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Draft for Development

Open Systems Interconnection: connection-oriented presentation service definition (ISO/DIS 8822)

Interconnexion de systèmes ouverts: définition du service de présentation orienté connexion

Kommunikation Offener Systeme: Definition des verbindungsorientierten Darstellungsdienstes

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It is being issued in the Draft for Development series of publications and is of a provisional nature because the subject matter is in the process of ongoing development within the International Standards Committee (ISO/TC 97/SC 21 Information Retrieval, Transfer and Management for Open Systems Interconnection).

It should be applied on this provisional basis, so that information and experience of its practical application may be obtained.

A review of this Draft for Development will be carried out

not later than two years after its publication. Notification of the start of the review period, with a request for the submission of comments from users of this Draft for Development will be made in an announcement in the appropriate issue of *BSI News*. Observations which it is felt should receive attention before the official call for comments will be welcomed.

According to the replies received, the responsible BSI Committee will judge whether the Draft for Development can be converted into a British Standard or what other action should be taken.

National foreword

This Draft for Development has been prepared under the direction of the Office and Information Standards Committee. The primary objective of this Draft for Development is to give advance guidance to product and systems designers concerned with the Presentation Layer of the Basic Reference Model for Open Systems Interconnection (OSI).

The text of the Draft for Development is identical with Draft International Standard ISO/DIS 8822 issued June 1986 by the International Organization for Standardization (ISO).

This Draft for Development is a revision of DD 101 : 1985 to take account of comments received on the ISO Draft Proposal. The main changes include introduction of a third functional unit giving another level of support to users of the session resynchronization service; simplification of the level of support given to users of the session activity service; and introduction of the P-ALTER-CONTEXT service in place of P-DEFINE-CONTEXT and P-DELETE-CONTEXT.

For ease of reproduction the ISO text has been reproduced unchanged.

The UK has actively participated through BSI Technical Committee IST/21 in the development of the ISO Draft International Standard. The Technical Committee will review any agreed amendments or addenda to the ISO text and will, where appropriate, update the text of this Draft for Development via an amendment or revision. When the ISO draft reaches an appropriate level of agreement and stability, this Draft for Development may then be converted to a British Standard.

This Draft for Development is closely related to DD 102 which specifies the protocol providing the service defined in this Draft for Development.

A brochure giving details of existing and projected British Standards publications for Open Systems Interconnection (OSI), data communications, database and computer graphics may be obtained from the Sales Department, BSI, Linford Wood, Milton Keynes, MK14 6LE, at no charge. Press releases for new British Standard publications in these areas will be issued to the computing press, and details of all new publications will be recorded in full in *BSI News*.

Terminology and conventions. The text of the Draft International Standard has been approved as suitable for publication as a Draft for Development without deviation. Some terminology and certain conventions are not identical with those used in Drafts for Development; attention is drawn especially to the following.

Wherever the words 'International Standard' appear, referring to this Draft for Development, they should be read as 'Draft for Development'.

Cross-references

International standards	Corresponding British Standards
ISO 7498-1984	BS 6568 : 1984 Description of basic reference model for open systems interconnection (Identical)
ISO/DIS 8326 revised-1984	DD 111 : 1985 Open Systems Interconnection: basic connection-oriented session service definition (ISO/DIS 8326 revised) (Identical)
ISO/DTR 8509	DD 108 : 1986 Open Systems Interconnection: service conventions (ISO/DTR 8509) (Identical)
ISO/DIS 8823	DD 102 : 1986 Open Systems Interconnection: connection-oriented presentation protocol specification (ISO/DIS 8823) (Identical)
ISO/DIS 8824.2	DD 103 : 1986 Open Systems Interconnection: specification of Abstract Syntax Notation One (ASN.1) (ISO/DIS 8824.2) (Identical)
ISO 7498/PDAD 3 (referred to as ISO 7498/Add 3 in the text)	DD 149 : 1986 Open Systems Interconnection: naming and addressing (ISO 7498/PDAD 3) (Identical)

0 INTRODUCTION

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

The aim of Open Systems Interconnection is to allow, with a minimum of technical agreement outside the interconnection standards, the interconnection of information processing systems

- from different manufacturers;
- under different managements;
- of different levels of complexity;
- of different ages.

This International Standard defines the service available to entities within the Application Layer of the Reference Model.

The International Standard recognizes that application-entities may wish to intercommunicate for a wide variety of reasons. While not all systems will share a common method of representing the information they wish to intercommunicate, they will be agreed about the subject matter of their communication and the meanings to be assigned to that information. The Presentation Service provides the proper means of transferring information so that the semantics are preserved during the transfer.

This International Standard contains an annex describing the relationship between application layer standards, presentation layer standards, abstract syntaxes, transfer syntaxes, abstract syntax notations and encoding rules.

1 SCOPE AND FIELD OF APPLICATION

This International Standard defines (in an abstract way) the externally visible service provided by the OSI Presentation Layer in terms of

- a) the primitive actions and events at the user/service boundary;
- b) the parameter data associated with each primitive action and event;
- c) the relationship between, and the valid sequences of, those actions and events.

The service defined in this International Standard is that which is provided by an OSI Presentation Protocol (in conjunction with the OSI Session Service) and which may be used by any OSI Application Protocol.

This International Standard does not specify individual implementations or products, nor does it constrain the implementation of entities and interfaces within a computer system. There is, therefore, no conformance to this International Standard.

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Documents

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2 REFERENCES

- ISO 7498, Information Processing Systems - Open Systems Interconnection - Basic Reference Model.
- ISO 8823, Information Processing Systems - Open Systems Interconnection - Connection-oriented Presentation Protocol Specification. 1)
- ISO 8326, Information Processing Systems - Open Systems Interconnection - Basic Connection-oriented Session Service Definition.
- ISO/TR 8509, Information Processing Systems - Open Systems Interconnection - Service Conventions.
- ISO 8824, Specification of Abstract Syntax Notation One (ASN.1). 1)
- ISO 7498/Add 3, Information Processing Systems - Open Systems Interconnection - Basic Reference Model
ADDENDUM 3: Naming and addressing. 1)

1) At present at the stage of draft.

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3 DEFINITIONS

3.1 Reference Model Definitions

This International Standard is based on the concepts developed in ISO 7498 and makes use of the following terms defined in it

- a) application-entity;
- b) presentation-connection;
- c) presentation-entity;
- d) Presentation Layer;
- e) presentation-service;
- f) presentation-service-access-point;
- g) presentation-service-data-unit;
- h) session-connection;
- i) session-service;
- j) two-way-alternate-communication;
- k) two-way-simultaneous-communication;
- l) transfer syntax.

NOTE- The abbreviations in clause 4 apply to some of these terms.

3.2 Service Convention 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) primitive;
- d) request;
- e) indication;
- f) response;
- g) confirm;

- h) unconfirmed service;
- i) confirmed service;
- j) provider-initiated service.

3.3 Naming and Addressing Definitions

This International Standard makes use of the following term defined in ISO 7498/Add 3:

Presentation-address.

3.4 Presentation Service Definitions

For the purpose of this International Standard the following definitions apply:

3.4.1 destructive: A service is destructive if its invocation may cause loss of data.

3.4.2 non-destructive: A service is non-destructive if its invocation does not cause the loss of data.

3.4.3 primitive type: A name for a set of values.

3.4.4 abstract syntax: Those aspects of the rules used in the formal specification of data which are independent of the encoding technique to represent the data.

3.4.5 notation for abstract syntax definition: A notation which enables complicated types to be defined and values of these types to be specified.

NOTE- This is done without determining the way an instance of the type is to be represented (by a sequence of octets) during transfer.

3.4.6 presentation context: An association of an abstract syntax with a transfer syntax that can be used to express all the information transfer requirements of the abstract syntax.

NOTE- From the viewpoint of the presentation service user, a presentation context represents a specific use of an abstract syntax.

3.4.7 defined context set: A set of presentation contexts that has been defined by agreement between all three parties to a communication: i.e. the presentation service provider and two service users.

NOTE- The inclusion of a context in the defined set implies that its formal description is acceptable to both service users and that the co-operating presentation-entities have agreed on a

mutually acceptable transfer syntax for that context.

3.4.8 default context: The default context is a presentation context which is always known to the presentation provider. It is the presentation context which always applies to P-EXPEDITED-DATA. It applies to all other user data when the defined context set is empty.

NOTE- The P-CONNECT service provides for agreement on the identity of the default context to be used on a presentation connection. If an identity is not thus agreed, then it is the responsibility of the presentation users to have agreed on the interpretation of the default context.

3.4.9 presentation context identifier: An identifier for a specific presentation context at the conceptual service interface.

3.4.10 abstract syntax name: A name for a specific abstract syntax at the conceptual service interface.

3.4.11 functional unit: A logical grouping of related services defined by this International Standard for the purpose of

- negotiation for use during the presentation connection;
- specification of conformance requirements;
- referencing by other standards.

3.4.12 disrupt: A service is disrupted by another service if the invocation of the second service results in primitives of the first service not being invoked as specified for the procedure of the first service.

3.4.13 inter-activity defined context set: When the last service of the activity management functional unit which was invoked was P-ACTIVITY-START or P-ACTIVITY-RESUME, then the inter-activity defined context set is the set of contexts which were available for use on the presentation immediately before the last P-ACTIVITY-START or P-ACTIVITY-RESUME invocation.

4 ABBREVIATIONS

PSDU	Presentation Service Data Unit.
APDU	Application Protocol Data Unit.
ASN.1	Abstract Syntax Notation One. (see DIS 8824).
PSAP	Presentation Service Access Point.
PCEP	Presentation Connection End Point.
PCI	Protocol control information.
PPM	Presentation protocol machine.
PPDU	Presentation protocol data unit.

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5 CONVENTIONS

This International Standard uses the descriptive conventions defined in ISO/TR 8509.

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SECTION ONE: GENERAL

6 OVERVIEW OF THE LAYER6.1 Purpose

The Presentation Layer is concerned with the representation of information in transit between open systems (see ISO 7498).

6.2 Relationship to Application Layer

NOTE- The presentation layer view of the application layer is described below.

6.2.1 An application (layer) protocol is specified in terms of the transfer of application protocol data units (APDUs) between application entities. A given application protocol can make use of several types of APDU; instances of these types are exchanged between application entities during the operation of the protocol.

6.2.2 A set of APDU type definitions associated with an application protocol constitutes an abstract syntax. For two application entities to communicate successfully they must have an agreement on the set of abstract syntaxes they intend to use prior to any communication taking place. During the course of communication they may decide to modify this agreement to a greater or lesser extent. As a consequence the set of abstract syntaxes in use may be changed.

6.2.3 An APDU type definition identifies the general nature of the information content of corresponding APDU instances: i.e. the different categories of information that may occur in an APDU instance and the ways in which they may be combined. It does not identify the transfer syntaxes to be used while APDU instances are in transit between presentation entities.

6.2.4 The Presentation Layer exists to ensure that the information content of PSDUs is preserved during their transit between application entities. It is the responsibility of co-operating application entities to determine the set of abstract syntaxes they employ in their communication and inform the Presentation Layer entities of this agreement. Knowing the set of abstract syntaxes to be used by the application entities, the entities in the Presentation Layer are responsible for selecting mutually acceptable transfer syntaxes that preserve the information content of PSDUs within the OSI environment. Encryption and data compression in the presentation layer are characteristics of particular transfer syntaxes.

NOTE- Entities in the Presentation Layer have no role in determining the set of abstract syntaxes to be used by application entities.

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6.2.5 The Presentation service does not define any specific mapping between APDUs and PSDUs. The structure of user data parameters that carry the information content of APDUs is specified in 6.6.

6.3 Relationship to Session Layer

Entities in the Presentation Layer support protocols that enhance the OSI Session Service in order to provide a Presentation Service with the facilities described in ISO 7498.

NOTE- It is not the function of the Presentation Layer to provide dialogue control and data transport functions additional to those provided by the Session Service.

6.4 Features of the Presentation Layer

The Presentation Layer has two functions it carries out on behalf of presentation service users:

- a) negotiation of transfer syntaxes;
- b) transformation to and from transfer syntax.

The function of syntax negotiation is supported by presentation protocols; it provides Presentation Service context definition facilities. Transformation of syntax is a function contained within a presentation entity and has no impact on presentation protocol design.

6.5 Negotiation of Syntax

Negotiation of transfer syntax takes place between two presentation entities when a user of the Presentation Service provides a specification of an abstract syntax for which a transfer syntax is required. The result of a successful negotiation is the association of an abstract syntax with a compatible transfer syntax; such an association constitutes a presentation context. From the viewpoint of the presentation service user, a presentation context represents a specific use of an abstract syntax.

6.6 Information Transfer

6.6.1 User information is carried in user data parameters of presentation primitives.

6.6.2 At the service interface the value of a user data parameter is structured as a list of typed data values; the type identifies the presentation context applicable to the data value and the syntactic description of the data value within that context. A data value may be structured such that it contains nested data values from other presentation contexts.

NOTE- This form cannot be more explicitly defined at the service level. Any real interface in a local system will specify the form explicitly.

6.7 Presentation Context Definition

6.7.1 The presentation service provides facilities for the definition of presentation contexts that match the information transfer requirements of its users. One or more presentation context definitions shall fully describe the information transfer requirements of users of a presentation connection.

6.7.2 There are two services by which presentation contexts may be defined. These are the P-CONNECT and the P-ALTER-CONTEXT services. The P-ALTER-CONTEXT service also provides for the deletion of contexts which are no longer required.

6.7.3 As presentation contexts are defined they are added to a defined context set. The action of context definition makes the a presentation context available for immediate use. This enables a presentation service user to identify a set of presentation contexts that are required to describe fully the flow of information between application entities.

6.7.4 If the defined context set is empty, then it is still possible to transfer information in presentation user data parameters; in this case information is transferred in the default context. Information which is transferred using the P-EXPEDITED-DATA service is always transferred in the default context. The default context may be "defined", that is identified by name, using the presentation connect service, but may not be redefined by any other presentation service.

6.8 Management of the Defined Context Set

If the presentation context management functional unit is not selected, then the defined context set will not change during the presentation connection and the remainder of clause 6.8 does not apply.

6.8.1 Presentation Context Management Functional Unit

6.8.1.1 If the Presentation Context Management functional unit is selected, the defined context set may change during the connection. This is accomplished by using the P-ALTER-CONTEXT service request. The presentation layer is responsible for ensuring that the defined context set is identical at both ends of a presentation connection; therefore P-ALTER-CONTEXT is a confirmed service. However, it is possible for certain

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destructive services to collide with or overtake the PPDUs for altering the defined context set.

6.8.1.2 If a P-RESYNCHRONIZE indication is received while awaiting the confirm for a P-ALTER-CONTEXT request, the state of the defined context set is indicated to the service user. If a P-RESYNCHRONIZE request is issued while awaiting the confirm for a P-ALTER-CONTEXT request, then the P-ALTER-CONTEXT request is cancelled and the state of the defined context set is indicated to both service users.

6.8.1.3 If the Activity Management functional unit is selected then the service user must own the activity token to issue a P-ALTER-CONTEXT request.

6.8.1.4 Interaction of the P-ACTIVITY-INTERRUPT and P-ACTIVITY-DISCARD services with P-ALTER-CONTEXT may cause misalignment of the defined context set and subsequent transfer of data in a context unknown to one of the presentation correspondents. This will be indicated as unreadable data to the receiving presentation user. Presentation service users can avoid this situation by use of the activity token and appropriate sequencing rules.

6.8.2 Context Restoration Functional Unit

6.8.2.1 The presentation user can select the context restoration functional unit. If the context restoration functional unit is not selected, the defined context set may only be changed via the P-ALTER-CONTEXT service and the remainder of clause 6.8 does not apply. If the context restoration functional unit is selected, the presentation service will remember the defined context set at specified points during the connection. If the presentation user requests a return to one of these points, the defined context set will be restored to the one active at that point.

6.8.2.2 The points remembered are

- the Major Synchronization point;
- the Minor Synchronization point;
- the Activity interrupt point;
- the start of the connection.

6.8.2.3 A P-RESYNCHRONIZE (restart) or (set) to a point known to presentation will restore the defined context set to the one known at that point. If the point specified is lower than those known to presentation, the defined context set will be restored to that defined to that defined at presentation connection establishment. If the point specified is higher than the ones known to presentation or if P-RESYNCHRONIZE (abandon) is requested, the defined context set will be left unchanged. If an unknown point, i.e. within the range of known points, but

not known by presentation, is specified, presentation will indicate this to the user and will not alter the defined context set.

6.8.2.4 If the activity token exists, only the owner of that token may initiate a P-ALTER-CONTEXT request. The defined context set outside activities is the one defined at presentation connection establishment and modified by any P-ALTER-CONTEXT requests issued outside an activity. When an activity is started its initial defined context set is equal to the defined context set for dialogue outside activities. However, subsequent P-ALTER-CONTEXT requests issued inside the activity alter only the defined context set of that activity.

6.8.2.5 A P-ACTIVITY-INTERRUPT causes presentation to save the defined context set of the activity and to restore the defined context set to that for dialogue outside activities.

6.8.2.6 A P-ACTIVITY-END or P-ACTIVITY-DISCARD causes presentation to discard the defined context set of the activity and to restore the defined context set to that outside activities.

6.8.2.7 A P-ACTIVITY-INTERRUPT issued outside activities has no effect on the defined context set

6.8.2.8 A P-ACTIVITY-RESUME will restore the defined context set to that of the specified activity or synchronization point. Since this service is unconfirmed, it is possible to receive data that is in an unknown context. If this happens an unreadable data indication will be issued to the user.

NOTE- Control of activity identifiers and the relations of activities to synchronization points is a concern of the application.

7 FACILITIES OF THE SERVICE

The Presentation Service comprises a number of facilities. Each facility is outlined below and the services which make up each facility are identified in table 1.

7.1 The Connection Establishment Facility

The connection establishment facility provides a service which allows a service user to establish a presentation-connection with another service user. The service allows the service users to exchange parameters through which they may establish the characteristics of the connection, in particular

- a) the Presentation Service Functional Units selected;
- b) an initial set of defined presentation contexts;
- c) the characteristics of the session connection;
- d) the abstract syntax to be used in the default context.

7.2 The Connection Termination Facility

The connection termination facility provides services which allow

- a) the orderly release of a presentation-connection by the service user in a way which is non-destructive;
- b) the termination of a presentation-connection in a way which may be destructive; termination may be initiated by either of the service users or by the service provider.

7.3 The Context Management Facility

The context management facility provides a service which allows

- a) the definition of presentation contexts by agreement among the two service users and the service provider; an identifier is associated with each defined presentation context, but this identifier has no significance beyond this Presentation Connection;
- b) the deletion of presentation contexts from the set of such contexts available for use.

TABLE 1 - Summary of presentation facilities, their services and purpose

Name of Service Primitive	Type of Service	Purpose
<u>Connection Establishment Facility</u>		
P-CONNECT	Confirmed	Connection establishment
<u>Connection Termination Facility</u>		
P-RELEASE	Confirmed	Connection release
P-U-ABORT	Non-confirmed	User initiated abort
P-P-ABORT	Non-confirmed	Provider initiated abort
<u>Context Management Facility</u>		
P-ALTER-CONTEXT	Confirmed	Context definition and deletion
<u>Information Transfer Facility</u>		
P-TYPED-DATA	Non-confirmed	Information transfer not subject to token control
P-DATA	Non-confirmed	Information transfer which may be subject to token control
P-EXPEDITED-DATA	Non-confirmed	)
P-CAPABILITY-DATA	Confirmed	) (see the note)
<u>Dialogue Control Facility</u>		
P-U-EXCEPTION-REPORT	Non-confirmed	)
P-P-EXCEPTION-REPORT	Provider -initiated	)
P-TOKEN-GIVE	Non-confirmed	)
P-TOKEN-PLEASE	Non-confirmed	)
P-CONTROL-GIVE	Non-confirmed	)
P-SYNC-MINOR	Optionally confirmed	) (see the note)
P-SYNC-MAJOR	Confirmed	)
P-RESYNCHRONIZE	Confirmed	)
P-ACTIVITY-START	Non-confirmed	)
P-ACTIVITY-RESUME	Non-confirmed	)
P-ACTIVITY-END	Confirmed	)
P-ACTIVITY-INTERRUPT	Confirmed	)
P-ACTIVITY-DISCARD	Confirmed	)

NOTE- The purpose of the P-service primitive follows that of the corresponding S-service primitive as specified in ISO 8326.

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7.4 The Information Transfer Facility

The information transfer facility provides services which allow service users to exchange information over a presentation connection. The services allow data with token control, data without token control, capability data and expedited data.

7.5 The Dialogue Control Facility

The dialogue control facility provides services which allow token management, synchronization, resynchronization and activity management. These services are mapped onto the corresponding session services. This International Standard describes them only in respect of their relationships to and effects on other presentation services. The presentation service, in certain cases, imposes additional constraints on the use of the services which directly invoke the session services; the use of these services also affects the states of the presentation-entities. They are more fully described in the session service definition (see ISO 8326).

8 FUNCTIONAL UNITS

8.1 Functional units are used by this International Standard for the purpose of identification of Presentation Service user requirements during presentation connection establishment.

8.2 Two categories of functional unit exist

a) session functional units, as defined in ISO 8326, comprising

- 1) the negotiated release functional unit;
- 2) the half duplex functional unit;
- 3) the duplex functional unit;
- 4) the expedited data functional unit;
- 5) the typed data functional unit;
- 6) the capability data exchange functional unit;
- 7) the minor synchronize functional unit;
- 8) the major synchronize functional unit;
- 9) the resynchronize functional unit;
- 10) the exceptions functional unit;
- 11) the activity management functional unit.

The selection of session functional units which may be made is subject to the constraints imposed by the session service, see ISO 8326.

NOTE- The decision of which session functional units are to be used is made during P-CONNECT.

b) presentation functional units, corresponding to services provided by the Presentation layer, and comprising

- 1) the presentation kernel functional unit;
- 2) the context management functional unit;
- 3) the context restoration functional unit.

8.3 The presentation kernel functional unit is always available and supports information transfer on whatever session functional unit data services are selected. The context management functional unit is optional and its use is negotiable. The context restoration functional unit is optional and its use is negotiable. The context restoration functional unit shall not be selected if the context management functional unit is not selected for use on the presentation connection.

8.4 When a session functional unit is selected, the corresponding presentation services and functions are made available.