INTERNATIONAL STANDARD

ISO/IEC 8823-1

Second edition
1994-12-15

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

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

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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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Full document details: ISO_IEC 8823-1_1994

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

Documents
Document Sharing Hub

Full document details: ISO_IEC 8823-1_1994

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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Full document details: ISO_IEC 8823-1_1994

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Full document details: ISO_IEC 8823-1_1994

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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.*

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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 I 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 I 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 I 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 I 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 I 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 I International Standard supports the presentation-service defined in ITU-T Rec. X.216 I ISO/IEC 8822.

5.2 Service assumed from the Session Layer

The protocol specified in this ITU-T Recommendation I International Standard assumes the use of the session-service defined in ITU-T Rec. X.215 I 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 I ISO/IEC 7498, and are further expanded in the Presentation Service Definition, ITU-T Rec. X.216 I ISO/IEC 8822.

5.4 Presentation functional units

Functional units are logical groupings of elements of procedure defined by this ITU-T Recommendation I 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 Recommentation I 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.

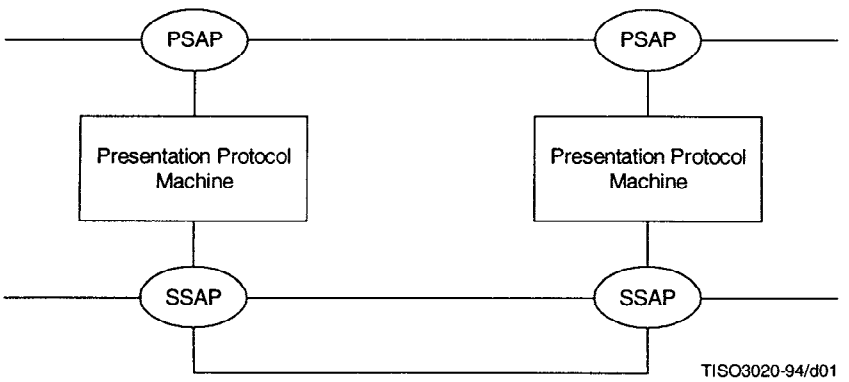

Figure 1 – Model of the Presentation Layer

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 I 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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Full document details: ISO_IEC 8823-1_1994

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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Full document details: ISO_IEC 8823-1_1994

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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Full document details: ISO_IEC 8823-1_1994

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 I 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 I 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.

Documents
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Full document details: ISO_IEC 8823-1_1994

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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