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Second edition
1994-12-15

AMENDMENT 2
1998-12-15

Information technology — Open Systems Interconnection — Connection-oriented presentation protocol: Protocol specification

AMENDMENT 2: Nested connections functional unit

Technologies de l'information — Interconnexion de systèmes ouverts (OSI) — Protocole de présentation en mode connexion: Spécification du protocole

AMENDEMENT 2: Unité fonctionnelle de connexions nichée

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Reference number
ISO/IEC 8823-1:1994/Amd.2:1998(E)

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Amendment 2 to ISO/IEC 8823-1:1994 was prepared by ITU-T (as ITU-T Rec. X.226/Amd.2) and was adopted under a special "fast-track procedure", by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, in parallel with its approval by national bodies of ISO and IEC. The identical text is published as ITU-T Rec. X.226/Amd.2.

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INTERNATIONAL STANDARD

ITU-T RECOMMENDATION

INFORMATION TECHNOLOGY – OPEN SYSTEMS INTERCONNECTION – CONNECTION-ORIENTED PRESENTATION PROTOCOL: PROTOCOL SPECIFICATION

AMENDMENT 2
Nested connections functional unit

1) Subclause 2.1

Insert the following to this subclause, by numerical order:

- ITU-T Recommendation X.215 (1995)/Amd.2 (1997) | ISO/IEC 8326:1996/Amd.2:1998, *Information technology – Open Systems Interconnection — Session service definition – Amendment 2: Nested connections functional unit.*
- ITU-T Recommendation X.216 (1994)/Amd.2 (1997) | ISO/IEC 8822:1994/Amd.2:1998, *Information technology – Open Systems Interconnection – Presentation service definition – Amendment 2: Nested connections functional unit.*

2) Subclause 3.4

Add a new item:

l) nested presentation connection.

3) Subclause 5.1

In this subclause, add and ITU-T Rec. X.216/Amd.2 | ISO/IEC 8822/Amd.2 *after reference to* ITU-T Rec. X.216 | ISO/IEC 8822.

4) Subclause 5.2

In this subclause, add and ITU-T Rec. X.215/Amd.2 | ISO/IEC 8326/Amd.2 *after reference to* ITU-T Rec. X.215 | ISO/IEC 8326.

5) Subclause 5.5

Add two new paragraphs after paragraph one:

Presentation connections can be established nested within existing presentation connections. Such connections are entirely independent in relation to services provided directly by the presentation layer, but have some dependencies (specified in ITU-T Rec. X.215 | ISO/IEC 8326) in relation to services passed through from the session layer.

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The PPM maintains a one-to-one correspondence between presentation connection end-points and session connection end-points, and the nesting structure (if any) within an outer-level session connection end-point is identical to the nesting structure within the corresponding presentation end-point.

6) Subclauses 6.2.2.3 through 6.2.2.6

Add a new sentence to the end of each subclause 6.2.2.3 through 6.2.2.6:

This parameter shall be absent on a CP that is issued on an S-CONNECT that is seeking to establish a nested session connection.

7) Subclause 8.2

In this subclause, add the following ASN.1 comment after the **X.410-mode parameters** *elements in* **CP-type**, **CPA-PPDU** *and* **CPR-PPDU** *(the parameter is erroneously named x400-mode-parameters in some places in the original printing):*

```
-- This OPTIONAL element shall be absent for a
-- nested presentation connection.
```

8) Subclause A.1

Add at the end of this subclause:

A request or response primitive on a nested presentation connection (including a P-CONNECT request) can occur only if both the following apply:

- it is permitted by the state table for the PPM for that connection;
- the state tables for the PPM for all enclosing presentation connections permit a P-DTreq event.

A PPDU event can only occur on the nested session connection supporting a nested presentation connection, if both the following apply:

- it is permitted by the state table for the PPM for that presentation connection;
- the state tables for the PPM for all enclosing presentation connections permit a TD event.

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INTERNATIONAL STANDARD

ISO/IEC 8823-1

Second edition
1994-12-15

AMENDMENT 1
1998-09-15

Information technology — Open Systems Interconnection — Connection-oriented presentation protocol: Protocol specification

AMENDMENT 1: Efficiency enhancements

Technologies de l'information — Interconnexion de systèmes ouverts (OSI) — Protocole de présentation en mode connexion: Spécification du protocole

AMENDEMENT 1: Améliorations d'efficacité

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Contents

Page

1) Subclause 2.1 1
2) Subclause 2.3 1
3) Subclause 3.4 1
4) Subclause 3.5 2
5) Subclause 4.2 2
6) Subclause 4.3 2
7) Subclause 5.4 2
5.4 *bis* Protocol options 2
5.4 *bis*.1 Nominated context protocol option 3
5.4 *bis*.2 Short encoding protocol option 3
5.4 *bis*.3 Packed encoding rules protocol option 3
5.4 *bis*.4 Null-encoding protocol option 3
5.4 *bis*.5 Short-connect protocol option 4
8) Subclause 6.2.1 4
9) Subclause 6.2.2 4
10) Subclause 6.2.3 5
11) Subclause 6.2.2 5
12) Subclause 6.2.2.16 5
13) Subclause 6.2.3.13 5
14) Subclause 6.2.5 6
15) Subclause 6.2.6 6
16) Subclause 6.2.7.2 7
17) Subclauses 6.2.8 through 6.2.11 8
18) Subclauses 6.4.4.2, 6.4.4.3 and 6.4.4.6 9
19) Subclause 7.1.1.1 10
20) Subclause 7.1.2.1 10
21) Subclauses 7.1.4 through 7.1.6 10
22) Subclause 8.1.1 11
23) Subclause 8.1.2 12
24) Subclauses 8.1.4 through 8.1.6 12
25) Subclause 8.2 13
8.2 *bis* Short-encoding PPDUs 14

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26) Subclause 8.3.1 14
27) Subclause 8.3.3 15
28) Subclause 8.4.1.2 15
29) Subclause 8.4.1.3 15
30) Subclause 8.4.1.4 15
31) Subclause 8.4.2.2 15
32) Subclause 8.4.2.5 15
33) Subclauses 8.4.4 through 8.4.4.2 16
34) Subclause A.4.1.2 16
35) Subclause A.5 16
36) Subclause A.5.2 16
37) Subclause A.6 17

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Amendment 1 to ISO/IEC 8823-1:1994 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 33, *Distributed application services*, in collaboration with ITU-T. The identical text is published as ITU-T Rec. X.226/Amd.1.

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INTERNATIONAL STANDARD

ITU-T RECOMMENDATION

INFORMATION TECHNOLOGY – OPEN SYSTEMS INTERCONNECTION – CONNECTION-ORIENTED PRESENTATION PROTOCOL: PROTOCOL SPECIFICATION

AMENDMENT 1
Efficiency enhancements

1) Subclause 2.1

Add the following references by numerical order:

- ITU-T Recommendation X.691 (1995) | ISO/IEC 8825-2:1995, *Information technology – ASN.1 encoding rules: Specification of Packed Encoding Rules (PER).*
- ITU-T Recommendation X.217 (1995)/Amd.1 (1996) | ISO/IEC 8649:1996/Amd.1:1997, *Information technology – Open Systems Interconnection – Service definition for the Association Control Service Element – Amendment 1: Support of authentication mechanisms for the connectionless mode.*
- ITU-T Recommendation X.227 (1995)/Amd.1 (1996) | ISO/IEC 8650-1:1996/Amd.1:1997, *Information technology – Open Systems Interconnection – Connection-oriented protocol for the Association Control Service Element: Protocol specification – Amendment 1: Incorporation of extensibility markers.*
- ITU-T Recommendation X.216 (1994)/Amd.1 (1997) | ISO/IEC 8822:1994/Amd.1:1998, *Information technology – Open Systems Interconnection – Presentation service definition – Amendment 1: Efficiency enhancements.*

2) Subclause 2.3

Add the following references by numerical order:

- ITU-T Recommendation X.216 (1994)/Addendum 1 (1995), *Service definition for Presentation layer efficiency enhancements.*
- ITU-T Recommendation X.225 (1995)/Addendum 1 (1995), *Protocol specification for Session layer efficiency enhancements.*

3) Subclause 3.4

Add the following new item at the end of the list:

l) Upper-layer context specification.

Consequently, item k) should have, at the end, a semi-colon instead of a period.

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4) Subclause 3.5

Insert the following definition by numerical order:

3.5.3 *bis* nominated context: A member of the Defined Context Set can be nominated by either PPM as its nominated context. There are independent nominated contexts for each direction of communication. There are no nominated contexts unless the nominated context protocol option is selected on the connection. If all the presentation data values in the User-data of PPDU are in the nominated context of the sender, alternative presentation PCI may be used to convey the User-data.

Add the following definitions after 3.5.14:

3.5.15 nominated context protocol option: An option of the presentation protocol that uses an efficient identification of the presentation context of user data when a single presentation data value is present in the user data of a primitive.

3.5.16 short-encoding protocol option: An option of the presentation protocol that uses efficient encoding of a PPDU containing a single presentation data value.

3.5.17 packed encoding protocol option: An option of the presentation protocol under which the Presentation PPDUs are encoded using the ASN.1 Packed Encoding Rules.

3.5.18 null-encoding protocol option: An option of the presentation protocol, negotiated during connection establishment, that permits a data transfer phase with zero presentation protocol control information.

3.5.19 short-connect protocol option: An option of the presentation protocol that permits an efficient negotiation, during connection establishment, of the null-encoding protocol option.

5) Subclause 4.2

Add the following PPDUs at the end of the list:

SHORT-CP PPDU	Short Connect PPDU
SHORT-CPA PPDU	Short Connect Accept PPDU
SHORT-CPR PPDU	Short Connect Reject PPDU

6) Subclause 4.3

Insert the following abbreviations by alphabetical order:

BER	Basic Encoding Rules
PER	Packed Encoding Rules

7) Subclause 5.4

Insert the following new subclauses after 5.4:

5.4 *bis* Protocol options

Protocol options are elements of procedure defined in the Protocol Specification. Some have no effect on the support of the Presentation Service; others imply restrictions on the support of Presentation Service or can only be used with other options that restrict the service.

The options that do not affect support of the Presentation Service can be negotiated at presentation-connection establishment by the Presentation protocol itself. These include the nominated context, short-encoding and packed encoding options.

The null-encoding option supports a restricted subset of the Presentation Service. It can be negotiated at presentation connection establishment.

The short-connect option can only be used to establish a connection that will use the null-encoding option.

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All options apart from short-connect may be negotiated using the fast-associate mechanism (see 6.2.6.9). The short-connect option and the fast-associate mechanism are mutually exclusive. All options may be the subject of *a priori* agreement.

NOTE 1 – The short-encoding and short-connect protocol options are completely separate. Short-encoding applies to the user-data of any PPDU on an established connection. Short-connect applies to the establishment of a connection that will use the null-encoding option.

NOTE 2 – The fast associate mechanism (see 6.2.6.9) is not considered a Presentation protocol option as it is implemented in the Session layer. It can be used to establish a presentation connection that uses any combination of the options, except short-connect.

5.4 *bis*.1 Nominated context protocol option

This protocol option allows each of the protocol machines to choose one of the presentation contexts of the DCS as its nominated context. The nominated context affects the presentation protocol control information that conveys the User-data, in circumstances defined in 8.4. There are independent nominated contexts for each direction – the initiator's nominated context applies to User-data sent by the connection-initiator, the responder's nominated context applies to User-data sent by the connection-responder. Even when the protocol option has been selected, there need not be a nominated context for either or both PPMs.

The nominated context protocol option does not affect the Presentation Service. It has no implications for which session functional units are used.

5.4 *bis*.2 Short encoding protocol option

This protocol option allows use of the Short-encoding form of User-data for any PPDU for which it is defined if the User-data contains only one presentation data value.

This protocol option does not affect the Presentation service. It requires support of the Special User-data parameter of the Session primitive whose User-data is the PPDU.

5.4 *bis*.3 Packed encoding rules protocol option

When this protocol option is selected, the PPDUs that are specified in ASN.1 in 8.2 are encoded using the Packed Encoding Rules. When the protocol option is not selected, these PPDUs are encoded using the Basic Encoding Rules. The negotiation of the Packed Encoding Rules protocol option is described in 6.2.6.8.

5.4 *bis*.4 Null-encoding protocol option

When this protocol option is selected, no presentation protocol control information is conveyed over the established presentation connection. In particular, no PPDUs associated with the normal and abnormal release of the connection are conveyed.

The null-encoding protocol option is used on an established connection. The use of the option restricts support of the Presentation service and is only available if one of the following conditions is applicable:

a) the presentation context definition list contains precisely one item in which the abstract syntax name is known to the responding PPM by bilateral agreement;

b) the presentation context definition list is empty and the default context is known by bilateral agreement;

c) the presentation context definition list is empty and the abstract syntax of the default context is specified in ASN.1 and is known to the responding PPM by bilateral agreement.

The null-encoding does not require particular Session functional units.

NOTE – It is expected that Presentation null-encoding will typically be used with the Session no-orderly-release functional unit, and with the Session null-encoding option, although this is not required.

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5.4 *bis*.5 Short-connect protocol option

The short-connect protocol option is used only in connection establishment to establish a connection on which the null-encoding option will be used, and thus one of the conditions in 5.4 *bis*.4 applies. In addition, it can only be used if both of the following conditions apply:

a) the calling and called presentation selectors are null;

b) the presentation-requirements parameter in the P-CONNECT service includes only the kernel functional unit.

The short-connect protocol option does not require particular Session functional units.

NOTE – It is expected that the Presentation short-connect protocol option will typically be used with the Session short connect mechanism with no upper-layer context identifier present.

8) Subclause 6.2.1

Modify, using the following text, the second paragraph:

The procedure uses the following PPDUs:

If the **short-connect** option is not selected, the connection establishment procedure uses:

a) CP PPDU;

b) CPA PPDU;

c) CPR PPDU.

If the **short-connect** option is selected, the connection establishment procedure uses:

d) SHORT-CP PPDU;

e) SHORT-CPA PPDU;

f) SHORT-CPR PPDU.

9) Subclause 6.2.2

Add the following subclause after 6.2.2.8:

6.2.2.8 *bis* Initiator's nominated context

This shall identify the presentation context from the presentation context definition list that is proposed as the nominated context for the initiating PPM. This parameter shall consist of the presentation context identifier from the appropriate item of the presentation context definition list.

This parameter shall only be present if the nominated context protocol option has been proposed and the presentation context definition list is present.

See also 6.2.6.6.

Add the following subclause after 6.2.2.12:

6.2.2.12 *bis* Protocol options

This shall identify the options of the Presentation protocol selected for use on this connection.

Only options which were proposed in the Protocol options parameter of the CP PPDU shall be selected.

See also 6.2.6.5.

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10) Subclause 6.2.3

Add the following subclause after 6.2.3.8:

6.2.3.8 *bis* Responder's nominated context

This shall identify the presentation context from the DCS that shall be the nominated context for the responding PPM. This parameter shall consist of the presentation context identifier for the presentation context being nominated.

This parameter shall only be present if the nominated context protocol option has been selected and the DCS is not empty.

See also 6.2.6.6.

11) Subclause 6.2.2

Add the following subclause after 6.2.2.15:

6.2.2.15 *bis* Protocol options

This shall identify each of the options of the Presentation protocol that the initiating PPM supports and proposes for use on this connection.

The protocol options defined are:

a) nominated context;

b) short-encoding;

c) Packed Encoding Rules;

d) null-encoding.

NOTE – The short-connect protocol option is not represented in this parameter, as the CP PPDU is not used with the short-connect protocol option.

If the parameter is absent, no options are proposed.

See also 6.2.6.5.

12) Subclause 6.2.2.16

Add at the end of the first sentence:

unless the fast-associate mechanism is used, in which case, if the User-data parameter does not appear on the P-CONNECT indication service primitive, the semantic content of the User-data shall be conveyed in the User-Summary parameter.

Consequently, replace the period after the word issued *by a comma.*

Add, after 6.2.2.16, the following subclause:

6.2.2.17 User Summary

This shall be the User Summary parameter from the P-CONNECT request service primitive. If the fast-associate mechanism is used and the User data parameter does not appear on the P-CONNECT indication service primitive, the User Summary parameter shall appear.

13) Subclause 6.2.3.13

Add at the end of the first sentence:

unless the fast-associate mechanism is used, in which case, if the User data parameter does not appear on the P-CONNECT indication service primitive, the semantic content of the User data shall be conveyed in the User Summary parameter.

Consequently, replace the period after the word service *by a comma.*

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Add, after 6.2.3.13, the following subclause:

6.2.3.14 User Summary

This shall be the User Summary parameter from the P-CONNECT request service primitive. If the fast-associate mechanism is used and the User data parameter does not appear on the P-CONNECT indication service primitive, the User Summary parameter shall appear.

14) Subclause 6.2.5

Add, immediately following the subclause heading, the following text:

If the null-encoding option is not selected, the connection establishment procedure is described in 6.2.6 through 6.2.7.

15) Subclause 6.2.6

Add, after 6.2.6.4, the following subclauses:

6.2.6.5 Protocol option negotiation

Presentation protocol options are negotiated between the two PPMs.

If the initiating PPM wishes to propose any of the protocol options, it identifies these in the Protocol options parameter of the CP PPDU. If it does not wish to propose any options, there is no Protocol options parameter on the CP PPDU.

In the CPA PPDU, the responding PPM indicates which of the proposed protocol options will be used on the connection. This shall include only options that were proposed on the CP PPDU and are supported by the responding PPM. If none of the options are selected for use on the connection, there is no Protocol options parameter on the CPA PPDU.

NOTE – The earlier editions of this Specification did not define any of the protocol options, or the Protocol options parameter. The rules of extensibility in 8.5 ensure that a responding PPM receiving a CP PPDU proposing options that are not recognized will ignore, and thus negotiate out, option proposals or the entire Protocol options parameter.

6.2.6.6 Nominated context

Each PPM determines which one (if any) of the presentation contexts of DCS shall be its nominated context (which will affect the encoding of User-data in the PPDUs it will send on the presentation connection). The PPM is not required to propose a nominated context, even if the nominated context protocol option is proposed and selected on the connection. If the PPM does not propose a nominated context, it has no nominated context.

The initiating PPM proposes the nominated context that will apply to PPDUs it will send (other than the CP and CPC-type PPDUs) by identifying one of the items in the presentation context definition list. If this presentation context is accepted by the responder in the presentation context result list, and the nominated context protocol option is selected on the connection, the context becomes the initiating PPM's nominated context when the CPA PPDU is received by the initiator. If the presentation context is rejected by the responding PPM or the responding Presentation user, but the connection is accepted, there is no nominated context for the initiating PPM. If the nominated context protocol option is not selected, there is no nominated context for either PPM.

The responding PPM identifies one element of the DCS as its nominated context. This immediately becomes the nominated context for the responding PPM. The nomination of the context applies to the encoding User-data of the CPA PPDU.

6.2.6.7 Short-encoding protocol option

The use of the short-encoding is negotiated between the two PPMs. The protocol option is selected only if both PPMs propose it.

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6.2.6.8 Packed encoding rules protocol option

Since use of the Packed encoding rules protocol option can include the encoding of the CP PPDU, negotiation of this protocol option is not always possible. The following mechanisms are available:

a) The use of the Packed encoding rules can be negotiated using the fast-associate mechanism. In this case, the semantics of the CP PPDU are then conveyed by the SS-user summary parameter of S-CONNECT.

b) The CP PPDU can be encoded using BER, but including a protocol options field that offers the PER protocol option. If the responder accepts the option, the CPA and all subsequent PPDUs are encoded using PER. If the responder does not accept the option, all PPDUs are encoded using BER.

NOTE 1 – The encoding rules used for the CPA PPDU can be determined from the high-order three bits of the first octet of the encoded CPA PPDU. For BER, these will be "001" (from the UNIVERSAL tag for SET and the constructed flag). For PER, these bits will be "011" (from the bit map for optional elements and the choice of mode).

c) The CP PPDU is encoded using PER. If the responder does not support the protocol option, the PER-encoded CP will appear to be a protocol error.

NOTE 2 – As the use of the CP PPDU is not negotiated in c), this mechanism is only suitable if it is known *a priori* that the PER protocol option is supported by the responder.

If the responding PPM sends a CPR PPDU (as specified in 6.2.5.5 or 6.2.5.6) the CPR PPDU shall use the same encoding rules as the received CP-type PPDU.

6.2.6.9 Fast-associate mechanism

If the fast associate mechanism is used during connection establishment, the initiating PPM as well as forming a CP PPDU to be passed to the Session service-provider in the User Data parameter of an S-CONNECT request, also passes the semantic content of the CP PPDU in the User Summary parameter of the S-CONNECT request. The User Summary parameter references an Upper-Layer Context specification and is a purely abstract parameter. If the P-CONNECT request User Information parameter was present, the semantic content of this will have been supplied to the PPM in the User Summary parameter of the P-CONNECT request, and is conceptually included in the User Summary parameter of the S-CONNECT request.

If Session provider (via the Session protocol) makes use of the fast associate mechanism, the responding PPM will receive only the User Summary parameter on the S-CONNECT indication, and not the User Data. The responding implementation will reconstruct the semantic content of the CP PPDU that would have been present in the S-CONNECT User-data, and issue a P-CONNECT indication with a User Summary parameter in place of its User data.

Similarly, the responding PPM will form a User Summary parameter on the S-CONNECT response from the CPA PPDU, including the semantic content of the User Summary parameter of the P-CONNECT response (if present) by reference to the same Upper-Layer Context specification. The initiating PPM reconstructs the CPA PPDU.

NOTE – The passing of the User Summary parameters and reconstruction of the PPDUs from the Session User Summary parameters is abstract. There is no requirement for a real implementation to perform these actions.

16) Subclause 6.2.7.2

Amend the first paragraph of 6.2.7.2 as follows:

If the initiating PPM receives an S-P-ABORT indication service primitive or an ARP PPDU, or an S-U-ABORT indication service primitive with no SS-user-data parameter, it shall issue a P-P-ABORT indication service primitive and the presentation-connection shall not be established.

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17) Subclauses 6.2.8 through 6.2.11

Add the following new subclauses 6.2.8 through 6.2.11, including all subclauses therein, after 6.2.7.2:

6.2.8 SHORT-CPA PPDU associated parameters

6.2.8.1 Encoding choice

This shall indicate the transfer syntax to be used for the (single) presentation context (which may be the default context) as follows:

a) transparent encoding (understood by bilateral agreement);

b) Basic Encoding Rules;

c) Packed Encoding Rules (unaligned variant);

d) Packed Encoding Rules (aligned variant).

The transfer syntaxes b), c) or d) apply only if the abstract syntax is specified using ASN.1.

6.2.8.2 User-data

This shall be the User-data parameter for the P-CONNECT response service primitive.

6.2.9 SHORT-CPR PPDU associated parameters

6.2.9.1 Encoding choice

This shall indicate the transfer syntax for the (single) presentation context (which may be the default context) as follows:

a) transparent encoding (understood by bilateral agreement);

b) Basic Encoding Rules;

c) Packed Encoding Rules (unaligned variant);

d) Packed Encoding Rules (aligned variant).

The transfer syntaxes b), c) or d) apply only if the abstract syntax is specified using ASN.1.

6.2.9.2 Reason

This parameter shall indicate that the rejection is either by the responding presentation service-provider or the responding presentation user. This parameter shall indicate the reason for the rejection of the presentation-connection establishment and shall appear as the Result parameter of the P-CONNECT confirm service primitive. It shall take one of the following values:

- presentation-user;
- reason not specified (transient);
- temporary congestion (transient);
- local limit exceeded (transient);
- called presentation-address unknown (permanent);
- protocol version not supported (permanent);
- default context not supported (permanent);
- user data not readable (permanent).

6.2.9.3 User-data

This shall be the User-data parameter for the P-CONNECT response service primitive.

6.2.10 SHORT-CP PPDU associated parameters

6.2.10.1 Encoding choice

This shall indicate the transfer syntax to be used for the (single) presentation context (which may be the default context) as follows:

a) transparent encoding (understood by bilateral agreement);

b) Basic Encoding Rules;

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c) Packed Encoding Rules (unaligned variant);

d) Packed Encoding Rules (aligned variant).

The transfer syntaxes b), c) or d) apply only if the abstract syntax is specified using ASN.1.

6.2.10.2 User-data

This shall be the User-data parameter for the P-CONNECT request service primitive.

6.2.11 Connection establishment procedure using the short-connect protocol option

6.2.11.1 When a P-CONNECT request service primitive is received by a PPM (the initiator), and the null-encoding option is to be proposed (thus, one of the conditions in 5.4 *bis*.4 applies) and all of the conditions of 5.4 *bis*.5 apply, the PPM may choose to use the short-connect protocol option. In this case, it shall initiate the establishment of a presentation connection by sending the SHORT-CP PPDU containing the encoding option selection parameter and user data.

6.2.11.2 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 "provider-rejection" and the presentation-connection shall not be established.

6.2.11.3 The responding PPM may refuse the proposed presentation-connection (if, for example, the encoding choice offered on the SHORT-CP PPDU is unacceptable), in which case it shall send a SHORT-CPR PPDU with a Reason parameter included (see 6.2.9.2). Alternatively, if not refusing, it shall issue a P-CONNECT indication service primitive.

6.2.11.4 When a P-CONNECT response service primitive is received by a PPM (the responder) with a Result parameter value of "user rejection", it shall refuse the establishment of a presentation connection by sending the SHORT-CPR PPDU. If it receives a P-CONNECT response primitive with a Result parameter value of "acceptance", it shall send a SHORT-CPA PPDU and the presentation-connection shall be established.

6.2.11.5 If the initiating PPM receives a SHORT-CPR PPDU refusing the presentation-connection, then it shall issue a P-CONNECT confirm service primitive with a Result parameter value set based on the encoding of the received Reason parameter, and the presentation-connection shall not be established.

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

6.2.11.7 If the presentation-connection is established, the transfer syntax of the User data belonging to the (single) presentation context (which may be the default context) is set according to the encoding-choice parameter value of the SHORT-CPA PPDU.

18) Subclauses 6.4.4.2, 6.4.4.3 and 6.4.4.6

Amend text as indicated:

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. If the null encoding protocol option has been selected, then issue an S-U-ABORT request primitive with no SS-user-data parameter. 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. If the null-encoding protocol option has been selected, then issue an S-U-ABORT request primitive with no SS-user-data parameter. The presentation-connection shall be released.

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6.4.4.6 ARP PPDU

When a PPM receives an ARP PPDU, or an S-U-ABORT indication service primitive with no SS-user-data parameter, it shall issue a P-P-ABORT indication service primitive and the presentation-connection shall be released.

19) Subclause 7.1.1.1

Add at the end of Table 1:

CP-PPDU associated parameter	S-CONNECT parameter	m/nm/s
User summary	SS-User-summary	nm

20) Subclause 7.1.2.1

Add at the end of Table 2:

CPA-PPDU associated parameter	S-CONNECT parameter	m/nm/s
User summary	SS-User-summary	nm

21) Subclauses 7.1.4 through 7.1.6

Add the following new subclauses 7.1.4 through 7.1.6, after 7.1.3.2:

7.1.4 SHORT-CPA PPDU

The SHORT-CPA PPDU shall be conveyed from the responding PPM to the initiating PPM in the S-CONNECT response and confirm primitives when the presentation connection is established.

7.1.4.1 SHORT-CPA PPDU associated parameters

Table 4 *bis* defines the mapping of the SHORT-CPA PPDU associated parameters onto the S-CONNECT parameters.

Table 4 *bis* – Mapping of SHORT-CPA PPDU associated parameters onto S-CONNECT parameters

SHORT-CPA PPDU associated parameter	S-CONNECT parameter	m/nm
Encoding-choice	SS-User-data	m
User data	SS-User-data	nm
m Mandatory nm Non-mandatory		

7.1.4.2 S-CONNECT Result parameter

This parameter shall have the value "accept".

7.1.5 SHORT-CPR PPDU

The SHORT-CPR PPDU shall be conveyed from the responding PPM to the initiating PPM in the S-CONNECT response and confirm primitives when the presentation-connection is not established.

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7.1.5.1 SHORT-CPR PPDU associated parameters

Table 4 *ter* defines the mapping of the SHORT-CPR PPDU associated parameters onto the S-CONNECT parameters.

Table 4 *ter* – Mapping of SHORT-CPR PPDU associated parameters onto S-CONNECT parameters

SHORT-CPR PPDU associated parameter	S-CONNECT parameter	m/nm
Encoding-choice	SS-User-data	m
Reason	SS-User-data	m
User data	SS-User-data	nm
m Mandatory nm Non-mandatory		

7.1.5.2 S-CONNECT Result parameter

This parameter may take the values:

- "reject by SS-provider" (a whole class of values);
- "reject be called SS-user" 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.

7.1.6 SHORT-CP PPDU

The SHORT-CP PPDU shall be conveyed from the initiating PPM to the responding PPM in the S-CONNECT request and indication primitives to establish the presentation-connection.

7.1.6.1 SHORT-CP PPDU associated parameters

Table 4 *quater* defines the mapping of the SHORT-CP PPDU associated parameters onto the S-CONNECT parameters.

Table 4 *quater* – Mapping of SHORT-CP PPDU associated parameters onto S-CONNECT parameters

SHORT-CP PPDU associated parameter	S-CONNECT parameter	m/nm
Encoding-choice	SS-User-data	m
User data	SS-User-data	nm
m Mandatory nm Non-mandatory		

22) Subclause 8.1.1

Add at the end of the list:

c) the structure of session-service primitives Special User-data parameter values.

Consequently, change the period at the end of item b) to semi-colon.

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23) Subclause 8.1.2

Change the first sentence with the addition of the following text:

8.1.2 The structure of SS-user data parameter values except for those in the SHORT-CPA, SHORT-CPR and SHORT-CP PPDUs is specified using:

Add at the end of the list:

d) the specification of the short-encoding PPDUs in 8.2 *bis*.

Consequently, change the period at the end of item c) to semi-colon.

Add at end of 8.1.2 the following sentence:

The structure of the SHORT-CPR, SHORT-CPA and the SHORT-CP PPDUs are specified in 8.1.4, 8.1.5 and 8.1.6 respectively.

24) Subclauses 8.1.4 through 8.1.6

Add the following new subclauses 8.1.4 through 8.1.6, after 8.1.3:

8.1.4 SHORT-CPR PPDU

The protocol control information of the SHORT-CPR PPDU shall be one octet, with the bits 6-4 identifying the Reason parameter and the two trailing bits consisting of the encoding-choice parameter. This PCI is followed by the User-data parameter (encoded as per the encoding-choice parameter).

The encoding of the SHORT-CPR is as shown in the following bit pattern:

0yyy00zz

where yyy identifies the Reason parameter defined as follows:

- 000: presentation-user;
- 001: reason not specified (transient);
- 010: temporary congestion (transient);
- 011: local limit exceeded (transient);
- 100: called presentation-address unknown (permanent);
- 101: protocol version not supported (permanent);
- 110: default context not supported (permanent);
- 111: user data not readable (permanent).

and zz identifies the encoding-choice as follows:

- 00: bilateral agreement;
- 01: BER;
- 10: unaligned PER;
- 11: aligned PER.

The User-data shall be of type null-encoding (see 8.4.4).

8.1.5 SHORT-CPA PPDU

The protocol control information of the SHORT-CPA PPDU shall be one octet, with the two trailing bits consisting of the encoding-choice parameter. This PCI is followed by the User-data parameter (encoded as per the encoding-choice parameter).

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The encoding of the SHORT-CPA is as shown in the following bit pattern:

0000 00zz

where zz identifies the encoding-choice as follows:

- 00: bilateral agreement;
- 01: BER;
- 10: unaligned PER;
- 11: aligned PER.

The User-data shall be of type null-encoding (see 8.4.4).

8.1.6 SHORT-CP PPDU

The protocol control information of the SHORT-CP PPDU shall be one octet, with the two trailing bits consisting of the encoding-choice parameter. This PCI is followed by the User-data parameter (encoded as per the encoding-choice parameter).

The encoding of the SHORT-CP is as shown in the following bit pattern:

0000 00zz

where zz identifies the encoding-choice as follows:

- 00: bilateral agreement;
- 01: BER;
- 10: unaligned PER;
- 11: aligned PER.

The User-data shall be of type null-encoding (see 8.4.4).

25) Subclause 8.2

Add to **CP-type**, *just before* **"user-data"**:

```
protocol-options                [11] Protocol-options DEFAULT {},
                                  -- shall be absent if no options are offered
initiators-nominated-context    [12] Presentation-context-identifier
                        OPTIONAL,
                                  -- shall only be present if nominated-context is
                                  -- offered in protocol-options
extensions                      [14] SEQUENCE { ... } OPTIONAL,
                                  -- to allow for future extensions
```

Add to **CPA-PPDU**, *just before* **"user-data"**:

```
protocol-options                [11] Protocol-options DEFAULT {},
                                  -- shall be absent if no options are selected
responders-nominated-context    [13] Presentation-context-identifier
                        OPTIONAL,
                                  -- shall only be present if nominated-context is
                                  -- selected in protocol-options
```

NOTE – Extension markers are only used in the CP PPDU. Presentation does not have a context-free transfer syntax, and does not identify its own encoding with a transfer syntax name, thus future extensions to PPDUs other than CP can be added using comments, provided these comments link the presence of the extensions to some field in the CP.

Add extensibility markers, " , ... " at the end of **Abort-reason** *and* **Event-identifier** *definitions.*

In the definitions of **Context-list**, **Presentation-context-deletion-list**, **Presentation-context-deletion-result-list**, **Presentation-context-identifier-list** *and* **Result-list** *change* **"SEQUENCE OF"** *to:*

```
SEQUENCE SIZE (0..7,...,8..MAX) OF
```


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Make the definition of **Presentation-context-identifier**:

Presentation-context-identifier :: = INTEGER
(1..127, ..., 128..MAX)

Add extensibility markers, " , ... " at the end of **Presentation-requirements**, **Protocol-version** *and* **Provider-reason**.

Make the definition of **Presentation-selector**:

Presentation-selector ::= OCTET STRING SIZE (1..4,...,0,5..MAX)

Add extensibility markers, " , ... " at the end of **Presentation requirements**.

Add before **Protocol-version**:

```
Protocol-options    ::= BIT STRING { nominated-context (0),
                                     short-encoding (1),
                                     packed-encoding-rules (2),
                                     ...
                                   }
```

Add extensibility markers, " , ... " at the end of the **CHOICE** *in* **User-data**.

In the definition of **Fully-encoded-data** *change* **"SEQUENCE OF"** *to:*

SEQUENCE SIZE (1,...,2..MAX) OF

Add, after 8.2, before 8.3:

8.2 *bis* Short-encoding PPDUs

8.2 *bis*.1 If the short-encoding protocol option is selected on the Presentation connection, and the PPM receives a P-DATA request in which the PS-User data value contains a single presentation data value, the PPM may optionally choose to use either the User-data type specified in 8.2, 8.3 and 8.4 or the encoding specified in 8.2 *bis*.2 or 8.2 *bis*.3 (corresponding to a "SHORT DT" PPDU). If the latter is used, a value, as specified in 8.2 *bis*.2 or 8.2 *bis*.3 shall be conveyed in the Special User-data parameter of the S-DATA request.

8.2 *bis*.2 If the presentation data value is from the nominated context, or the DCS contains only one member and the context management functional unit is not selected or the DCS is empty, then:

a) the SS-user data parameter of the S-DATA request shall be the concatenation of the bitstrings resulting from the encoding of the presentation data value forming the PS-User data value according to the appropriate transfer syntax;

b) the Special User-data parameter of the S-DATA request shall be the value 1 (i.e. the bitstring "01").

8.2 *bis*.3 If the DCS contains more than one element and the presentation data value in the PS-user data value is from a presentation context that is a member of the DCS, has a presentation context identifier that is less than 255, and is not the nominated context, then:

a) the first octet of the SS-User data parameter of the S-DATA request shall be the presentation context identifier encoded as a binary integer;

b) the second and all subsequent octets of the SS-User data parameter of the S-DATA request shall be the concatenation of the bitstrings resulting from the encoding of the presentation data value forming the PS-User data value according to the appropriate transfer syntax;

c) the Special User-data parameter of the S-DATA request shall be the value 2 (i.e. the bitstring "10").

26) Subclause 8.3.1

Change 8.3.1 to:

8.3.1 Except for type User-data, ASN.1 datatypes specified in 8.2 shall be encoded:

a) if the packed-encoding-rules protocol option is not selected, according to the Basic Encoding Rules for ASN.1 (see ITU-T Rec. X.690 | ISO/IEC 8825-1); or

b) if the packed-encoding-rules protocol option is selected, according to the Packed Encoding Rules for ASN.1 (see ITU-T Rec. X.691 | ISO/IEC 8825-2).

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27) Subclause 8.3.3

Add at the beginning of 8.3.3 the following text:

8.3.3 Unless the null-encoding protocol option is selected, 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.

28) Subclause 8.4.1.2

Replace the text of this subclause by the following text:

The User-data value shall be of type Simply-encoded-data when the default context is used and the null-encoding protocol option is not selected.

29) Subclause 8.4.1.3

Replace the text of this subclause by the following text:

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 and the null-encoding protocol option is not selected.

Add, before the Note in 8.4.1.3:

8.4.1.3 *bis* The User-data value shall be of type Simply-encoded-data if the nominated-context protocol option has been selected and the presentation-data-values are from the presentation-context nominated by the sender.

30) Subclause 8.4.1.4

Replace item b) by:

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:

   i) if the packed-encoding-rules protocol option is not selected, according to the Basic Encoding Rules for ASN.1 (see ITU-T Rec. X.690 | ISO/IEC 8825-1); or

   ii) if the packed-encoding-rules protocol option is selected, according to the Packed Encoding Rules for ASN.1 (see ITU-T Rec. X.691 | ISO/IEC 8825-2).

31) Subclause 8.4.2.2

Replace a) and b) by:

a) the DCS contains more than one member and the nominated-context protocol option has not been selected; or

b) the context management functional unit has been selected and the nominated-context protocol option has not been selected; or

c) the presentation-data-values are not all from the presentation-context nominated by the sender.

If the nominated context uses a transfer syntax that produces non-self-delimiting values, the sender shall send only one pdv from the nominated context on a single Presentation primitive.

Add at the beginning of 8.4.2.4:

When the packed-encoding-rules protocol option is not selected,

32) Subclause 8.4.2.5

Add at the beginning of this subclause:

When the packed-encoding-rules protocol option is not selected,

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Add after this subclause and before 8.4.2.6:

8.4.2.5 *bis* When the packed-encoding-rules protocol option is selected, Full encoding shall be the application of the Packed Encoding Rules for ASN.1 (see ITU-T Rec. X.691 | ISO/IEC 8825-2) 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 *ter*.

8.4.2.5 *ter* When the packed-encoding-rules protocol option is selected, the presentation data values component of a PDV-list value shall be encoded according to the Packed Encoding Rules for ASN.1 (see ITU-T Rec. X.691 | ISO/IEC 8825-2). The various options for the presentation-data-values component of the PDV-list value shall be as specified in 8.4.2.5, a), b) and c).

NOTE – The use of the single ASN.1 type applies only to a value encoded according to the Basic Encoding Rules, even if the Presentation PCI is encoded according to the Packed Encoding Rules.

33) Subclauses 8.4.4 through 8.4.4.2

Add the following new subclauses 8.4.4 through 8.4.4.2, after 8.4.3.2:

8.4.4 Null encoding

8.4.4.1 This encoding shall be used when the null-encoding protocol option is selected on the Presentation connection.

8.4.4.2 Null encoding shall be the concatenation of the bit strings.

34) Subclause A.4.1.2

Replace A.4.1.2 as follows:

A.4.1.2 If the incoming event is related to a received PPDU or SS-provider event, the PPM shall issue a P-P-ABORT indication. If there is an underlying session-connection, the PPM shall issue an ARP PPDU if possible, or if the null encoding protocol option has been selected, then issue an S-U-ABORT request primitive with no SS-user-data parameter.

35) Subclause A.5

Add as A.5.1 bis:

A.5.1 *bis* Protocol options

A set of protocol options used in the procedures specified in this annex is defined as:

po-dom = (NC)

where NC is the nominated context protocol option.

A Boolean function PO is defined over po-dom as follows:

for p in po-dom

PO(p) = true if, and only if, the protocol option p has been selected during the presentation-connection establishment phase.

36) Subclause A.5.2

Add to list in A.5.2:

h) the nominated context of this PPM;

i) the presentation context proposed as the nominated context for the initiating PPM;

j) the known nominated context of the peer PPM.

Consequently, change the period at the end of item g) to semi-colon.

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37) Subclause A.6

Add the following row to Table A.16 after S-P-Abind*:*

Abbreviated Name	Category	Name and Description
S-U-ABind-nd	SS primitive	S-U-ABORT indication with no SS-user-data parameter

Add the following rows to Table A.17:

Abbreviated name	Name and description
STAI3	await SCA PPDU
STAI4	await P-CONNECT response

Add the following rows to Table A.18:

Abbreviated Name	Category	Name and Description
SCA	PPDU	SHORT CONNECT ACCEPT
SCR	PPDU	SHORT CONNECT REJECT
SCN	PPDU	SHORT CONNECT

Add the following rows to Table A.19:

Code	Action
[24]	If the PPDU contains an Initiator's nominated context parameter, record the presentation context proposed as the nominated context of the initiating PPM.
[25]	If PO(NC) is TRUE and the presentation context proposed for the nominated context of the initiating PPM is a member of the DCS, then record that context as the known nominated context of the peer PPM.
[26]	If PO(NC) is TRUE and the presentation context proposed for the nominated context of the initiating PPM is a member of the DCS, then record that context as the nominated context of this PPM.
[27]	If PO(NC) is TRUE and the PPDU contains a Responder's nominated context parameter, then record that context as the nominated context of this PPM.
[28]	If PO(NC) is TRUE and the PPDU contains a Responder's nominated context parameter, then record that context as the known nominated context of the peer PPM.

Add the following row to Table A.20:

Code	Meaning
p31	Local choice and conditions for choosing the null-encoding and short-connect protocol options as defined in 5.4 *bis* are satisfied.

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Replace Table A.21 by:

Table A.21 – Connection establishment

	STAI0 idle no connection	STAI1 await CPA	STAI2 await P-CONrsp after CP received	STAI3 await SCA	STAI4 await P-CONrsp after SCN received
P-CONreq	p02 & p03 & ¬p31 [04][05][02][20] [24] CP STAI1 p31 [03][24] SCN STAI3				
CP	p01 & p02 & p03 & p22 [01][02][20] [24] P-CONind STAI2 ^p01 OR ^p02 OR ^p22 [01] [24] CPR STAI0				
P-CONrsp+			p04 [06] [12] [26][28] CPA STAt0		SCA STAt0
CPA		p04 [03] [12] [25][27] P-CONcnf+ STAt0			
P-CONrsp			p04 [06] CPR STAI0		SCR STAI0
CPR		p04 P-CONcnf STAI0			
S-CONcnf		P-CONcnf STAI0		P-CONcnf STAI0	
SCA				[12] P-CONcnf+ STAt0	
SCN	p01 & p22 P-CONind STAI4 ¬p01 OR ¬p22 ARP STAI0				
SCR				P-CONcnf STAI0	

Add the following bottom row to Table A.23:

S-U-ABind-nd	P-PABind STAI0	P-PABind STAI0	P-PABind STAI0	P-PABind STAI0	P-PABind STAI0	P-PABind STAI0

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4851903 0581922 980

CONTENTS

Page

1 Scope 1

2 Normative references 1

2.1 Identical ITU-T Recommendations | International Standards 1

2.2 Paired ITU-T Recommendations | International Standards equivalent in technical content 2

2.3 Additional References 2

SECTION 1 – GENERAL 2

3 Definitions 2

3.1 Reference Model definitions 2

3.2 Service conventions definitions 3

3.3 Naming and Addressing definitions 3

3.4 Presentation Service definitions 3

3.5 Presentation protocol definitions 3

4 Abbreviations 4

4.1 Data Units 4

4.2 Types of presentation-protocol-data-units 4

4.3 Other abbreviations 5

5 Overview of the presentation protocol 5

5.1 Service provided by the Presentation Layer 5

5.2 Service assumed from the Session Layer 5

5.3 Functions of the Presentation Layer 5

5.4 Presentation functional units 5

5.5 Model of the Presentation Layer 6

SECTION 2 – PRESENTATION PROTOCOL SPECIFICATION 6

6 Elements of Procedure 6

6.1 User data parameters 7

6.2 Connection establishment 7

6.3 Normal release of connection 14

6.4 Abnormal release of connection 14

6.5 Context alteration 15

6.6 Information transfer 18

6.7 Token handling 19

6.8 Synchronization and resynchronization 19

6.9 Exception reporting 21

6.10 Activity management 22

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4851903 0581923 817

7 Mapping of PPDUs onto the session-service 22
7.1 Connection establishment 22
7.2 Normal release of connection 24
7.3 Abnormal release of connection 25
7.4 Context alteration 26
7.5 Information transfer 26
7.6 Token handling 27
7.7 Synchronization 27
7.8 Resynchronization 28
7.9 Exception reporting 29
7.10 Activity management 29
8 Structure and encoding of PPDUs 30
8.1 General 30
8.2 Structure of SS-user data parameter values 30
8.3 Encoding of SS-user data parameter values 36
8.4 Encoding of values of type User-data 36
8.5 Rules of extensibility for normal mode 37
SECTION 3 – CONFORMANCE 37
9 Conformance 37
9.1 Dynamic Conformance 37
9.2 Static Conformance 38
9.3 Protocol implementation conformance statement 38
10 Precedence 38
Annex A – State Tables 39
A.1 General 39
A.2 Notation for state tables 39
A.3 Conventions for entries in state tables 39
A.4 Actions to be taken by the PPM 39
A.5 Definition of sets and variables 40
A.6 Relationship to Session-service 41
Annex B – Registration of Transfer Syntaxes 58
B.1 Introduction 58
B.2 Registration Procedures 58
B.3 Form of registration of a transfer syntax 58
Annex C – Corrections and enhancements incorporated in ITU-T Rec. X.226 | ISO/IEC 8823-1 60

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

International Standard ISO/IEC 8823-1 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 21, *Open systems interconnection, data management and open distributed processing*, in collaboration with ITU-T. The identical text is published as ITU-T Recommendation X.226.

This second edition cancels and replaces the first edition (ISO 8823:1988), and is a consolidation of the first edition and Amendment 5:1992.

ISO/IEC 8823 consists of the following parts, under the general title *Information technology — Open Systems Interconnection — Connection-oriented presentation protocol:*

— *Part 1: Protocol specification*

— *Part 2: Protocol Implementation Conformance Statement (PICS) Proforma*

Annexes A and B form an integral part of this part of ISO/IEC 10026. Annex C is for information only.

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Introduction

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

This ITU-T Recommendation | International Standard 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 ITU-T Recommendation | International Standard 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 initial users of this ITU-T Recommendation | International Standard 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 ITU-T Recommendation | International Standard, 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 ITU-T Recommendation | International Standard does not contain any tests to demonstrate this conformance and cannot, therefore, be considered as a complete product standard. The variations and options available within this ITU-T Recommendation | International Standard 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 ITU-T Recommendation | International Standard with statements of the options provided or required, or with statements of the intended purpose of provision or use.

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INTERNATIONAL STANDARD

ITU-T RECOMMENDATION

INFORMATION TECHNOLOGY – OPEN SYSTEMS INTERCONNECTION – CONNECTION-ORIENTED PRESENTATION PROTOCOL: PROTOCOL SPECIFICATION

1 Scope[1)]

1.1 This ITU-T Recommendation | International Standard 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 ITU-T Recommendation | International Standard supplemented by state tables in Annex A.

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 ITU-T Recommendation | International Standard also specifies conformance criteria for systems implementing these procedures. It does not contain tests which can be used to demonstrate this conformance.

2 Normative references

The following ITU-T Recomendations and International Standards contain provisions which, through reference in this text, constitute provisions of this ITU-T Recommendation | International Standard. At the time of publication, the editions indicated were valid. All Recommendations and Standards are subject to revision, and parties to agreements based on this ITU-T Recommendation | International Standard are encouraged to investigate the possibility of appllying the most recent editions of the Standards and Recommendations listed below. Members of IEC and ISO maintain registers of currently valid International Standards. The ITU-T Secretariat maintains a list of currently valid ITU-T Recommendations.

2.1 Identical ITU-T Recommendations | International Standards

– ITU-T Recommendation X.200 (1994) | ISO/IEC 7498:1994, *Information technology – Open Systems Interconnection – Basic Reference Model: The basic model.*

[1)] The implementation and use of this Recommendation | International Standard 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 ITU-T Recommendations, or under the mechanisms identified in the Registration Authority procedures. A Registration procedures specification is given in Annex B.

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- ITU-T Recommendation X.215 (1994) | ISO/IEC 8326:1994, *Information technology – Open Systems Interconnection – Session service definition.*
- ITU-T Recommendation X.246 (1994) | ISO/IEC 8823-2:1994, *Information technology – Open Systems Interconnection – Connection-oriented presentation protocol: Protocol implementation Conformance Statement (PICS) proforma.*
- ITU-T Recommendation X.680 (1994) | ISO/IEC 8824-1:1994, *Information technology – Abstract Syntax Notation One* (ASN.1): *Specification of basic notation.*
- ITU-T Recommendation X.690 (1994) | ISO/IEC 8825-1:1994, *Information technology – ASN.1 encoding rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER).*
- ITU-T Recommendation X.216 (1994) | ISO/IEC 8822:1994, *Information technology – Open Systems Interconnection – Presentation service definition.*
- ITU-T Recommendation X.660 (1992) | ISO/IEC 9834-1:1993, *Information technology – Open Systems Interconnection – Procedures for the operation of OSI registration authorities: General procedures.*
- ITU-T Recommendation X.210 (1993) | ISO/IEC 10731:1994, *Information technology – Open Systems Interconnection – Basic Reference Model: Conventions for the definition of OSI services.*

2.2 Paired ITU-T Recommendations | International Standards equivalent in technical content

- ITU-T Recommendation X.208 (1992), *Open Systems Interconnection – Specification of Abstract Syntax Notation One (ASN.1).*

  ISO/IEC 8824:1990, *Information processing systems – Open Systems Interconnection – Specification of Abstract Syntax Notation One (ASN.1).*
- ITU-T Recommendation X.209 (1992), *Open Systems Interconnection – Specification of Basic Encoding Rules for Abstract Syntax Notation One (ASN.1).*

  ISO/IEC 8825:1990, *Information processing systems – Open Systems Interconnection – Specification of Basic Encoding Rules for Abstract Syntax Notation One (ASN.1).*
- CCITT Recommendation X.650 (1992), *Open Systems Interconnection (OSI) – Reference Model for naming and addressing.*

  ISO 7498-3:1989, *Information processing systems – Open Systems Interconnection – Basic Reference Model – Part 3: Naming and addressing.*

2.3 Additional References

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

SECTION 1 – GENERAL

3 Definitions

3.1 Reference Model definitions

This ITU-T Recommendation | International Standard is based on the concepts developed in ITU-T Rec. X.200 | ISO/IEC 7498 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;

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h) session-connection;

i) Session Layer;

j) session-service-access-point;

k) session-service-data-unit;

l) session-service-provider;

m) transfer syntax.

3.2 Service conventions definitions

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

a) service-user;

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

a) session-address;

b) presentation-address;

c) presentation-selector.

3.4 Presentation Service definitions

This ITU-T Recommendation | International Standard is also based on concepts developed in ITU-T Rec. X.216 | ISO/IEC 8822 and makes use of the following terms defined in that International Standard:

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 context;

i) functional unit;

j) X.410-1984 mode;

k) normal mode.

3.5 Presentation protocol definitions

For the purpose of this ITU-T Recommendation | International Standard, the following definitions apply:

3.5.1 local matter: A decision made by a system concerning its behaviour in the Presentation Layer that is not subject to the requirements of this ITU-T Recommendation | International Standard.

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3.5.2 valid presentation-protocol-data-unit: A presentation-protocol-data-unit which complies with the requirements of this ITU-T Recommendation | International Standard for structure and encoding.

3.5.3 invalid presentation-protocol-data-unit: A presentation-protocol-data-unit which does not comply with the requirements of this ITU-T Recommendation | International Standard for structure and encoding.

3.5.4 protocol error: A situation occurring when a presentation-protocol-data-unit is used in a way which does not comply with the procedures defined in this ITU-T Recommendation | International Standard.

3.5.5 original activity identifier: 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 self-delimiting: 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 presentation context identifier: 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 syncpoint identifier: 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 initiator: The presentation protocol machine that initiates the presentation-connection establishment.

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

3.5.11 requestor: The presentation protocol machine that initiates a particular action.

3.5.12 acceptor: The presentation protocol machine that accepts a particular action.

3.5.13 octet-aligned transfer syntax: A transfer syntax in which all the bit patterns used to represent presentation data values are a multiple of eight bits.

3.5.14 self-delimiting transfer syntax: A transfer syntax in which the rules for forming the bit patterns used to represent presentation data values enable a decoder (in all cases) to determine the end of the bit pattern independently of the way in which the bit-pattern is carried.

4 Abbreviations

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

4.1 Data Units

PPDU	presentation-protocol-data-unit
PSDU	presentation-service-data-unit
SSDU	session-service-data-unit

4.2 Types of presentation-protocol-data-units

AC PPDU	Alter Context PPDU
ACA PPDU	Alter Context Acknowledge PPDU
ARP PPDU	Abnormal Release Provider PPDU
ARU PPDU	Abnormal Release User PPDU
CP PPDU	Connect Presentation PPDU
CPA PPDU	Connect Presentation Accept PPDU
CPR PPDU	Connect Presentation Reject PPDU
RS PPDU	Resynchronize PPDU

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RSA PPDU	Resynchronize Acknowledge PPDU
TC PPDU	Capability Data PPDU
TCC PPDU	Capability Data Acknowledge PPDU
TD PPDU	Presentation Data PPDU
TE PPDU	Expedited Data PPDU
TTD PPDU	Presentation Typed Data PPDU

4.3 Other abbreviations

ASN.1	Abstract Syntax Notation One (see ITU-T Rec. X.680 | ISO/IEC 8824)
DCS	defined context set
PPCI	presentation-protocol-control-information
PPM	presentation protocol machine
PS	presentation-service
PSAP	presentation-service-access-point
PS-user	presentation-service-user
SS	session-service
SSAP	session-service-access-point

5 Overview of the presentation protocol

5.1 Service provided by the Presentation Layer

The protocol specified in this ITU-T Recommendation | International Standard supports the presentation-service defined in ITU-T Rec. X.216 | ISO/IEC 8822.

5.2 Service assumed from the Session Layer

The protocol specified in this ITU-T Recommendation | International Standard assumes the use of the session-service defined in ITU-T Rec. X.215 | ISO/IEC 8326.

5.3 Functions of the Presentation Layer

The functions of the Presentation Layer are described in the Reference Model, ITU-T Rec. X.200 | ISO/IEC 7498, and are further expanded in the Presentation Service Definition, ITU-T Rec. X.216 | ISO/IEC 8822.

5.4 Presentation functional units

Functional units are logical groupings of elements of procedure defined by this ITU-T Recommendation | International Standard 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 specified by this ITU-T Recommendation | International Standard.

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.

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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.

It is not available when the session symmetric synchronize functional unit is selected.

5.5 Model of the Presentation Layer

The presentation protocol machine (PPM) (see 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 (ITU-T Rec. X.216 | ISO/IEC 8822). 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 (ITU-T Rec. X.215 | ISO/IEC 8326). 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.

NOTE – A presentation-entity is comprised of one or more PPMs.

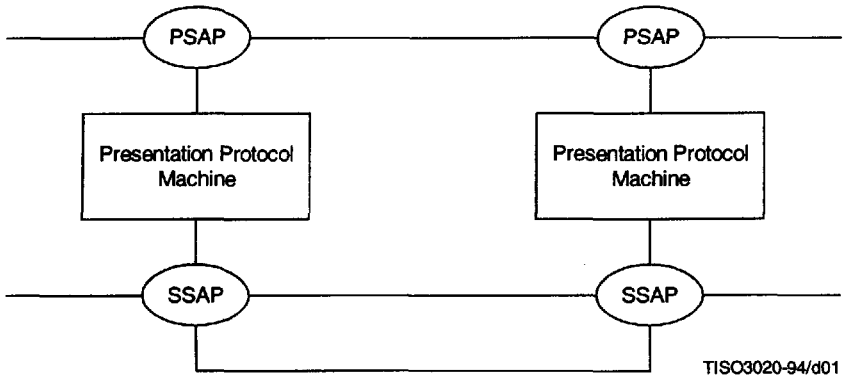

Figure 1 – Model of the Presentation Layer

SECTION 2 – PRESENTATION PROTOCOL SPECIFICATION

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 clause does not identify a parameter as either a PPDU parameter or a session-service primitive parameter. Such a distinction is specified in clause 7. For further information on the use of parameters, refer to the Presentation Service Definition (ITU-T Rec. X.216 | ISO/IEC 8822).

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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 this subclause gives the rules for determining the presentation contexts from which these presentation data values (including any embedded presentation data values) shall be taken.

NOTE - Version 1 of the session-service imposes a restriction on the length of certain SS-user data parameters, in particular that of S-U-ABORT. If version 1 of the session-service is being used and 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 ITU-T Recommendation | International Standard 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.

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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.

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6.2.2.13 Initial synchronization point serial number(s)

This shall be the Initial synchronization point serial number parameter(s) from the P-CONNECT request service primitive, and shall appear as the Initial synchronization point serial number parameter(s) 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 values 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 International Standard shall be version 1.

6.2.3.3 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.

6.2.3.4 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:

- acceptance;
- user-rejection;
- provider-rejection.

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The transfer syntax name shall be present if the presentation context definition result takes the value "acceptance". 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 "provider-rejection". 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 6.2.6.3.

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(s) from the P-CONNECT response service primitive, and shall appear as the Initial synchronization point serial number parameter(s) 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 International Standard shall be version 1.

See also 6.2.6.4.

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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:

- acceptance;
- user-rejection;
- provider-rejection.

The transfer syntax name shall be present if the presentation context definition result takes the value "acceptance". 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 "provider-rejection". 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.

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 "acceptance", "provider-rejection" or "user-rejection". 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.

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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 "user data not readable".

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 "provider-rejection" 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 "user-rejection", 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 "acceptance", it shall send a CPA PPDU (see 6.2.3).

6.2.5.7 If the initiating PPM receives a CPR PPDU refusing the presentation-connection, then it shall issue a P-CONNECT confirm service primitive with a Result parameter value of "user-rejection" (if the Provider reason parameter is not present) or "provider-rejection" (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 "acceptance", 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.

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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 ("provider-rejection"). 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 ITU-T Recommendation | International Standard.

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 "default context not supported" and a Default context result parameter of value "provider-rejection".

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 "user-rejection", then it shall send a CPR PPDU with a Default context result parameter value of "user-rejection".

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 (ITU-T Rec. X.215 | ISO/IEC 8326).

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.

6.2.7.2 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.

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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 7.

6.3.2.2 The SS-user data parameters of session-service primitives used shall represent or be represented by the 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.

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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 PPD.U

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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 and 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 indication 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:

- acceptance;
- user-rejection;
- provider-rejection.

The transfer syntax name shall be present if the presentation context addition result takes the value "acceptance". 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 "provider-rejection". 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:

- acceptance;
- user-rejection.

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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 "provider-rejection".

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 "acceptance" 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 "acceptance" shall be deleted from the DCS and no longer be 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.

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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 service 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.

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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 clause 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, symmetric synchronization and resynchronization procedures are used to make available to PS-users the synchronization, symmetric 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(s)

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

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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 "abandon", then the DCS is unchanged;

b) if the resynchronize type is "restart" or "set", 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.

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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 "abandon", 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 "restart" or "set", 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 "abandon", then the DCS is replaced by that specified in the Presentation context identifier list parameter of the PPDU;

b) if the resynchronize type is "restart" or "set", 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 clause 7.

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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 clause 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 has a DCS associated with it, then it shall restore the DCS.

6.10.2.7 When the Context Restoration functional unit is selected the pdvs in the user data parameters of the P-ACTIVITY-INTERRUPT and P-ACTIVITY-DISCARD services should be according to the inter-activity DCS, or the default context if the inter-activity DCS is empty.

6.10.3 Collisions and interactions

6.10.3.1 P-ALTER-CONTEXT

The pdvs in the user data parameters of this service are passed between the PS-users and shall obey the rules of 10.1 of Rec. X.216 | ISO/IEC 8822.

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.

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7.1.1.1 CP PPDU associated parameters

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

Table 1 – 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(s)	Initial synchronization point serial number(s)	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 (ITU-T Rec. X.215 | ISO/IEC 8326)

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-service primitives.

7.1.2.1 CPA PPDU associated parameters

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

Table 2 – Mapping of CPA PPDU associated parameters onto S-CONNECT parameters

CPA PPDU associated parameter	S-CONNECT parameter	n/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(s)	Initial synchronization point serial number(s)	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 (ITU-T Rec. X.215 | ISO/IEC 8326)

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7.1.2.2 S-CONNECT Result parameter

This parameter shall have the value "accept".

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 primitives.

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 defines the mapping of the CPR PPDU associated parameters onto S-CONNECT parameters.

Table 3 – Mapping of CPR PPDU associated parameters onto S-CONNECT parameters

CPR PPDU associated parameter	S-CONNECT parameter	n/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 (ITU-T Rec. X.215 | ISO/IEC 8326)

7.1.3.2 S-CONNECT Result parameter

This parameter may take the values:

- reject by SS-provider (a whole class of values);
- reject by called SS-user 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 defines the mapping.

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Table 4 – 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 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 defines the mapping of the ARU PPDU associated parameters onto S-U-ABORT parameters.

Table 5 – Mapping of ARU PPDU associated parameters onto S-U-ABORT parameters

ARU PPDU associated parameter	S-U-ABORT parameter	n/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 (ITU-T Rec. X.215 | ISO/IEC 8326)		

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 defines the mapping of the ARP PPDU associated parameters onto S-U-ABORT parameters.

Table 6 – Mapping of ARP PPDU associated parameters onto S-U-ABORT parameters

ARP PPDU associated parameter	S-U-ABORT parameter	n/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 (ITU-T Rec.215 X. | ISO/IEC 8326)		

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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 defines the mapping of the AC PPDU associated parameters onto S-TYPED-DATA parameters.

Table 7 – Mapping of AC PPDU associated parameters onto S-TYPED-DATA parameters

AC PPDU associated parameter	S-TYPED-DATA parameter	n/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 (ITU-T Rec. X.215 | ISO/IEC 8326)		

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 defines the mapping of the ACA PPDU associated parameters onto S-TYPED-DATA parameters.

Table 8 – Mapping of ACA PPDU associated parameters onto S-TYPED-DATA parameters

ACA PPDU associated parameter	S-TYPED-DATA parameter	n/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 (ITU-T Rec. X.215 | ISO/IEC 8326)		

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 defines the mapping of the TTD PPDU associated parameters onto S-TYPED-DATA parameters.

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Table 9 – Mapping of TTD PPDU associated parameters onto S-TYPED-DATA parameters

TTD PPDU associated parameter	S-TYPED-DATA parameter	n/nm/s
User data	SS-user data	nm
m Mandatory nm Non-mandatory s As defined in the Session Service Definition (ITU-T Rec. X.215 | ISO/IEC 8326)		

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 PPDU

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 defines the mapping.

Table 10 – 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	S-TOKEN-PLEASE indication
P-CONTROL-GIVE request	S-CONTROL-GIVE request
P-CONTROL-GIVE indication	S-CONTROL-GIVE indication

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 defines the mapping.

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Table 11 – 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	S-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 RS PPDU shall be conveyed from the requesting PPM to the accepting PPM in the S-RESYNCHRONIZE request and indication session-service primitives.

7.8.1.1 RS PPDU associated parameters

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

Table 12 – Mapping of RS PPDU associated parameters onto S-RESYNCHRONIZE parameters

RS PPDU associated parameter	S-RESYNCHRONIZE parameter	n/nm/s
Resynchronize type	Resynchronize type	s
Synchronization point serial number(s)	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 (ITU-T Rec. X.215 | ISO/IEC 8326)

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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 defines the mapping of the RSA PPDU associated parameters onto S-RESYNCHRONIZE parameters.

Table 13 – Mapping of RSA PPDU associated parameters onto S-RESYNCHRONIZE parameters

RSA PPDU associated parameter	S-RESYNCHRONIZE parameter	n/nm/s
Synchronization point serial number(s)	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 (ITU-T Rec. X.215 | ISO/IEC 8326)		

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 defines the mapping.

Table 14 – 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 defines the mapping.

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Table 15 – Mapping of Activity management service 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-ATIVITY-RESUME indication
P-ACTIVITY-INTERRUPT request	S-ACTIVITY-INTERRUPT request
P-ACTIVITY-INTERRUPT indication	S-ACTIVITY-INTERRUPT indication
P-ACTIVITY-NTERRUPT 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	S-ACTIVITY-END response
P-ACTIVITY-END confirm	S-ACTIVITY-END confirm

8 Structure and encoding of PPDUs

8.1 General

8.1.1 The structure of PPDUs (whether explicitly 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 (ITU-T Rec. X.680 | ISO/IEC 8824);

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

NOTE – ASN.1 comments in 8.2 are an integral part of this ITU-T Recommendation International Standard, 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

```
ISO8823-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.
```


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```
IMPORTS RTORQapdu, RTOACapdu, RTORJapdu, RTABapdu FROM
        Reliable-Transfer-APDUs  { joint-iso-ccitt (2) reliable-transfer (3) apdus (0)  };
--
CP-type  ::=  SET {
        mode-selector                       [0] IMPLICIT Mode-selector,
        x410-mode-parameters                [1] IMPLICIT SET  {
            COMPONENTS OF Reliable-Transfer-APDUs.RTORQapdu
        }   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 CP PPDU[1] -- ,
        normal-mode-parameters              [2] IMPLICIT SEQUENCE {
            protocol-version                [0] IMPLICIT Protocol-version DEFAULT {version-1},
            calling-presentation-selector   [1] IMPLICIT Calling-presentation-selector   OPTIONAL,
            called-presentation-selector    [2] IMPLICIT Called-presentation-selector OPTIONAL,
            presentation-context-definition-list [4] IMPLICIT
                                        Presentation-context-definition-list          OPTIONAL,
            default-context-name            [6] IMPLICIT Default-context-name   OPTIONAL,
            presentation-requirements       [8] IMPLICIT Presentation-requirements  OPTIONAL,
            user-session-requirements       [9] IMPLICIT User-session-requirements  OPTIONAL
                    -- shall not be present if equal to the Revised session
                    -- requirements parameter -- ,
            user-data 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 "accept".
--
--
CPA-PPDU  ::=  SET {
        mode-selector                       [0] IMPLICIT Mode-selector,
        x410-mode-parameters                [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[1] --,
        normal-mode-parameters              [2] IMPLICIT SEQUENCE {
            protocol-version                [0] IMPLICIT Protocol-version DEFAULT {version 1},
            responding-presentation-selector [3] IMPLICIT Responding-presentation-selector  OPTIONAL,
            presentation-context-definition-result-list [5] IMPLICIT
                                        Presentation-context-definition-result-list  OPTIONAL,
            presentation-requirements       [8] IMPLICIT Presentation-requirements  OPTIONAL,
            user-session-requirements       [9] IMPLICIT User-session-requirements  OPTIONAL,
                    -- shall not be present if equal to the Revised session
                    -- requirements parameter --
```

[1] ASN.1 module Reliable-transfer-APDUs is defined in Edition 1 of ISO 9066-2, *Information processing systems – Text communications – Reliable transfer – Part 2: Protocol specification.*

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```
            user-data 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 "reject by SS-provider"
-- or "reject by called SS-user".
--
CPR-PPDU    ::=  CHOICE   {
        x400-mode-parameters 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 PPDU2) --,
        normal-mode-parameters SEQUENCE  {
            protocol-version                        [0]   IMPLICIT Protocol-version DEFAULT {version-1},
            responding-presentation-selector        [3]   IMPLICIT
                                    Responding-presentation-selector   OPTIONAL,
            presentation-context-definition-result-list [5]   IMPLICIT
                                    Presentation-context-definition-result-list   OPTIONAL,
            default-context-result                  [7]   IMPLICIT Default-context-result   OPTIONAL,
            provider-reason                         [10]  IMPLICIT Provider-reason  OPTIONAL,
            user-data User-data  OPTIONAL
        }
            -- Shall be used for normal mode only.  --
}
--
--
-- The SS-user data parameter of the S-U-ABORT request and indication
-- service primitives shall be an Abort-type value.
--
Abort-type    ::=  CHOICE   {
        aru-ppdu ARU-PPDU           -- for a P-U-ABORT --,
        arp-ppdu ARP-PPDU           -- for a P-P-ABORT --
}
--
ARU-PPDU    ::=  CHOICE   {
        x400-mode-parameters 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 PPDU3.  --,
        normal-mode-parameters              [0] IMPLICIT SEQUENCE  {
            presentation-context-identifier-list [0] IMPLICIT
                                    Presentation-context-identifier-list   OPTIONAL,
            user-data User-data  OPTIONAL
        }
            -- Shall be used for normal mode only.
}
--
ARP-PDDU    ::=  SEQUENCE   {
        provider-reason    [0] IMPLICIT Abort-reason   OPTIONAL,
        event-identifier   [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.
--
```

2) ASN.1 module Reliable-transfer-APDUs is defined in Edition 1 of ISO 9066-2, *Information processing systems – Text communications – Reliable transfer – Part 2: Protocol specification.*

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```
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  {
        presentation-context-addition-list     [0] IMPLICIT Presentation-context-addition-list   OPTIONAL,
        presentation-context-deletion-list     [1] IMPLICIT Presentation-context-deletion-list   OPTIONAL,
        user-data User-data    OPTIONAL
}
--
ACA-PPDU    ::=  SEQUENCE  {
        presentation-context-addition-result-list  [0] IMPLICIT
                                    Presentation-context-addition-result-list    OPTIONAL,
        presentation-context-deletion-result-list  [1] IMPLICIT
                                    Presentation-context-deletion-result-list    OPTIONAL,
        user-data 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  {
        presentation-context-identifier-list   [0] IMPLICIT
                                    Presentation-context-identifier-list   OPTIONAL,
        user-data 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  {
        presentation-context-identifier-list   [0] IMPLICIT
                                    Presentation-context-identifier-list   OPTIONAL,
        user-data 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     Presentation-context-identifier,
        abstract-syntax-name                Abstract-syntax-name,
```


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```
        transfer-syntax-name-list          SEQUENCE OF Transfer-syntax-name
}

Default-context-name    ::=    SEQUENCE  {
        abstract-syntax-name [0] IMPLICIT Abstract-syntax-name,
        transfer-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 { mode-value  [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 Presentation-context-identifier,
        transfer-syntax-name Transfer-syntax-name
}

Presentation-requirements    ::= BIT STRING  { context-management    (0), restoration    (1) }

Presentation-selector    ::= OCTET STRING
```


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```
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-supported        (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 {
          result                [0] IMPLICIT Result,
          transfer-syntax-name  [1] IMPLICIT Transfer-syntax-name    OPTIONAL,
          provider-reason       [2] IMPLICIT INTEGER    {
               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 {
          simply-encoded-data  [APPLICATION 0]  IMPLICIT Simply-encoded-data,
          fully-encoded-data   [APPLICATION 1]  IMPLICIT Fully-encoded-data }
-- Subclause 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 PDV-list
-- contains one or more PDV-list values.
-- See 8.4.2.

PDV-list  ::=  SEQUENCE {
          transfer-syntax-name Transfer-syntax-name     OPTIONAL,
          presentation-context-identifier Presentation-context-identifier,
          presentation-data-values  CHOICE  {
               single-ASN1-type     [0] ABSTRACT-SYNTAX.&Type   (CONSTRAINED BY{
                         -- Type corresponding to presentation context identifier --}),
               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),
```


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exceptions **(9),**
typed-data **(10),**
symmetric-synchronize **(11),**
data-separation **(12)**

}
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 (ITU-T Rec. X.690 | ISO/IEC 8825).

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:

a) The contents of the Simply-encoded-data value shall be the concatenation of the bitstrings[3].

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 (ITU-T Rec. X.690 | ISO/IEC 8825).

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 identifier octets and no length octets) as specified in a) above resulting from the encoding of the presentation data values forming the PS-user data value according to the appropriate transfer syntax.

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 (ITU-T Rec. X.690 | ISO/IEC 8825) 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.

---

[3] If the transfer syntax is not self-delimiting, then there is a danger that concatenated presentation data values will be ambiguous.

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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 (ITU-T Rec. X.690 | ISO/IEC 8825). 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 (ITU-T Rec. X.690 | ISO/IEC 8825), then the option "single-ASN1-type" 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 "octet-aligned" 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 "arbitrary" shall be used. The contents octets of the BIT STRING shall be the concatenation of the bitstrings[4] 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 nam 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 (ITU-T Rec. X.690 | ISO/IEC 8825).

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 (ITU-T Rec. X.690 | ISO/IEC 8825).

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.

SECTION 3 – CONFORMANCE

9 Conformance

9.1 Dynamic Conformance

A system claiming conformance to this ITU-T Recommendation | International Standard shall exhibit external behaviour consistent with having implemented

a) a PPM as defined by clause 6 and Annex A;

b) use of the session-service as defined by clause 7;

c) encoding of PPDUs as defined by clause 8.

---

[4] If the transfer syntax is not self-delimiting, then there is a danger that concatenated presentation data values will be ambiguous.

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9.2 Static Conformance

A system claiming conformance to this ITU-T Recommendation | International Standard shall be capable of:

a) Supporting normal mode, X.410-1984 mode, or both. A system claiming to implement the procedures specified in this ITU-T Recommendation | International Standard 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 ITU-T Recommendation | International Standard 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 clause 7.

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

9.3 Protocol implementation conformance statement

The supplier of an implementation which is claimed to conform to this specification shall complete a copy of the PICS proforma provided in ITU-T Rec. X.246 | ISO/IEC 8823-2 and shall provide the information necessary to identify both the supplier and the implementation.

10 Precedence

10.1 The aspects of the protocol for the presentation layer are specified in several clauses in this ITU-T Recommendation | International Standard. This clause states the rules of precedence for possible situations where the same aspect may be specified in more than one place in an apparently inconsistent manner. The relevant aspects of protocol specification are:

a) sequencing rules;

b) mapping to the session-service; and

c) structure and encoding of PPDUs.

10.2 Annex A and clause 6 specify the elements of procedure which govern the behaviour of the presentation protocol. Annex A takes precedence over any other clause in this ITU-T Recommendation | International Standard which may state or imply contradictory sequencing rules.

10.3 Clause 7 specifies which presentation parameters are carried in which session service primitives. Clause 7 takes precedence over any other part of this ITU-T Recommendation | International Standard which may state or imply on what services presentation parameters are carried.

10.4 Clause 8 specifies the structure and encoding of presentation parameters carried in session service user data parameters. Clause 8 takes precedence over any other part of this ITU-T Recommendation | International Standard which may state or imply structure and encoding of presentation parameters carried in session service user data.

NOTE – Any person who, when making use of an International Standard encounters an inaccuracy or ambiguity, is requested to notify their National Member Body of ISO without delay in order that the matter may be investigated and appropriate action taken.

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Annex A

State Tables

(This annex forms an integral part of this ITU-T Recommendation | International Standard)

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 actions 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 clause 6. In the case of divergence between this annex and clause 6, an error in specification is indicated.

Table A.16 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.17 specifies the abbreviated name and name of each state.

Table A.18 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.19 specifies the specific actions.

Table A.20 specifies the predicates.

Tables A.21 to A.29 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.19.

A.2.3 Predicates are represented by the notation pnn, where nn is the number of the predicate in Table A.20.

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 consisting 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.

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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.21 to A.29. 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 is the context management functional unit;

CR is the context restoration functional unit.

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

for f in fu-dom

FU (f) is 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;

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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.

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Table A.16 – 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

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Table A.16 *(end)* **– Incoming Event List**

Abbreviated Name	Category	Name and Description
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
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.17 – 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

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Table A.18 – 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

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Table A.18 *(end)* **– Outgoing Event List**

Abbreviated Name	Category	Name and Description
P-UABind	PS primitive	P-U-ABORT indication
P-UERind	PS primitive	P-U-EXCEPTION-REPORT indication
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
TCC	PPDU	CAPABILITY DATA ACKNOWLEDGE
TD	PPDU	DATA
TE	PPDU	EXPEDITED DATA
TTD	PPDU	P-TYPED DATA

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Table A.19 – Specific Actions

Code	Action
[01]	Mark presentation contexts proposed for definition which provider cannot support as "provider-rejection".
[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: a) set aep to FALSE; and 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
[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.

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Table A.20 – 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 a presentations 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 is 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 data 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.
p29	Each presentation data value is from presentation contexts of the inter-activity DCS or from the default context if the inter-activity DCS is empty.
p30	The value of rs is TRUE.

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Table A.21 – Connection establishment

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

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TableA.22 – Connection release (normal)

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

Table A.23 – Connection release (abort)

	STA11 await CPA	STA12 await P-CONrsp	STAac0 await ACA	STAac1 await P-ALTERrsp	STAac2 await ACA or P-ALTERrsp	STAt0 connected- data transfer
P-UABreq	p03 ARU STAI0	p03 ARU STAI0	p07 ARU STAI0	p05 ARU STAI0	p07 ARU STAI0	p05 ARU STAI0
ARU	p03 & p21 P-UABind STAI0	p03 & p21 & p23 P-UABind STAI0	p21 & p24 P-UABind STAI0	p06 & p21 P-UABind STAI0	p21 & p25 P-UABind STAI0	p05 & p21 P-UABind STAI0
ARP	P-PABind STAI0	P-PABind STAI0	P-PABind STAI0	P-PABind STAI0	P-PABind STAI0	P-PABind STAI0
S-PABind	P-PABind STAI0	P-PABind STAI0	P-PABind STAI0	P-PABind STAI0	P-PABind STAI0	P-PABind STAI0

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Table A.24 – Context management

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

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Table A.25 – Data transfer

	STAac0 await ACA	STAac1 await P-ALTERrsp	STAac2 await ACA or P-ALTERrsp	STAt0 connected data transfer
P-DTreq	p07 TD STAac0	p05 TD STAac1	p07 TD STAac2	p05 TD STAt0
TD	p05 P-DTind STAac0	p06 P-DTind STAac1	p06 P-DTind STAac2	p05 [09] P-DTind STAt0
P-TDreq	p07 & p14 TTD STAac0	p05 & p14 TTD STAac1	p07 & p14 TTD STAac2	p05 & p14 TTD STAt0
TTD	p05 & p14 P-TDind STAac0	p06 & p14 P-TDind STAac1	p06 & p14 P-TDind STAac2	p05 & p14 [09] P-TDind STAt0
P-EXreq	p13 TE STAac0	p13 TE STAac1	p13 TE STAac2	p13 TE STAt0
TE	p13 P-EXind STAac0	p13 P-EXind STAac1	p13 P-EXind STAac2	p13 [09] P-EXind STAt0
P-CDreq	p07 TC STAac0	p05 TC STAac1	p07 TC STAac2	p05 TC STAt0
TC	p05 P-CDind STAac0	p06 P-CDind STAac1	p06 P-CDind STAac2	p05 [09] P-CDind STAt0
P-CDrsp	p07 TCC STAac0	p05 TCC STAac1	p07 TCC STAac2	p05 TCC STAt0
TCC	p05 P-CDcnf STAac0	p06 P-CDcnf STAac1	p06 P-CDcnf STAac2	p05 P-CDcnf STAat0

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Table A.26 – Token handling

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

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Table A.27 – Synchronization

	STAac0 await ACA	STAac1 await P-ALTERrsp	STAac2 await ACA or P-ALTERrsp	STAt0 connected-data transfer
P-SYNmreq	^p17 & p07 S-SYNmreq STAac0	p05 S-SYNmreq [13] STAac1	^p17 & p07 S-SYNmreq STAac2	p05 S-SYNmreq [13] STAt0
S-SYNmind	p05 P-SYNmind [13] STAac0	^p17 & p06 P-SYNmind STAac1	^p17 & p06 P-SYNmind STAac2	p05 P-SYNmind [13] STAt0
P-SYNmrsp	p07 S-SYNmrsp STAac0	p05 P-SYNmind STAac1	p07 P-SYNmind STAac2	p05 P-SYNmind STAt0
S-SYNmcnf	p05 P-SYNmcnf STAac0	p06 P-SYNmcnf STAac1	p06 P-SYNmcnf STAac2	p05 P-SYNmcnf STAt0
P-SYNMreq	^p17 & p07 S-SYNMreq STAac0	p05 S-SYNMreq STAac1	^p17 & p07 S-SYNMreq STAac2	p05 S-SYNMreq STAt0
S-SYNMind	p05 S-SYNMind STAac0	^p17 & p06 S-SYNMind STAac1	^p17 & p06 S-SYNMind STAac2	p05 S-SYNMind STAt0
P-SYNMrsp	p07 S-SYNMrsp [22] [13] STAac0	^p17 & p05 S-SYNMrsp STAac1	^p17 & p07 S-SYNMrsp STAac2	p05 S-SYNMrsp [22] [13] STAat0
S-SYNMcnf	^p17 & p05 P-SYNMcnf STAac0	p06 P-SYNMcnf [22] [13] STAac1	^p17 & p06 P-SYNMcnf STAac2	p05 P-SYNMcnf [22] [13] STAt0

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Table A.28 – Activity management and exception handling

	STAac0 await ACA	STAac1 await P-ALTERrsp	STAac2 await ACA or P-ALTERrsp	STAt0 connected- data transfer
P-ACTSreq	^p17 & p07 S-ACTSreq STAac0	p05 [17] S-ACTSreq STAac1	^p17 & p07 S-ACTSreq STAac2	p05 [17] S-ACTSreq STAt0
S-ACTSind	p05 [09] [17] P-ACTSind STAac0	^p17 & p06 P-ACTsind STAac1	^p17 & p06 P-ACTSind STAac2	p05 [09] [17] S-ACTSind STAt0
P-ACTEreq	^p17 & p07 S-ACTEreq STAac0	p05 S-ACTEreq STAac1	^p17 & p07 S-ACTEreq STAac2	p05 S-ACTEreq STAt0
S-ACTEind	p05 P-ACTEind STAac0	^p17 & p06 P-ACTEind STAac1	^p17 & p06 P-ACTEind STAac2	p05 P-ACTEind STAt0
P-ACTErsp	p07 [14] [15] S-ACTErsp STAac0	^p17 & p05 S-ACTErsp STAac1	^p17 & p07 S-ACTErsp STAac2	p05 [14] [15] S-ACTErsp STAt0
S-ACTEcnf	^p17 & p05 P-ACTEcnf STAac0	p06 [14] [19] P-ACTEcnf STAac1	^p17 & p06 P-ACTEcnf STAac2	p05 [14] [19] P-ACTEcnf STAt0
P-ACTIreq	^p17 S-ACTIreq STAt0 P17 & p29 [14] S-ACTIreq STAt0	^p17 S-ACTIreq STAat0 P17 & p29 [14] S-ACTIreq STAt0	^p17 S-ACTIreq STAt0 P17 & p29 [14] S-ACTIreq STAt0	^p17 S-ACTIreq STAt0 P17 & p29 [14] S-ACTIreq STAt0
S-ACTIind	^p17 [20] P-ACTIind STAt0 P17 & p29 [14] [20] P-ACTIind STAt0	^p17 [20] P-ACTIind STAt0 P17 & p29 [14] [20] P-ACTIind STAt0	^p17 [20] P-ACTIind STAt0 P17 & p29 [14] [20] P-ACTIind STAt0	^p17 [20] P-ACTIind STAt0 P17 & p29 [14] [20] P-ACTIind STAt0
P-ACTIrsp				^p17 OR (p17 & p29) [14] S-ACTIrsp STAt0

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Table A.28 *(end)* **– Activity management and exception handling**

	STAac0 await ACA	STAac1 await P-ALTERrsp	STAac2 await ACA or P-ALTERrsp	STAt0 connected- data transfer
S-ACTIcnf				^p17 OR (p17 & p29) [14] P-ACTIcnf STAt0
P-ACTRreq	^p17 & p07 S-ACTRreq STAac0	(^p17 OR p27 OR ^p28) & p05 S-ACTRreq STAac1 ^p27 & p28 & p17 & p16 [17] [16] S-ACTRreq STAac1	^p17 & p07 S-ACTRreq STAac2	(^p17 OR p27 OR ^p28) & p05 S-ACTRreq STAt0 ^p27 & p28 & p17 & p16 [17] [16] S-ACTRreq STAt0
S-ACTRind	(^p17 OR p27 OR ^p28) & p05 [09] P-ACTRind STAac0 ^p27 & p28 & p17 & p16 [09] [17] [16] P-ACTRind STAac0	^p17 & p06 P-ACTRind STAac1	^p17 & p06 P-ACTRind STAac2	(^p17 OR p27 OR ^p28) & p05 [09] P-ACTRind STAt0 ^p27 & p28 & p17 & p16 [09] [17] [16] P-ACTRind STAt0
P-ACTDreq	^p17 S-ACTDreq STAt0 ^p17 & p29 [14] S-ACTDreq STAt0	^p17 S-ACTDreq STAt0 ^p17 & p29 [14] S-ACTDreq STAt0	^p17 S-ACTDreq STAt0 ^p17 & p29 [14] S-ACTDreq STAt0	^p17 S-ACTDreq STAt0 ^p17 & p29 [14] S-ACTDreq STAt0
P-ACTDind	^p17 [09] P-ACTDind STAt0 p17 & p29 [14] [09] P-ACTDind STAt0	^p17 [09] P-ACTDind STAt0 p17 & p29 [14] [09] P-ACTDind STAt0	^p17 [09] P-ACTDind STAt0 p17 & p29 [14] [09] P-ACTDind STAt0	^p17 [09] P-ACTDind STAt0 p17 & p29 [14] [09] P-ACTDind STAt0
P-ACTDrsp				^p17 OR p17 & p29 [14] [19] S-ACTDrsp STAt0
S-ACTDcnf				^p17 OR p17 & p29 [14] [19] P-ACTDcnf STAt0
P-UERreq	p07 S-UERreq STAt0	p05 S-UERreq STAt0	p07 S-UERreq STAt0	p05 S-UERreq STAt0
S-UERind	p05 P-UERind STAt0	p06 P-UERind STAt0	p06 P-UERind STAt0	p05 P-UERind STAt0
S-PERind	P-PERind STAt0	P-PERind STAt0	P-PERind STAt0	P-PERind STAt0

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Table A.29 – Resynchronization

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

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Table A.29 *(end)* **– Resynchronization**

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

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Annex B

Registration of Transfer Syntaxes

(This annex forms an integral part of this ITU-T Recommendation | International Standard)

B.1 Introduction

The identification of transfer syntaxes to enable abstract syntaxes to be used on a presentation-connection requires unambiguous naming of transfer syntaxes. This annex specifies the registration procedures for allocating such names.

B.2 Registration Procedures

This version of this ITU-T Recommendation | International Standard specifies the registration of transfer syntaxes and encoding rules specified:

a) in International Standards; or

b) by some organization which has need.

There is no requirement at this stage for an International Registration Authority for transfer syntaxes.

B.2.1 Registration in International Standards

In some cases, the names of transfer syntax specifications are specified in International Standards referencing this International Standard. The name shall be defined in accordance with ITU-T Rec. X.660 | ISO/IEC 9834-1. An International Registration Authority covering this type of information object is not currently intended.

The referencing International Standard will assign a name in accordance with ITU-T Rec. X.660 | ISO/IEC 9834-1, but need not reference ITU-T Rec. X.660 | ISO/IEC 9834-1.

B.2.2 Registration by some organization which has a need

The assignment of names for transfer syntax specifications shall be in accordance with the general procedures and of the form specified in ITU-T Rec. X.660 | ISO/IEC 9834-1 Part 1.

Organizations wishing to assign such names shall find an appropriate superior in the naming tree of ITU-T Rec. X.660 | ISO/IEC 9834-1-1 and request that an arc be assigned to them.

NOTE – Such "superiors" include ISO/IEC National Bodies, organizations with International Code Designators assigned in accordance with ISO 6523, telecommunications administrations and ROAs, and organizations which have been delegated registration authority.

B.3 Form of registration of a transfer syntax

B.3.1 A transfer syntax registration shall include the following information:

a) the name assigned to the transfer syntax;

b) whether or not the transfer syntax is octet-aligned;

c) whether the transfer syntax is or is not self-delimiting;

c) whether it is context-free or context-sensitive;

d) either the name of the abstract syntax to which it is applicable, or the class of abstract syntaxes to which it is applicable.

B.3.2 A transfer syntax for a given abstract syntax is said to be **well-defined** if it consists of the specification, for each presentation data value in the abstract syntax, of a set of one or more bit patterns which are associated with that presentation data value.

NOTE – The bit patterns may be specified directly, or by the identification of some algorithm that is applied to the notation used in the definition of the abstract syntax. In the latter case the same name (that of the algorithm) can provide a transfer syntax name for a wide class of abstract syntaxes.

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B.3.3 A transfer syntax is said to be **context-free** if a particular bit pattern be associated with at most one presentation data value in the abstract syntax; otherwise it is said to be **context-sensitive**.

NOTE – It is recommended, but not required, that transfer syntaxes be context-free. In the case of context-sensitive transfer syntaxes, decoding of a value will require knowledge of the state of the application in which the value was transmitted. Such state information is visible in the presentation layer only if it is unambiguously determined by the pattern of presentation service primitives issued, independently of the user data of those primitives. Violation of this recommendation can therefore constrain implementors to a closer integration of the presentation layer support with the application layer support than they might otherwise wish.

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Annex C

Corrections and enhancements incorporated in ITU-T Rec. X.226 | ISO/IEC 8823-1

(This annex does not form an integral part of this ITU-T Recommendation | International Standard)

C.1 ITU-T Recommendations and International Standards are subject to constant review and revision by the ITU-T Study Group and ISO/IEC Technical Committee concerned. This ITU-T Recommendation | International Standard includes corrections of all errors, ambiguities, and inconsistencies (collectively referred to as Defects) identified and approved by ITU-T SG7 | ISO/IEC JTC 1, during the period of publication of the first edition of CCITT Rec. X.226 | ISO 8823 (1988), and the date of publication of this ITU-T Recommendation | International Standard. The OSI presentation service has also been subject to a number of technical extensions, developed as Amendments to CCITT Rec. X.216 | ISO 8822 (1987).

C.2 The corrections incorporated in this ITU-T Recommendation | International Standard arose from the following Defect Reports[5]:

8822/004

8822/005

8822/008

8823/011

8823/012

8823/013

8823/017

C.3 The following amendments are incorporated in this ITU-T Recommendation | International Standard:

ISO/IEC 8823/AM 2, Unlimited User Data

ISO/IEC 8823/AM 3, Procedures for the registration of transfer syntax

ISO/IEC 8823/AM 4, Symmetric synchronization

ISO/IEC 8823/AM 5, Additional session synchronization functionality

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5) Copies of Defect Reports are obtainable from ISO/IEC JTC 1 Secretariat, American National Standards Institute, 1430 Broadway, New York, N.Y. 10018, U.S.A.

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ICS 35.100.60

Descriptors: data processing, information interchange, network interconnection, open systems interconnection, presentation layer, communication procedure, control procedures, protocols.

Price based on 60 pages

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