive | P-CONNECT response reject |
| P-DTreq | PS primitive | P-DATA request |
| P-EXreq | PS primitive | P-EXPEDITED-DATA request |
| P-GTreq | PS primitive | P-TOKEN-GIVE request |
| P-PTreq | PS primitive | P-TOKEN-PLEASE request |
| P-RELreq | PS primitive | P-RELEASE request |
| P-RELrsp+ | PS primitive | P-RELEASE response accept |
| P-RELrsp- | PS primitive | P-RELEASE response reject |
| P-RSYNreq | PS primitive | P-RESYNCHRONIZE request |
| P-RSYNrsp | PS primitive | P-RESYNCHRONIZE response |
| P-SYNMreq | PS primitive | P-SYNC-MAJOR request |
| P-SYNMrsp | PS primitive | P-SYNC-MAJOR response |
| P-SYNmreq | PS primitive | P-SYNC-MINOR request |
| P-SYNmrsp | PS primitive | P-SYNC-MINOR response |
| P-TDreq | PS primitive | P-TYPED-DATA request |
| P-UABreq | PS primitive | P-U-ABORT request |
| P-UERreq | PS primitive | P-U-EXCEPTION-REPORT request |

TABLE A-1/X.226 *(continued)*

**Incoming Event List**

| Abbreviated Name | Category | Name and Description |
|---|---|---|
| RS | PPDU | RESYNCHRONIZE |
| RSA | PPDU | RESYNCHRONIZE ACKNOWLEDGE |
| S-ACTDcnf | SS primitive | S-ACTIVITY-DISCARD confirm |
| S-ACTDind | SS primitive | S-ACTIVITY-DISCARD indication |
| S-ACTEcnf | SS primitive | S-ACTIVITY-END confirm |
| S-ACTEind | SS primitive | S-ACTIVITY-END indication |
| S-ACTIcnf | SS primitive | S-ACTIVITY-INTERRUPT confirm |
| S-ACTIind | SS primitive | S-ACTIVITY-INTERRUPT indication |
| S-ACTRind | SS primitive | S-ACTIVITY-RESUME indication |
| S-ACTSind | SS primitive | S-ACTIVITY-START indication |
| S-CGind | SS primitive | S-CONTROL-GIVE indication |
| S-CONcnf- | SS primitive | S-CONNECT confirm reject (provider) |
| S-GTind | SS primitive | S-TOKEN-GIVE indication |
| S-P-ABind | SS primitive | S-P-ABORT indication |
| S-PERind | SS primitive | S-P-EXCEPTION-REPORT indication |
| S-PTind | SS primitive | S-TOKEN-PLEASE indication |
| S-RELcnf+ | SS primitive | S-RELEASE confirm accept |
| S-RELcnf- | SS primitive | S-RELEASE confirm reject |
| S-RELind | SS primitive | S-RELEASE indication |
| S-RSYNcnf | SS primitive | S-RESYNCHRONIZE confirm |
| S-RSYNind | SS primitive | S-RESYNCHRONIZE indication |
| S-SYNMcnf | SS primitive | S-SYNC-MAJOR confirm |
| S-SYNMind | SS primitive | S-SYNC-MAJOR indication |
| S-SYNmcnf | SS primitive | S-SYNC-MINOR confirm |
| S-SYNmind | SS primitive | S-SYNC-MINOR indication |
| S-UERind | SS primitive | S-U-EXCEPTION-REPORT indication |
| TC | PPDU | CAPABILITY DATA |
| TCC | PPDU | CAPABILITY DATA ACKNOWLEDGE |
| TD | PPDU | DATA |
| TE | PPDU | EXPEDITED DATA |
| TTD | PPDU | TYPED DATA |

TABLE A-2/X.226

**States**

| Abbreviated Name | Name and Description |
|---|---|
| STAI0 | idle - no connection |
| STAI1 | await CPA PPDU |
| STAI2 | await P-CONNECT response |
| STAt0 | connected - data transfer |
| STAac0 | await ACA PPDU |
| STAac1 | await P-ALTER-CONTEXT response |
| STAac2 | await ACA PPDU or P-ALTER-CONTEXT response |

TABLE A-3/X.226

**Outgoing Event List**

| Abbreviated Name | Category | Name and Description |
|---|---|---|
| AC | PPDU | ALTER CONTEXT |
| ACA | PPDU | ALTER CONTEXT ACKNOWLEDGE |
| ARP | PPDU | PROVIDER ABORT |
| ARU | PPDU | USER ABORT |
| CP | PPDU | PRESENTATION CONNECT |
| CPA | PPDU | PRESENTATION CONNECT ACCEPT |
| CPR | PPDU | PRESENTATION CONNECT REJECT |
| P-ACTDcnf | PS primitive | P-ACTIVITY-DISCARD confirm |
| P-ACTDind | PS primitive | P-ACTIVITY-DISCARD indication |
| P-ACTEcnf | PS primitive | P-ACTIVITY-END confirm |
| P-ACTEind | PS primitive | P-ACTIVITY-END indication |
| P-ACTIcnf | PS primitive | P-ACTIVITY-INTERRUPT confirm |
| P-ACTIind | PS primitive | P-ACTIVITY-INTERRUPT indication |
| P-ACTRind | PS primitive | P-ACTIVITY-RESUME indication |
| P-ACTSind | PS primitive | P-ACTIVITY-START indication |
| P-ALTERcnf | PS primitive | P-ALTER-CONTEXT confirm |
| P-ALTERind | PS primitive | P-ALTER-CONTEXT indication |
| P-CDcnf | PS primitive | P-CAPABILITY-DATA confirm |
| P-CDind | PS primitive | P-CAPABILITY-DATA indication |
| P-CGind | PS primitive | P-CONTROL-GIVE indication |
| P-CONcnf+ | PS primitive | P-CONNECT confirm accept |
| P-CONcnf- | PS primitive | P-CONNECT confirm reject |
| P-CONind | PS primitive | P-CONNECT indication |
| P-DTind | PS primitive | P-DATA indication |
| P-EXind | PS primitive | P-EXPEDITED-DATA indication |
| P-GTind | PS primitive | P-TOKEN-GIVE indication |
| P-PABind | PS primitive | P-P-ABORT indication |
| P-PERind | PS primitive | P-P-EXCEPTION-REPORT indication |
| P-PTind | PS primitive | P-TOKEN-PLEASE indication |
| P-RELcnf+ | PS primitive | P-RELEASE confirm accept |
| P-RELcnf~ | PS primitive | P-RELEASE confirm reject |
| P-RELind | PS primitive | P-RELEASE indication |
| P-RSYNcnf | PS primitive | P-RESYNCHRONIZE confirm |
| P-RSYNind | PS primitive | P-RESYNCHRONIZE indication |
| P-SYNMcnf | PS primitive | P-SYNC-MAJOR confirm |
| P-SYNMind | PS primitive | P-SYNC-MAJOR indication |
| P-SYNmcnf | PS primitive | P-SYNC-MINOR confirm |
| P-SYNmind | PS primitive | P-SYNC-MINOR indication |
| P-TDind | PS primitive | P-TYPED-DATA indication |
| P-UABind | PS primitive | P-U-ABORT indication |
| P-UERind | PS primitive | P-U-EXCEPTION-REPORT indication |

TABLE A-3/X.226 *(continued)*

**Outgoing Event List**

| Abbreviated Name | Category | Name and Description |
|---|---|---|
| RS | PPDU | RESYNCHRONIZE |
| RSA | PPDU | RESYNCHRONIZE acknowledge |
| S-ACTDreq | SS primitive | S-ACTIVITY-DISCARD request |
| S-ACTDrsp | SS primitive | S-ACTIVITY-DISCARD response |
| S-ACTEreq | SS primitive | S-ACTIVITY-END request |
| S-ACTErsp | SS primitive | S-ACTIVITY-END response |
| S-ACTIreq | SS primitive | S-ACTIVITY-INTERRUPT request |
| S-ACTIrsp | SS primitive | S-ACTIVITY-INTERRUPT response |
| S-ACTRreq | SS primitive | S-ACTIVITY-RESUME request |
| S-ACTSreq | SS primitive | S-ACTIVITY-START request |
| S-CGreq | SS primitive | S-CONTROL-GIVE request |
| S-GTreq | SS primitive | S-TOKEN-GIVE request |
| S-PTreq | SS primitive | S-TOKEN-PLEASE request |
| S-RELreq | SS primitive | S-RELEASE request |
| S-RELrsp+ | SS primitive | S-RELEASE response accept |
| S-RELrsp- | SS primitive | S-RELEASE response reject |
| S-RSYNreq | SS primitive | S-RESYNCHRONIZE request |
| S-RSYNrsp | SS primitive | S-RESYNCHRONIZE response |
| S-SYNMreq | SS primitive | S-SYNCHRONIZE-MAJOR request |
| S-SYNMrsp | SS primitive | S-SYNCHRONIZE-MAJOR response |
| S-SYNmreq | SS primitive | S-SYNCHRONIZE-MINOR request |
| S-SYNmrsp | SS primitive | S-SYNCHRONIZE-MINOR response |
| S-UERreq | SS primitive | S-U-EXCEPTION-REPORT request |
| TC | PPDU | CAPABILITY DATA |
| TTC | PPDU | CAPABILITY DATA ACKNOWLEDGE |
| TD | PPDU | DATA |
| TE | PPDU | EXPEDITED DATA |
| TTD | PPDU | P-TYPED DATA |

TABLE A-4/X.226

**Specific Actions**

| Code | Action |
|---|---|
| [01] | Mark presentation contexts proposed for definition which provider cannot support as ÒprovideÍrejectionÓ. |
| [02] | Set cr and rl to FALSE. |
| [03] | Record abstract and transfer syntaxes for the presentation contexts of the agreed DCS and for the default context. |
| [04] | Propose at least one transfer syntax for each presentation context. |
| [05] | Propose a transfer syntax for the default context if one is named in the request service primitive. |
| [06] | Select one transfer syntax for each presentation context agreed for definition and include the agreed presentation contexts in the DCS. |
| [07] | Set rl to TRUE. |
| [08] | If rl is TRUE then set cr to TRUE. |
| [09] | If aep is TRUE then:<br>a) set aep to FALSE; and<br>b) if FU(CR) is TRUE then the synchronization points associated with the last activity no longer have associated DCSs. |
| [10] | Record selected transfer syntax for each new presentation context and include new presentation contexts in the DCS. |
| [11] | Remove the presentation contexts agreed for deletion from the DCS. |
| [12] | Record FU(f) for f in fu-dom according to the presentation requirements in the CPA PPDU. |
| [13] | If FU(CR) then associate the DCS with the syncpoint identifier. |
| [14] | If FU(CR) and an activity is in progress, set the DCS to the inter-activity DCS. |
| [15] | Set aep to TRUE. |
| [16] | Set the DCS to that associated with the syncpoint identifier. |
| [17] | If FU(CR) then remember the DCS as the inter-activity DCS. |
| [18] | Set the DCS to that agreed during presentation-connection establishment. |
| [19] | Eliminate any associations between syncpoint serial number and the DCS for the current activity. |
| [20] | Set aep to FALSE. |
| [21] | Set the DCS as specified by the Presentation context identifier list parameter of the PPDU. |
| [22] | If FU(CR), then eliminate any associations between syncpoint identifiers and DCSs. |

TABLE A-5/X.226

**Predicates**

| Code | Meaning |
|---|---|
| p01 | The presentation-connection is acceptable to the PPM (local matter). |
| p02 | If present, the named default context can be supported. |
| p03 | Each presentation data value is from a presentation context of the DCS proposed in the presentation-connection establishment, or from the default context if this DCS is empty. |
| p04 | Each presentation data value is from presentation contexts of the DCS being accepted in the presentation-connection establishment, or from the default context if this DCS is empty. |
| p05 | Each presentation data value is from presentation contexts of the DCS, or from the default context if the DCS is empty. |
| p06 | Each presentation data value is from presentation contexts of the DCS not proposed for deletion from the DCS by the peer PPM. |
| p07 | Each presentation data value is from presentation contexts of the DCS not proposed for deletion from the DCS by the local PPM. |
| p08 | The value of cr is TRUE. |
| p09 | Each presentation data value if from presentation contexts of the DCS not accepted for deletion from the DCS, or from presentation contexts accepted for addition to the DCS, or if no such presentation contexts are available, from the default context. |
| p11 | FU(CM) is TRUE. |
| p13 | Each presentation data value is from the default context. |
| p14 | FU(CM) is false, or FU(CM) is true and typed data functional unit was selected as a User session requirement. |
| p15 | Each presentation data value is from presentation contexts of the DCS which was agreed during presentation-connection establishment, or from the default context if this DCS is empty. |
| p16 | Each presentation data value is from presentation contexts of the DCS associated with the pair of Old activity identifier and Synchronization point serial number parameter values or from the default context when this DCS is empty. |
| p17 | FU(CR) is TRUE. |
| p18 | Each presentation date value is in presentation contexts of the DCS associated with the syncpoint identifier or from the default context if this DCS is empty. |
| p19 | Either no syncpoint identifier is associated with a DCS or the resync identifier is not associated with a DCS and is greater than the lowest syncpoint identifier which has an associated DCS. |
| p20 | The PPDU contains a Presentation context identifier list parameter. |
| p21 | Each presentation data value is from presentation contexts specified in the PPDU, or from the default context if no presentation contexts are specified in the PPDU. |
| p22 | For each presentation data value, an instance (chosen as a local matter) of encoding is supported by the PPM. |
| p23 | For each presentation data value the encoding is supported by the PPM. |
| p24 | Each presentation data value is from presentation contexts of the DCS, or from presentation contexts proposed for addition to the DCS by the local PPM, or from the default context if either the DCS is empty or all presentation contexts of the DCS were proposed for deletion by the local PPM. |
| p25 | Each presentation data value is from presentation contexts of the DCS not proposed for deletion by the peer PPM or from presentation contexts proposed for addition to the DCS by the local PPM. |
| p26 | The syncpoint identifier has an associated DCS. |
| p27 | Old session connection identifier parameter present. |
| p28 | There is a DCS associated with the pair of Old activity identifier and Synchronization point serial number parameters values. |

TABLE A-6/X.226

**Connexion Establishment**

| | STAI0<br>idle<br>no connection | STAI1<br>await<br>CPA | STAI2<br>await<br>P-CONrsp |
|---|---|---|---|
| P-CONreq | p02 & p03<br>[04] [05] [02] [20]<br>CP<br>STAI1 | | |
| CP | p01 & p02 & p03 & p22<br>[01] [02] [20]<br>P-CONind<br>STAI2<br>^p01 OR ^p02 OR ^p22<br>[01]<br>CPR<br>STAI0 | | |
| P-CONrsp+ | | | p04<br>[06] [12]<br>CPA<br>STAt0 |
| CPA | | p04<br>[03] [12]<br>P-CONcnf+<br>STAt0 | |
| P-CONrsp- | | | p04<br>[06]<br>CPR<br>STAI0 |
| CPR | | p04<br>P-CONcnf-<br>STAI0 | |
| S-CONcnf- | | P-CONcnf-<br>STAI0 | |

TABLE A-7/X.226

**Connection release (normal)**

| | STAac0<br>await<br>ACA | STAac1<br>await<br>P-ALTERrsp | STAac2<br>await ACA or<br>P-ALTERrsp | STAt0<br>connected - data<br>transfer |
|---|---|---|---|---|
| P-RELreq | p07<br>[08] [07]<br>S-RELreq<br>STAac0 | p05<br>[08] [07]<br>S-RELreq<br>STAac1 | p07<br>[08] [07]<br>S-RELreq<br>STAac2 | p05<br>[08] [07]<br>S-RELreq<br>STAt0 |
| S-RELind | p05<br>[08] [07]<br>P-RELind<br>STAac0 | p06<br>[08] [07]<br>P-RELind<br>STAac1 | p06<br>[08] [07]<br>P-RELind<br>STAac2 | p05<br>[08] [07]<br>P-RELind<br>STAt0 |
| P-RELrsp+ | p07 & ^p08<br>S-RELrsp+<br>STAI0<br>p07 & p08<br>[02]<br>S-RELrsp+<br>STAt0 | p05 & ^p08<br>S-RELrsp+<br>STAI0<br>p05 & p08<br>[02]<br>S-RELrsp+<br>STAt0 | p07 & ^p08<br>S-RELrsp+<br>STAI0<br>p07 & p08<br>[02]<br>S-RELrsp+<br>STAt0 | p05 & ^p08<br>S-RELrsp+<br>STAI0<br>p05 & p08<br>[02]<br>S-RELrsp+<br>STAt0 |
| S-RELcnf+ | p05 & ^p08<br>P-RELcnf+<br>STAI0<br>p05 & p08<br>[02]<br>P-RELcnf+<br>STAt0 | p06 & ^p08<br>P-RELcnf+<br>STAI0<br>p06 & p08<br>[02]<br>P-RELcnf+<br>STAt0 | p06 & ^p08<br>P-RELcnf+<br>STAI0<br>p06 & p08<br>[02]<br>P-RELcnf+<br>STAt0 | p05 & ^p08<br>P-RELcnf+<br>STAI0<br>p05 & p08<br>[02]<br>P-RELcnf+<br>STAt0 |
| P-RELrsp- | p07<br>[02]<br>S-RELrsp-<br>STAac0 | p05<br>[02]<br>S-RELrsp-<br>STAac1 | p07<br>[02]<br>S-RELrsp-<br>STAac2 | p05<br>[02]<br>S-RELrsp-<br>STAt0 |
| S-RELcnf- | p05<br>[02]<br>P-RELcnf-<br>STAac0 | p06<br>[02]<br>P-RELcnf-<br>STAac1 | p06<br>[02]<br>P-RELcnf-<br>STAac2 | p05<br>[02]<br>P-RELcnf-<br>STAt0 |

TABLE A-8/X.226

**Connection release (abort)**

| | STAI1<br>await<br>CPA | STAI2<br>await<br>P-COMrsp | STAac0<br>await<br>ACA | STAac1<br>await<br>P-ALTERrsp | STAac2<br>await ACA or<br>P-ALTERrsp | STAt0<br>connected - data<br>transfer |
|---|---|---|---|---|---|---|
| P-UABreq | p03<br>ARU<br>STAI0 | p03<br>ARU<br>STAI0 | p07<br>ARU<br>STAI0 | p05<br>ARU<br>STAI0 | p07<br>ARU<br>STAI0 | p05<br>ARU<br>STAI0 |
| ARU | p03 & p21<br>P-UABind<br>STAI0 | p03 & p21 & p23<br>P-UABind<br>STAI0 | p21 & p24<br>P-UABind<br>STAI0 | p06 & p21<br>P-UABind<br>STAI0 | p21 & p25<br>P-UABind<br>STAI0 | p05 & p21<br>P-UABind<br>STAI0 |
| ARP | P-PABind<br>STAI0 | P-PABind<br>STAI0 | P-PABind<br>STAI0 | P-PABind<br>STAI0 | P-PABind<br>STAI0 | P-PABind<br>STAI0 |
| S-PABind | P-PABind<br>STAI0 | P-PABind<br>STAI0 | P-PABind<br>STAI0 | P-PABind<br>STAI0 | P-PABind<br>STAI0 | P-PABind<br>STAI0 |

TABLE A-9/X.226

**Context Management**

| | STAac0<br>await<br>ACA | STAac1<br>await<br>P-ALTERrsp | STAac2<br>await ACA or<br>P-ALTERrsp | STAt0<br>connected - data<br>transfer |
|---|---|---|---|---|
| P-ALTERreq | | p05<br>[04]<br>AC<br>STAac2 | | p05 & p11<br>[04]<br>AC<br>STAac0 |
| AC | p06<br>[01]<br>P-ALTERind<br>STAac2 | | | p05 & p11<br>[01] [09]<br>P-ALTERind<br>STAac1 |
| P-ALTERrsp | | p09<br>[06] [11]<br>ACA<br>STAt0 | p09<br>[06] [11]<br>ACA<br>STAac0 | |
| ACA | p09<br>[10] [11]<br>P-ALTERcnf<br>STAt0 | | p09 & p06<br>[10] [11]<br>P-ALTERcnf<br>STAac1 | |

TABLE A-10/X.226

**Data Transfer**

| | STAac0<br>await<br>ACA | STAac1<br>await<br>P-ALTERrsp | STAac2<br>await ACA or<br>P-ALTERrsp | STAt0<br>connected - data<br>transfer |
|---|---|---|---|---|
| P-DTreq | p07<br>TD<br>STAac0 | p05<br>TD<br>STAac1 | p07<br>TD<br>STAac2 | p05<br>TD<br>STAt0 |
| TD | p05<br>P-DTind<br>STAac0 | p06<br>P-DTind<br>STAac1 | p06<br>P-DTind<br>STAac2 | p05<br>[09]<br>P-DTind<br>STAt0 |
| P-TDreq | p07 & p14<br>TTD<br>STAac0 | p05 & p14<br>TTD<br>STAac1 | p07 & p14<br>TTD<br>STAac2 | p05 & p14<br>TTD<br>STAt0 |
| TTD | p05 & p14<br>P-TDind<br>STAac0 | p06 & p14<br>P-TDind<br>STAac1 | p06 & p14<br>P-TDind<br>STAac2 | p05 & p14<br>[09]<br>P-TDind<br>STAt0 |
| P-EXreq | p13<br>TE<br>STAac0 | p13<br>TE<br>STAac1 | p13<br>TE<br>STAac2 | p13<br>TE<br>STAt0 |
| TE | p13<br>P-EXind<br>STAac0 | p13<br>P-EXind<br>STAac1 | p13<br>P-EXind<br>STAac2 | p13<br>[09]<br>P-EXind<br>STAt0 |
| P-CDreq | p07<br>TC<br>STAac0 | p05<br>TC<br>STAac1 | p07<br>TC<br>STAac2 | p05<br>TC<br>STAt0 |
| TC | p05<br>P-CDind<br>STAac0 | p06<br>P-CDind<br>STAac1 | p06<br>P-CDind<br>STAac2 | 0<br>[09]<br>P-CDind<br>STAt0 |
| P-CDrsp | p07<br>TCC<br>STAac0 | p05<br>TCC<br>STAac1 | p07<br>TCC<br>STAac2 | p05<br>TCC<br>STAt0 |
| TCC | p05<br>P-CDcnf<br>STAac0 | p06<br>P-CDcnf<br>STAac1 | p06<br>P-CDcnf<br>STAac2 | p05<br>P-CDcnf<br>STAt0 |

TABLE A-11/X.226

**Token Handling**

| | STAac0<br>await<br>ACA | STAac1<br>await<br>P-ALTERrsp | STAac2<br>await ACA or<br>P-ALTERrsp | STAt0<br>connected - data<br>transfer |
|---|---|---|---|---|
| P-GTreq | S-GTreq<br>STAac0 | S-GTreq<br>STAac1 | S-GTreq<br>STAac2 | S-GTreq<br>STAt0 |
| S-GTind | P-GTind<br>STAac0 | P-GTind<br>STAac1 | P-GTind<br>STAac2 | [09]<br>P-GTind<br>STAt0 |
| P-PTreq | p07<br>S-PTreq<br>STAac0 | p05<br>S-PTreq<br>STAac1 | p07<br>S-PTreq<br>STAac2 | p05<br>S-PTreq<br>STAt0 |
| S-PTind | p05<br>P-PTind<br>STAac0 | p06<br>P-PTind<br>STAac1 | p06<br>P-PTind<br>STAac2 | p05<br>[09]<br>P-PTind<br>STAt0 |
| P-CGreq | S-CGreq<br>STAac0 | S-CGreq<br>STAac1 | S-CGreq<br>STAac2 | S-CGreq<br>STAt0 |
| S-CGind | P-CGind<br>STAac0 | P-CGind<br>STAac1 | P-CGind<br>STAac2 | [09]<br>P-CGind<br>STAt0 |

TABLE A-12/X.226

**Synchronization**

| | STAac0<br>await<br>ACA | STAac1<br>await<br>P-ALTERrsp | STAac2<br>await ACA or<br>P-ALTERrsp | STAt0<br>connected - data<br>transfer |
|---|---|---|---|---|
| P-SYNmreq | ^p17 & p07<br>S-SYNmreq<br>STAac0 | p05<br>S-SYNmreq<br>[13]<br>STAac1 | ^p17 & p07<br>S-SYNmreq<br>STAac2 | p05<br>S-SYNmreq<br>[13]<br>STAt0 |
| P-SYNmind | p05<br>P-SYNmind<br>[13]<br>STAac0 | ^p17 & p06<br>P-SYNmind<br>STAac1 | ^p17 & p06<br>P-SYNmind<br>STAac2 | p05<br>P-SYNmind<br>[13]<br>STAt0 |
| P-SYNmrsp | p07<br>S-SYNmrsp<br>STAac0 | p05<br>S-SYNmrsp<br>STAac1 | p07<br>S-SYNmrsp<br>STAac2 | p05<br>S-SYNmrsp<br>STAt0 |
| S-SYNmcnf | p05<br>P-SYNmcnf<br>STAac0 | p06<br>P-SYNmcnf<br>STAac1 | p06<br>P-SYNmcnf<br>STAac2 | p05<br>P-SYNmcnf<br>STAt0 |
| P-SYNMreq | ^p17 & p07<br>S-SYNMreq<br>STAac0 | p05<br>S-SYNMreq<br>STAac1 | ^p17 & p07<br>S-SYNMreq<br>STAac2 | p05<br>S-SYNMreq<br>STAt0 |
| S-SYNMind | p05<br>P-SYNMind<br>STAac0 | ^p17 & p06<br>P-SYNMind<br>STAac1 | ^p17 & p06<br>P-SYNMind<br>STAac2 | p05<br>P-SYNMind<br>STAt0 |
| P-SYNMrsp | p07<br>S-SYNMrsp<br>[22] [13]<br>STAac0 | ^p17 & p05<br>S-SYNMrsp<br>STAac1 | ^p17 & p07<br>S-SYNMrsp<br>STAac2 | p05<br>S-SYNmrsp<br>[22] [13]<br>STAt0 |
| S-SYNcnf | ^p17 & p05<br>P-SYNMcnf<br>STAac0 | p06<br>P-SYNMcnf<br>[22] [13]<br>STAac1 | ^p17 & p06<br>P-SYNMcnf<br>STAac2 | p05<br>P-SYNMcnf<br>[22] [13]<br>STAt0 |

TABLE A-13/X.226

**Activity Management and Exception Handling**

| | STAac0<br>await<br>ACA | STAac1<br>await<br>P-ALTERrsp | STAac2<br>await ACA or<br>P-ALTERrsp | STAt0<br>connected - data transfer |
|---|---|---|---|---|
| P-ACTSreq | ^p17 & p07<br>S-ACTSreq<br>STAac0 | p05<br>[17]<br>S-ACTSreq<br>STAac1 | ^p17 & p07<br>S-ACTSreq<br>STAac2 | p05<br>[17]<br>S-ACTSreq<br>STAt0 |
| S-ACTSind | p05<br>[09] [17]<br>P-ACTSind<br>STAac0 | •p17 & p06<br>P-ACTSind<br>STAac1 | ^p17 & p06<br>P-ACTSind<br>STAac2 | p05<br>[09] [17]<br>P-ACTSind<br>STAt0 |
| P-ACTEreq | ^p17 & p07<br>S-ACTEreq<br>STAac0 | p05<br>S-ACTEreq<br>STAac1 | ^p17 & p07<br>S-ACTEreq<br>STAac2 | p05<br>S-ACTEreq<br>STAt0 |
| S-ACTEind | p05<br>P-ACTEind<br>STAac0 | •p17 & p06<br>P-ACTEind<br>STAac1 | ^p17 & p06<br>P-ACTEind<br>STAac2 | p05<br>P-ACTEind<br>STAt0 |
| P-ACTErsp | p07<br>[14] [15]<br>S-ACTErsp<br>STAac0 | ^p17 & p05<br>S-ACTErsp<br>STAac1 | ^p17 & p07<br>S-ACTErsp<br>STAac2 | p05<br>[14] [15]<br>S-ACTErsp<br>STAt0 |
| S-ACTEcnf | ^p17 & p05<br>P-ACTEcnf<br>STAac0 | p06<br>[14] [19]<br>P-ACTEcnf<br>STAac1 | ^p17 & p06<br>P-ACTEcnf<br>STAac2 | p05<br>[14] [19]<br>P-ACTEcnf<br>STAt0 |
| P-ACTIreq | S-ACTIreq<br>STAt0 | S-ACTIreq<br>STAt0 | S-ACTIreq<br>STAt0 | S-ACTIreq<br>STAt0 |
| S-ACTIind | [20]<br>P-ACTIind<br>STAt0 | [20]<br>P-ACTIind<br>STAt0 | [20]<br>P-ACTIind<br>STAt0 | [20]<br>P-ACTIind<br>STAt0 |
| P-ACTIrsp | | | | [14]<br>S-ACTIrsp<br>STAt0 |
| S-ACTIcnf | | | | [14]<br>P-ACTIcnf<br>STAt0 |
| P-ACTRreq | ^p17 & p07<br>S-ACTRreq<br>STAac0 | (^p17 OR p27 OR •p28) & p05<br>S-ACTRreq<br>STAac1<br>•p27 & p28 & p17 & p16<br>[17] [16]<br>S-ACTRreq<br>STAac1 | ^p17 & p07<br>S-ACTRreq<br>STAac2 | (^p17 OR p27 OR •p28) & p05<br>S-ACTRreq<br>STAt0<br>^p27 & p28 & p17 & p16<br>[17] [16]<br>S-ACTRreq<br>STAt0 |
| S-ACTRind | (^p17 OR p27 OR •p28) & p05<br>[09]<br>P-ACTRind<br>STAac0<br>^p27 & p28 & p17 & p16<br>[09] [17] [16]<br>P-ACTRind<br>STAac0 | ^p17 & p06<br><br>P-ACTRind<br>STAac1 | ^p17 & p06<br><br>P-ACTRind<br>STAac2 | (^p17 OR p27 OR •p28) & p05<br><br>[09]<br>P-ACTRind<br>STAt0<br>^p27 & p28 & p17 & p16<br>[09] [17] [16]<br>P-ACTRind<br>STAt0 |

TABLE A-13/X.226 *(continued)*

**Activity Management and Exception Handling**

| | STAac0<br>await<br>ACA | STAac1<br>await<br>P-ALTERrsp | STAac2<br>await ACA or<br>P-ALTERrsp | STAt0<br>connected - data transfer |
|---|---|---|---|---|
| P-ACTDreq | S-ACTDreq<br>STAt0 | S-ACTDreq<br>STAt0 | S-ACTDreq<br>STAt0 | S-ACTDreq<br>STAt0 |
| S-ACTDind | [09]<br>P-ACTDind<br>STAt0 | [09]<br>P-ACTDind<br>STAt0 | [09]<br>P-ACTDind<br>STAt0 | [09]<br>P-ACTDind<br>STAt0 |
| P-ACTDrsp | | | | [14] [19]<br>S-ACTDrsp<br>STAt0 |
| S-ACTDcnf | | | | [14] [19]<br>P-ACTDcnf<br>STAt0 |
| P-UERreq | p07<br>S-UERreq<br>STAt0 | p05<br>S-UERreq<br>STAt0 | p07<br>S-UERreq<br>STAt0 | p05<br>S-UERreq<br>STAt0 |
| S-UERind | p05<br>P-UERind<br>STAt0 | p06<br>P-UERind<br>STAt0 | p06<br>P-UERind<br>STAt0 | p05<br>P-UERind<br>STAt0 |
| S-PERind | P-PERind<br>STAt0 | P-PERind<br>STAt0 | P-PERind<br>STAt0 | P-PERind<br>STAt0 |

TABLE A-14/X.226

**Resynchronization**

| | STAac0<br>await<br>ACA | STAac1<br>await<br>P-ALTERrsp | STAac2<br>await ACA or<br>P-ALTERrsp | STAt0<br>connected - data transfer |
|---|---|---|---|---|
| P-RSYNreq | ^p17 & p07<br>RS<br>STAt0<br>p17 & p19 & p07<br>RS<br>STAt0<br>p17 & p26 & p18<br>RS<br>STAt0<br>p17 & ^p19 & ^p26 & p15<br>[18]<br>RS<br>STAt0 | ^p17 & p05<br>RS<br>STAt0<br>p17 & p19 & p05<br>RS<br>STAt0<br>p17 & p26 & p18<br>RS<br>STAt0<br>p17 & ^p19 & ^p26 & p15<br>[18]<br>RS<br>STAt0 | ^p17 & p07<br>RS<br>STAt0<br>p17 & p19 & p07<br>RS<br>STAt0<br>p17 & p26 & p18<br>RS<br>STAt0<br>p17 & ^p19 & ^p26 & p15<br>[18]<br>RS<br>STAt0 | •p11 & p05<br>RS<br>STAt0<br>p11 & ^p17 & p05<br>RS<br>STAt0<br>p11 & p17 & p19 & p05<br>RS<br>STAt0<br>p11 & p17 & p26 & p18<br>RS<br>STAt0<br>p11 & p17 & ^p19 & ^p26 & p15<br>[18]<br>RS<br>STAt0 |
| RS | ^p17 & p21<br>[21]<br>P-RSYNind<br>STAt0<br>p17 & p19 & p21<br>[21]<br>P-RSYNind<br>STAt0<br>p17 & p26 & p18<br>[16]<br>P-RSYNind<br>STAt0<br>p17 & ^p19 & ^p26 & p15<br>[18]<br>P-RSYNind<br>STAt0 | •p17 & p21<br>P-RSYNind<br>STAt0<br>p17 & p19 & p21<br>P-RSYNind<br>STAt0<br>p17 & p26 & p18<br>[16]<br>P-RSYNind<br>STAt0<br>p17 & ^p19 & ^p26 & p15<br>[18]<br>P-RSYNind<br>STAt0 | ^p17 & p21<br>[21]<br>P-RSYNind<br>STAt0<br>p17 & p19 & p21<br>[21]<br>P-RSYNind<br>STAt0<br>p17 & p26 & p18<br>[16]<br>P-RSYNind<br>STAt0<br>p17 & ^p19 & ^p26 & p15<br>[18]<br>P-RSYNind<br>STAt0 | ^p11 & p05<br>P-RSYNind<br>STAt0<br>p11 & ^p17 & p21<br>P-RSYNind<br>STAt0<br>p11 & p17 & p19 & p21<br>P-RSYNind<br>STAt0<br>p11 & p17 & p26 & p18<br>[16]<br>P-RSYNind<br>STAt0<br>p11 & p17 & ^p19 & ^p26 & p15<br>[18]<br>P-RSYNind<br>STAt0 |
| P-RSYNrsp | | | | ^p11 & p05<br>RSA<br>STAt0<br>p11 & ^p17 & p05<br>RSA<br>STAt0<br>p11 & p17 & p19 & p05<br>RSA<br>STAt0<br>p11 & p17 & p26 & p05<br>RSA<br>STAt0<br>p11 & p17 & ^p19 & ^p26 & p05<br>RSA<br>STAt0 |

TABLE A-14/X.226 *(continued)*

**Resynchronization**

| | STAac0<br>await<br>ACA | STAac1<br>await<br>P-ALTERrsp | STAac2<br>await ACA or<br>P-ALTERrsp | STAt0<br>connected - data transfer |
|---|---|---|---|---|
| RSA | | | | ^p11 & p05<br>P-RSYNcnf<br>STAt0<br>p11 & ^p17 & p21<br>[21]<br>P-RSYNcnf<br>STAt0<br>p11 & p17 & p19 & p21<br>[21]<br>P-RSYNcnf<br>STAt0<br>p11 & p17 & p26 & p05<br>P-RSYNcnf<br>STAt0<br>p11 & p17 & ^p19 & ^p26 & p05<br>P-RSYNcnf<br>STAt0 |

Appendix I

(to Recommendation X.226)

**Differences between Recommendation X.226**

**and ISO International Standard 8823**

I.1 Recommendation X.226 contains no statement concerning the relative precedence of any section or annex. ISO/IEC JTC 1 has indicated its intention to add a statement, prior to publication of ISO 8823, concerning precedence.

Blanc