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**Information technology — Open Systems
Interconnection — Connectionless presentation
protocol specification**

*Technologies de l'information — Interconnexion de systèmes ouverts — Spécification
de protocole de présentation en mode sans connexion*



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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 9576 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*.

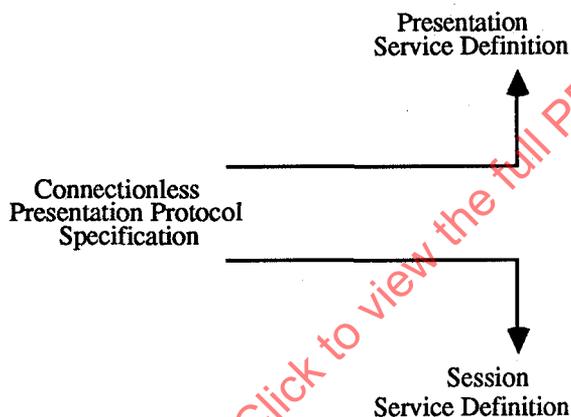
Annex A forms an integral part of this International Standard.

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Introduction

This International Standard (ISO 9576) is one of a set of International Standards produced to facilitate the interconnection of information processing systems. The set of standards covers the services and protocols required to achieve such interconnection.

This International Standard is positioned with respect to other related standards by the layers defined in the Reference Model for Open System Interconnection (ISO 7498). In particular, it is a protocol of the Presentation Layer. It is most closely related to the Presentation Service Definition (ISO 8822) and the addendum to the Presentation Service Definition covering connectionless-mode transmission (ISO 8822/Amd.1), the Session Service Definition (ISO 8326), and the addendum to the Session Service Definition covering connectionless-mode transmission (ISO 8326/Amd.3). The interrelationships of these standards is depicted below:



The structure of this International Standard is similar to the structure of the connection-oriented Presentation Protocol specification in order to facilitate cross reference between the two standards.

Information technology - Open Systems Interconnection - Connectionless presentation protocol specification

1 Scope

This International Standard¹⁾ specifies

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

- c) the interactions between peer presentation-entities through the exchange of presentation-protocol-data-units;
- d) the interactions between a presentation-entity and the presentation-service-user in the same system through the exchange of presentation-service primitives;
- e) the interactions between a presentation-entity and the session-service-provider through the exchange of session-service primitives.

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

These procedures are applicable to instances of communication between systems which support the Presentation Layer of the OSI Reference Model, and which wish to transfer presentation service data units using connectionless-mode presentation service primitives.

This 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 standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

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

ISO 7498/Add.1: 1987, *Information processing systems - Open Systems Interconnection - Basic Reference Model - Addendum 1: Connectionless-mode Transmission*.

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

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

ISO 8326/Add.3: -²⁾, *Information processing systems - Open Systems Interconnection - Basic connection oriented session service definition - Addendum 3: Connectionless-mode session service*.

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

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

1) The implementation and use of this 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 under the mechanisms identified in the Registration Authority procedures. A Registration Authority procedure specification is under development.

2) To be published.

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ISO 8822/Amd.1: -¹⁾, *Information processing systems - Open Systems Interconnection - Connection oriented presentation service definition - Amendment 1: Connectionless-mode presentation service.*

ISO 8823: 1988, *Information processing systems - Open Systems Interconnection - Connection oriented presentation protocol specification.*

ISO 8824: 1987, *Information processing systems - Open Systems Interconnection - Specification of Abstract Syntax Notation One (ASN.1).*

ISO 8825: 1987, *Information processing systems - Open Systems Interconnection - Specification of Basic Encoding Rules For Abstract Syntax Notation One (ASN.1).*

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1) To be published.

3 Definitions

3.1 Reference model definitions

This International Standard is based on the concepts developed in ISO 7498 and ISO 7498/Add.1 and makes use of the following terms derived from them:

- a) Presentation Layer;
- b) presentation-protocol-data-unit;
- c) presentation-service;
- d) presentation-service-access-point;
- e) presentation-service-data-unit;
- f) presentation-protocol-control-information;
- g) Session Layer;
- h) session-service-data-unit;
- i) session-service-access-point;
- j) transfer syntax;
- k) (N)-connectionless-mode-transmission.

3.2 Naming and Addressing definitions

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

- a) session-address;
- b) presentation-address;
- c) presentation-selector.

3.3 Service conventions definitions

This International Standard makes use of the following terms defined in ISO/TR 8509 as they apply in the Presentation Layer.

- a) service-user;
- b) service-provider;
- c) service primitive;
- d) request;

- e) indication;
- f) non-confirmed service;

3.4 Presentation Service definitions

This International Standard is also based on concepts developed in ISO 8822 and ISO 8822/Amd.1, and makes use of the following terms defined in those International Standards:

- a) abstract syntax;
- b) abstract syntax name;
- c) transfer syntax name;
- d) presentation data value;
- e) presentation context;
- f) default context.

4 Abbreviations

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

UD PPDU	Unit Data PPDU
---------	----------------

4.3 Other Abbreviations

ASN.1	Abstract Syntax Notation One
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 connectionless presentation protocol

5.1 Service provided by the Presentation Layer

The Service provided by the protocol herein described is a connectionless-mode presentation-service. The connectionless-mode presentation service is described in ISO 8822/Amd.1. The connectionless presentation-service primitives provided are summarized in Table 1.

5.2 Service assumed from the Session Layer

The Presentation Protocol described in this International Standard can operate only over the connectionless-mode session-service as indicated in Table 2.

5.3 Functions of the Presentation Layer

The functions of the Presentation Layer for connectionless-

mode transmission are described in the addendum to the Reference Model, ISO 7498/Amd.1, and are further expanded in the Connectionless-mode Presentation Service Definition, ISO 8822/Amd.1.

5.4 Model of the Presentation Layer

A presentation-protocol-entity is comprised of one or more presentation protocol machines (PPMs). A PPM may be connection oriented or connectionless. The connectionless-mode PPM communicates with the presentation-service-user through one or more PSAPs by means of the connectionless-mode presentation service primitives. These presentation-service primitives cause or result from the exchange of PPDU's between peer presentation-entities engaged in connectionless-mode transmission. These protocol exchanges are effected by making use of the services of the Session Layer, as defined in the addendum to the Session Service Definition covering connectionless-mode transmission (ISO 8326/Add.3).

Table 1 - Presentation Service Primitives

Primitive	Parameters
P-UNIT-DATA request	Calling-presentation-address Called-presentation-address Presentation context definition list Quality of service User data
P-UNIT-DATA indication	Calling-presentation-address Called-presentation-address Presentation context definition list User data

Table 2 - Session Service Primitives

Primitive	Parameters
S-UNIT-DATA request	Calling-session-address Called-session-address Quality of service SS-user data
S-UNIT-DATA indication	Calling-session-address Called-session-address SS-user data

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

actions are considered to be an indivisible action. The model of the presentation layer in connectionless-mode is illustrated in Figure 1.

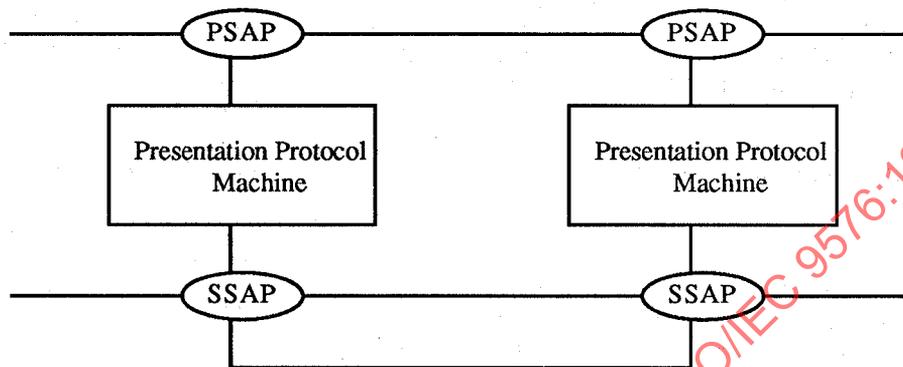


Figure 1 - Model of the Presentation Layer

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6 Elements of Procedure

6.1 PPDU transfer

6.1.1 Purpose

The PPDU transfer procedure is used to convey a presentation-protocol-data-unit (PPDU) in a session-service primitive. For the connectionless-mode protocol, only one type of protocol data unit, namely Unit Data PPDU (UD PPDU), is defined.

6.1.2 UD PPDU associated parameters

6.1.2.1 Protocol version

This shall identify the version of the presentation protocol that the sending PPM supports. The version of the protocol defined in this International Standard shall be version-1. Only one protocol version can be proposed by the sending PPM.

6.1.2.2 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-UNIT-DATA request service primitive and shall appear as one item of Presentation context definition list parameter of the P-UNIT-DATA indication service primitive, if issued. Each item contains three components: a presentation context identifier, an abstract syntax name and a transfer syntax list.

6.1.2.3 Calling-presentation-selector

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

6.1.2.4 Calling-session-address

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

6.1.2.5 Called-presentation-selector

This shall be the presentation-selector part of the called-presentation-address parameter from the P-UNIT-DATA request service primitive and shall appear as the called-

presentation-selector part of the called-presentation-address parameter of the P-UNIT-DATA indication service primitive, if issued.

6.1.2.6 Called-session-address

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

6.1.2.7 Quality of service

This shall be the Quality of service parameter from the P-UNIT-DATA request service primitive.

6.1.2.8 User data

This shall be the user data parameter from the P-UNIT-DATA request service primitive, and shall appear as the user data parameter of the P-UNIT-DATA indication service primitive, if issued.

If the presentation context definition list parameter is present then the user data shall be a list of presentation data values (including any embedded presentation data values) from presentation contexts defined in the Presentation context list parameter. 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.

NOTE - The overall dimensions of the PPDU including presentation user data is determined by limitations imposed by the underlying service provider. The amount of presentation user data which can be supported is therefore influenced by the selection of transfer syntax.

6.2 Procedure

6.2.1 Sending a UD PPDU

The calling and called address parameters of the P-UNIT-DATA request service primitive are used to determine the calling-session-address, calling-presentation-selector, called-session-address, and the called-presentation-selector.

When a P-UNIT-DATA request service primitive is received by a PPM, it shall send a UD PPDU containing the calling-session-address, the calling-presentation-selector, the called-session-address, the called-presentation-selector and the presentation data values.

As a requestor's option, the presentation data values contained in an UD PPDU may be encoded more than once

to allow the transfer of the same presentation data values using a number of different transfer syntaxes.

A S-UNIT-DATA request service primitive is issued with the calling and called-session-address parameters, the quality of service parameter requested, and the SS-User-data parameter containing the UD PPDU (UD-type value followed by UDC-type values, if present).

The presentation context definition list parameter of the P-UNIT-DATA request primitive is used to determine the presentation context definition list of the UD PPDU.

6.2.2 Receiving a UD PPDU

The UD PPDU (UD-type value followed by UDC-type values, if present) arrives in the SS-User-data field of a S-UNIT-DATA indication. The calling-session-address from the S-UNIT-DATA indication and the calling-presentation-selector from the UD-type value in the UD PPDU will be used to determine the calling-presentation-address parameter for the P-UNIT-DATA indication. The called-session-address parameter from the S-UNIT-DATA indication, and the called-presentation-selector from the UD-type value in the UD PPDU will be used to determine the called-presentation-address parameter for the P-UNIT-DATA indication.

The receiving PPM is not required to examine UDC-type values of UD PPDU. If, for any presentation data values received, all its examined encodings are expressed according to transfer syntaxes not supported by the receiving PPM, then the receiving PPM does not issue a P-UNIT-DATA indication.

In all other cases, it shall issue a P-UNIT-DATA indication with all the parameters.

The presentation context definition list of the UD PPDU is used to determine the presentation context definition list parameter for the P-UNIT-DATA indication.

7 Mapping of the PPDU onto the Session-service

Unit Data Transfer

a) **UD PPDU** : The UD PPDU shall be conveyed from the sending PPM to the receiving PPM in the S-UNIT-DATA request and indication session-service primitives.

b) **UD PPDU associated parameters** : Table 3 defines the mapping of the UD PPDU associated parameters onto S-UNIT-DATA parameters.

TABLE 3 - Mapping of UD PPDU associated parameters onto S-UNIT-DATA parameters

UD PPDU associated parameter	S-UNIT-DATA parameter	m/nm/s
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
quality of service	quality of service	s
user data	SS-user-data	m

Key:

m : mandatory

nm : non-mandatory

s : as defined in the Session Service Definition (ISO 8326/Add.3)

8 Structure and encoding of UD PPDU

8.1 General

8.1.1 The structure of the PPDU 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 (ISO 8824);
- b) additional comments contained in the ASN.1 description;

NOTE - ASN.1 comments in 8.2 are an integral part of this International Standard, and frequently express requirements.

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

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BEGIN

-- The value of the SS-user data parameter of the S-UNIT-DATA request and indication session-service primitives shall be
 -- a UD-type value, followed as a requestor's option by zero or more UDC-type values.

```

UD-type ::= SEQUENCE
{
  [0] IMPLICIT Protocol-version           DEFAULT {version-1},
  [1] IMPLICIT Calling-presentation-selector OPTIONAL,
  [2] IMPLICIT Called-presentation-selector OPTIONAL,
  [4] IMPLICIT Presentation-context-definition-list OPTIONAL,
  User-data
}
  
```

-- Shall be the parameters of the UD PPDU.

-- As a sender's option, the presentation data values contained in a UD PPDU may be encoded more than once,
 -- using UDC-type values, to allow the transfer of the same presentation data values using a number of different
 -- transfer syntaxes.

UDC-type ::= User-data

-- Shall not be present if the Presentation context definition list parameter is not present in the UD 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 UD PPDU This shall be the same set of presentation data values which were contained
 -- in the UD-type.

Abstract-syntax-name ::= OBJECT IDENTIFIER

Called-presentation-selector ::= Presentation-selector

Calling-presentation-selector ::= Presentation-selector

Context-list ::= SEQUENCE OF SEQUENCE { Presentation-context-identifier,
 Abstract-syntax-name,

SEQUENCE OF Transfer-syntax-name }

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

Presentation-context-identifier ::= INTEGER

Presentation-selector ::= OCTET STRING

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

Transfer-syntax-name ::= OBJECT IDENTIFIER

User-data ::= CHOICE {
 [APPLICATION 0] IMPLICIT Simply-encoded-data,
 [APPLICATION 1] IMPLICIT Fully-encoded-data }

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

Simply-encoded-data ::= OCTET STRING

-- See clause 8.4.1.

Fully-encoded-data ::= SEQUENCE OF PDV-list

-- contains one or more PDV-list values.

-- See clause 8.4.2.

PDV-list ::= SEQUENCE

```

{ Transfer-syntax-name OPTIONAL,
  Presentation-context-identifier,
  presentation-data-values CHOICE
    { single-ASN1-type [0] ANY,
      octet-aligned [1] IMPLICIT OCTET STRING,
      arbitrary [2] IMPLICIT BIT STRING }

```

-- Contains one or more presentation data values from

-- the same presentation context.

-- See clause 8.4.2.

}

END

8.3 Encoding of SS-user data parameter values

8.3.1 Except for type User-data, ASN.1 data types specified in 8.2 shall be encoded according to the Basic Encoding Rules for ASN.1 (ISO 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-UNIT-DATA request and indication service primitives shall be the concatenation of the encodings of the UD-type value and the UDC-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 and when the presentation context definition list parameter contains only one entry.

8.4.1.3 Simple encoding shall be as follows:

- a) The contents of the Simply-encoded-data value shall be the concatenation of the bitstrings resulting from the encoding of the presentation data values forming the PS-user data value according to the appropriate transfer syntax.
- b) Whenever User-data appears as an element of some other ASN.1 type in 8.2, the encoding of the User-data value shall be according to the Basic Encoding Rules for ASN.1 (ISO 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.

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 in the UD-type and UDC-type when the default context is not in use and the presentation context definition list parameter contains more than one entry.

8.4.2.3 Full encoding shall be the application of the Basic Encoding Rules for ASN.1 (ISO 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.

8.4.2.4 The presentation-data-values component of a PDV-list value shall be encoded according to the Basic Encoding Rules for ASN.1 (ISO 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 (ISO 8825), then the "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 bitstrings¹ 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 bitstrings¹ resulting from the encoding of the presentation data values contained in that PDV-list value according to the appropriate transfer syntax.

8.4.2.5 The Presentation-context-identifier component of a PDV-list value in a UD PPDU shall identify the presentation context of the presentation data values.

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

1) There is a danger that concatenated presentation data value will be ambiguous if the transfer syntax is not self-delimiting.