INTERNATIONAL STANDARD

ISO/IEC 9545

Second edition
1994-08-15

Information technology — Open Systems Interconnection — Application Layer structure

Technologies de l'information — Interconnexion de systèmes ouverts (OSI) — Structure de la couche Application



Reference number
ISO/IEC 9545:1994(E)

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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 9545 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, in collaboration with ITU-T. The identical text is published as ITU-T X.207.

This second edition cancels and replaces the first edition (ISO/IEC 9545:1989), which has been technically revised.

Annexes A, B and C of this International Standard are for information only.

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Introduction

This Recommendation | International Standard is a refinement of the description of the OSI Application Layer contained in ITU-T Rec. X.200 | ISO/IEC 7498-1.

The purpose of this Recommendation | International Standard is to facilitate a coherent and modular approach to Application Layer standardization. It defines a set of architectural principles and concepts that provide a basis for structuring and relating the specifications contained in Application Layer Recommendations and Standards. It defines the internal structure of the Application Layer, providing a framework for the development of Application Layer Recommendations and Standards. It also describes the general principles underlying the operation of application-protocols.

The following subjects are covered by this Recommendation | International Standard:

a) the relationship between distributed information processing and OSI communication services;

b) the structure of application-entities;

c) the OSI-service and protocol structure in the Application Layer; and

d) ASO-context and application-context.

This Recommendation | International Standard only considers those aspects of distributed information processing for an application which are relevant for the derivation of generic requirements for the structuring of Application Layer communications.

The architectural framework specified in this Recommendation | International Standard embodies concepts that may not be fully supported by existing Application Layer Recommendations and Standards. However, these concepts have been specified so as to provide a basis for the development of future Application Layer Recommendations and Standards which, it is anticipated, will require their use.

This Recommendation | International Standard may be subject to future expansion, particularly with regard to multi-peer communication, security, application-context management, recovery, and Open Distributed Processing.

A companion Technical Report, which is currently under development, will provide guidance on applying this Application Layer Structure during the creation of Application Layer service and protocol Recommendations and Standards.

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INTERNATIONAL STANDARD

ITU-T RECOMMENDATION

INFORMATION TECHNOLOGY – OPEN SYSTEMS INTERCONNECTION – APPLICATION LAYER STRUCTURE

1 Scope

This Recommendation | International Standard refines the description of the Application Layer contained in the Basic Reference Model for OSI (ITU-T Rec. X.200 | ISO/IEC 7498-1). It provides a framework for coordinating the development of existing and future Application Layer Recommendations and Standards. It is provided for reference by Application Layer Recommendations and Standards.

In particular this Recommendation | International Standard:

a) defines the nature of Recommendations and Standards in the Application Layer and the relationships among them;

b) defines the architectural framework in which individual OSI Application Layer protocols are developed.

c) defines concepts which provide a flexible approach to structuring in the Application Layer;

d) defines the categories of identifiable objects which are necessary for the specification and operation of protocols;

e) relates distributed information processing activities to the Recommendations and Standards in the Application Layer;

f) structures, and relates, specifications in Application Layer Recommendations and Standards;

g) identifies the various kinds of specification necessary in Application Layer Recommendations and Standards.

This Recommendation | International Standard is provided for reference by Application Layer Recommendations and Standards. Its purpose is to facilitate a coherent and modular approach to the structuring of specifications for Application Layer behaviour. It neither specifies services nor protocols for OSI; nor is it an implementation specification for systems, nor a basis for appraising the conformance of implementations.

2 Normative references

The following Recommendations and International Standards contain provisions which, through reference in this text, constitute provisions of this 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 Recommendation | International Standard are encouraged to investigate the possibility of applying the most recent editions of the Recommendations and Standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards. The Telecommunication Standardization Bureau of the ITU maintains a list of currently valid ITU-T Recommendations.

2.1 Identical Recommendations | International Standards

- ITU-T Recommendation X.200 (1994)[1] | ISO/IEC 7498-1:1994, *Information technology – Open Systems Interconnection – Basic Reference Model.*
- ITU-T Recommendation X.210 (1993) | ISO/IEC 10731:1993, *Information technology – Open Systems Interconnection – Conventions for the Definition of OSI services.*
- CCITT Recommendation X.660 (1992) | ISO/IEC 9834-1:1993, *Information technology – Open Systems Interconnection – Procedures for the operation of OSI Registration Authorities: General Procedures.*

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[1] Presently at the stage of draft.

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2.2 Paired Recommendations | International Standards equivalent in technical content

- CCITT Recommendation X.217 (1992), *Service definition for the Association Control Service Element.*

  ISO 8649:1989, *Information technology – Open Systems Interconnection – Service Definition for the Association Control Service Element.*

- CCITT Recommendation X.216 (1988), *Presentation service definition for Open Systems Interconnection for CCITT applications.*

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

- 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: Naming and Addressing.*

3 Definitions

3.1 For the purposes of this Recommendation | International Standard, the following terms as defined in ITU-T Rec. X.200 | ISO/IEC 7498-1 apply:

a) abstract syntax;

b) application-entity;

c) application-process;

d) application-process-invocation;

e) application-process-type;

f) (N)-address;

g) (N)-association;

h) (N)-entity;

i) (N)-entity-invocation;

j) (N)-entity-type;

k) (N)-function;

l) (N)-layer;

m) (N)-protocol;

n) (N)-protocol-control-information;

o) (N)-protocol-data-unit;

p) (N)-service-access-point;

q) presentation context;

r) real open system; and

s) transfer syntax.

3.2 For the purposes of this Recommendation | International Standard, the following terms as defined in CCITT Rec. X.650 | ISO 7498-3 apply:

a) AEI-identifier;

b) AE-qualifier;

c) AE-title;

d) AE-type-title;

e) AP-invocation-identifier;

f) application-association-identifier;

g) AP-title;

h) (N)-directory-function; and

i) (N)-protocol-addressing-information.

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3.3 For the purposes of this Recommendation | International Standard, the following terms as defined in ITU-T Rec. X.210 | ISO/IEC 10731 apply:

a) deliver (primitive);

b) OSI-service;

c) OSI-service primitive;

d) OSI-service-user; and

e) submit (primitive).

3.4 For the purposes of this Recommendation | International Standard, the following definitions apply.

NOTE – The word "object" is used here in the general English sense.

3.4.1 AE-invocation: A specific utilization of part or all of the capabilities of a given application-entity in support of the communications requirements of an application-process-invocation.

NOTE – This is a specific use of the ASO-invocation concept.

3.4.2 AE-type: A description of a class of application-entities in terms of a set of capabilities defined for the Application Layer.

NOTE – This is a specific use of the ASO-type concept.

3.4.3 application-association, association: A cooperative relationship between two ASO-invocations which governs their bilateral use of the Presentation Service for communication of information and coordination of their joint operation.

NOTE – This is a specific use of the ASO-association concept.

3.4.4 application-association-identifier: A name that unambiguously identifies an application-association within the scope of the participating ASO-invocations.

3.4.5 application-context: A set of rules shared in common by two ASO-invocations in order to support an application-association.

NOTE – This is a specific use of the ASO-context concept.

3.4.6 application-context-definition: A specification of an application-context.

3.4.7 application-context- name: A name that unambiguously identifies an application-context-definition.

3.4.8 application-service-element: A set of application-functions that provides a capability for the interworking of application-entity-invocations for a specific purpose; application-service-elements are a component of application-service-objects.

NOTE – This definition refines the original definition of application-service-elements in ITU-T Rec. X.200 | ISO/IEC 7498-1.

3.4.9 application-service-object: An active element within (or equivalent to the whole of) the application-entity embodying a set of capabilities defined for the Application Layer that corresponds to a specific ASO-type (without any extra capabilities being used).

NOTE – This is a specific use of the (N)-entity concept defined in ITU-T Rec. X.200 | ISO/IEC 7498-1.

3.4.10 ASE-invocation: A specific utilization of part or all of the capabilities of a given application-service-element.

3.4.11 ASE-type: A description of a class of application-service-elements in terms of a set of capabilities defined for the Application Layer.

3.4.12 ASO-association: A cooperative relationship among two or more ASO-invocations for the purpose of communication of information and the coordination of their joint operation.

NOTE – This is a specific use of the (N)-association concept.

3.4.13 ASO-association-identifier: A name that unambiguously identifies an ASO-association within the scope of the participating ASO-invocations.

3.4.14 ASO-context: A set of rules shared in common among ASO-invocations in order to support an ASO-association.

3.4.15 ASO-context-definition: A specification of an ASO-context.

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3.4.16 ASO-invocation: A specific utilization of part or all of the capabilities of a given ASO (without extra capabilities being used).

NOTE – This is a specific use of the (N)-entity-invocation concept defined in ITU-T Rec. X.200 | ISO/IEC 7498-1.

3.4.17 ASOI-identifier: A name that unambiguously identifies an ASOI within the scope of the pair (parent invocation, ASO).

3.4.18 ASOI-tag: A name that unambiguously identifies an ASOI within the scope of the pair (API, ASO).

3.4.19 ASO-name: A name that unambiguously identifies an ASO within the scope of an AP.

3.4.20 ASO-qualifier: A name that unambiguously identifies an ASO within the scope of its parent.

NOTE – When the ASO is the AE, the parent of the ASO is the AP. In all other cases, the parent is the parent ASO.

3.4.21 ASO-title: A name that unambiguously identifies an ASO in the OSI environment.

3.4.22 ASO-type: A description of a class of ASOs in terms of a set of capabilities defined for the Application Layer.

NOTE – This is a specific use of the (N)-entity-type concepts defined in ITU-T Rec. X.200 | ISO/IEC 7498-1.

3.4.23 ASO-type-title: A name that unambiguously identifies an ASO-type in the OSI environment.

3.4.24 association control service element: An ASE that provides the exclusive means for establishing and terminating all application-associations.

NOTE – The functionality of this ASE is defined in CCITT Rec. X.217 | ISO/IEC 8649.

3.4.25 child ASO: An ASO is a child ASO of the ASO that immediately contains it.

3.4.26 control function: The component of an ASO that controls the interactions among the ASEs and/or ASOs within the containing ASO.

3.4.27 parent ASO: An ASO is a parent ASO to its immediately contained ASOs and ASEs.

4 Abbreviations

ACSE	Association Control Service Element
AE	application-entity
AEI	AE-invocation
AP	application-process
APCI	application-protocol-control-information
API	AP-invocation
APDU	application-protocol-data-unit
ASE	application-service-element
ASEI	ASE-invocation
ASO	application-service-object
ASOI	ASO-invocation
CF	control function
ISP	International Standardized Profile
OSI	Open Systems Interconnection

5 Application Layer concepts

5.1 Introduction

5.1.1 Recommendations and International Standards for OSI are intended to support the communication requirements of applications (i.e. information processing tasks) requiring coordinated processing activities in two or more real open systems. In particular, standards for the OSI Application Layer define procedures for the support of distributed information processing.

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5.1.2 This Application Layer Structure provides a basis for the modelling and specification, within Application Layer Recommendations and Standards, of the structure of application-entities (AEs) and the communications behaviour of AE-invocations (AEIs). This Application Layer Structure contains:

a) a model that enables the description of the internal structure of an AE and its AEIs;

b) a specification of generic features of interactions among Application Layer components;

c) a description of the categories of specification that are necessary in Application Layer Recommendations and Standards together with a description of their inter-relationships.

NOTE – Application Layer specifications developed before this edition of this Application Layer Structure may use different terms for equivalent concepts. The extent to which such specifications can be used within this structure has to be considered on a case-by-case basis.

5.1.3 The Application Layer differs from the other layers of OSI in several important respects. As the highest layer of OSI, it does not provide connections within the Application Layer. Also, it provides a wide range of communications services to support various kinds of distributed information processing requirements. Therefore, this Application Layer Structure provides a recursive modular approach to the modelling and specification of these communications services that will enable particular distributed information processing requirements to be satisfied.

5.1.4 The Application Layer is supported by layers 1 to 6 in OSI as visible at the Presentation service.

5.1.5 This Application Layer Structure makes no assumptions about whether communicating application-processes (APs) are in the same or different open systems.

5.2 Application-processes

5.2.1 In ITU-T Rec. X.200 | ISO/IEC 7498-1, the cooperative operation of real open systems is modelled in terms of the interactions among APs in these systems. An AP is an abstract representation of a set of resources including processing resources within a real open system which perform information processing for a particular application. The capabilities of the APs that are involved in interaction among AP-invocations are determined by the requirements of the information processing that the APs support: no constraints are imposed by this Application Layer Structure either on the form of these interactions or on the possible relationships that may exist among them.

5.2.2 Depending upon the nature of an application, an AP may only need to communicate with other APs intermittently; moreover, the set of APs involved in distributed processing for an application may change with time. At a particular time, an AP may be represented by zero, one, or more AP-invocations.

5.2.3 Cooperative operation among AP-invocations requires that they share sufficient information to interact and carry out processing activities in a compatible manner. The information determining the nature of the interactions among AP-invocations is of three kinds:

a) Information describing the set of objects (using this term in its most general sense) which are the subject of distributed information processing activities.

b) Information describing the procedures to be used to effect communication among the AP-invocations for the control and co-ordination of distributed information processing.

c) Information representing the net effect (i.e. state) of past interactions among the AP-invocations.

The purpose of OSI Application Layer Recommendations and International Standards is to provide definitions of procedures for interworking which are related to these three kinds of information.

5.3 Application-entities

5.3.1 The aspects of an AP that need to be taken into account for the purpose of OSI are represented by one or more AEs. An AE represents a set of OSI communication capabilities of a particular AP.

5.3.2 An AE represents one, and only one, AP in the OSI environment. Different APs may be represented by AEs of the same AE-type. An AP may be represented by a set of AEs: these AEs may be, but need not be, of different AE-types.

5.3.3 An AE-type specifies the communications capabilities of AEs of a particular type: i.e. it specifies the range of OSI service and protocol behaviours that may be displayed by AEIs of that type .

5.3.4 An AEI is a specific use of the capabilities of an AE in order to communicate with peer AEIs and so provide an OSI-service.

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5.3.5 An AEI is an integral part of an AP-invocation. It supports those activities of an AP-invocation which require communication within the OSI environment. There may be zero, one or more AEIs within an AP-invocation at a particular point in time: these AEIs may be, but need not be, of different AE-types.

5.3.6 Communication in the Application Layer takes place among two or more AEIs. These cooperating AEIs may be of different AE-types. However, where different AE-types are involved, some correspondence and compatibility is necessary among the behaviours described by the AE-types.

5.3.7 The lifetime of an AEI is controlled by the AP-invocation which it represents in the OSI environment. An AP-invocation may have a longer lifetime than any or all of its AEIs.

5.4 Application-service-objects

5.4.1 An application-service-object (ASO) is a composite component that is distinguished for the purpose of structuring the Application Layer.

5.4.2 An ASO is a configuration of various groups of application communication functions, each of which has been separately distinguished for purposes of OSI service and protocol specification. The components of such a configuration are ASEs, other ASOs, and a CF which determines the properties of the configuration. An ASO is a composition of:

a) one or more ASEs and a CF; or

b) one or more ASOs and a CF; or

c) one or more ASEs and one or more ASOs and a CF.

The component ASOs can, in turn, be decomposed in the same way. Component ASEs and ASOs may be of the same or different type.

5.4.3 An ASO-invocation (ASOI) represents a specific use of the capabilities of an ASO. The behaviour of an ASOI is characterised by:

a) the OSI-service which it provides to its OSI-service-user(s), in conjunction with its peer(s);

b) the APCI contained in the APDUs it exchanges with its peer(s); and

c) the OSI-service(s) which it uses.

An ASOI exhibits a communications behaviour within a range specified by its ASO-type. An ASOI includes state information related to its communication behaviour.

5.4.4 An AE is itself an ASO. It is an ASO which, in a particular configuration, is not contained by any other ASO. An AE-type is the ASO-type for the ASO which is equivalent to the AE. An AEI is an ASOI of the ASO which is equivalent to the AE.

5.4.5 Within an ASOI there are other ASOIs and/or ASEIs which correspond to the ASOs and/or ASEs from which the relevant ASO is composed. At a particular point in time there may be zero, one or more ASOIs corresponding to a particular ASO: the actual number is affected by factors including constraints imposed by the CF and by the requirements of particular instances of communication.

5.4.6 The CF of an ASOI determines how its component ASEIs and ASOIs operate in combination so as to enable the ASOI to provide a particular OSI-service as a result of its operating in concert with peer ASOIs.

5.4.7 An ASO-type describes the communication capabilities of ASOs of a particular type. An ASO-type includes:

a) a definition of the OSI-service provided by ASOIs of that type as a result of their operation in concert with peer ASOIs;

b) one or more references to component ASE-types and/or ASO-types that are partly or fully included;

c) a specification of the CF which determines how the component ASEIs and ASOIs of an ASOI of that type operate in combination and make use of the Presentation service and/or the OSI services provided by other ASOs or ASEs so as to provide the OSI-service that is particular to that ASO-type.

An ASO-type may be the subject of international standardization.

NOTE – The creation of appropriate ASO-types is dependent upon a variety of systems requirements and constraints. Some ASO-types will be the subject of international standardization; other ASO-types will be the subject of definition in more limited communities of interest.

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5.4.8 The state information modelled by an ASOI (including all its components) reflects the net effect of its communications with other ASOIs. The existence of this state information provides a basis for modelling the co-ordinated consecutive, and/or concurrent use of multiple ASO-associations.

NOTE – For example, this provides one possible method for modelling the continuation of an activity following the loss of an application-association.

5.4.9 The lifetime of an ASOI is determined by the AEI of which it is a part. An AEI may have a longer lifetime than any or all of its component ASOIs. The lifetime of an ASOI is not determined by the duration of the ASO-associations in which it is a participant. Since an AEI is an ASOI, at least one ASOI exists for the lifetime of the AEI.

5.5 Application-service-elements

5.5.1 An ASE is an indivisible component of an ASO. It is a combination of application communication functions within an ASO that is distinguished for purposes of OSI service and protocol specification.

5.5.2 An ASE-type describes the communication capabilities of ASEs of a particular type. An ASE-type specifies the set of application-protocol-data-units (APDU) handled by the ASE and the procedures governing their use. This constitutes the application-protocol among ASEs.

5.5.3 An ASEI represents a specific use of the capabilities of an ASE. The behaviour of an ASEI is characterized by:

a) the OSI-service which it provides to its OSI-service- user(s), in conjunction with its peer(s);

b) the APCI it exchanges with its peer(s); and

c) its requirements for the use of the Presentation service, ASO services, and ASE services.

5.5.4 ASEs may occur as components of ASOs at any level of recursion in the Application Layer structure.

5.5.5 An ASE-type may be the subject of international standardization.

NOTE – The creation of appropriate ASE-types is dependent upon a variety of systems requirements and constraints. Some ASE-types will be the subject of international standardization; other ASE-types will be the subject of definition in more limited communities of interest.

5.6 Control functions

5.6.1 The specification of a CF is an integral part of an ASO-type. The CF of an ASOI provides the OSI-service of the ASOI through coordination and use of:

a) OSI-services of component ASOIs and ASEIs, and

b) supporting OSI-services available to the ASOI which are external to the ASOI; these may be provided by other ASOIs and/or by the OSI Presentation Layer.

5.6.2 A CF provides functions of the following kinds:

a) mapping and coordination between the OSI-service provided by the ASOI and the OSI-services provided by the component ASOI(s) and ASEI(s);

b) mapping and coordination between the supporting OSI-services provided to the ASOI and the OSI-services required by the component ASOI(s) and ASEI(s);

c) any other control and coordination functions that may be necessary to achieve the cooperative operation of the component invocations within the ASOI.

The characteristics of the mappings are determined by the properties of the OSI-services involved: there need not be a one-to-one mapping between OSI-service primitives.

NOTE – For instance, a CF of an ASOI may generate a sequence of OSI-service primitives as a consequence of the invocation of a single OSI-service primitive of the ASOI.

5.6.3 The mapping between OSI-service primitives of the ASOI and the OSI-service primitives of the components, requires the CF of an ASOI to accommodate:

a) provision for the OSI-service of the ASOI;

b) coordination of the communications behaviour of the components of the ASOI so that they are consistent with the range of communications behaviours permitted for a particular ASO-association;

c) coordination of communications behaviours on multiple (and possibly concurrent) ASO-associations.

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5.6.4 A CF of an ASOI coordinates the use made of OSI-services and presentation-services by the components of the ASOI for their exchange of APDUs with other ASOIs. The CF is required to provide a mapping that preserves the properties of the services used by the individual components, by taking into account the characteristics of the supporting services.

5.6.5 In mapping APDUs to and from OSI-services and/or presentation services, a CF may perform some of the following functions:

a) concatenation and separation of APDUs;

b) transformations of APDUs insofar as they are consistent with both the abstract syntax that specifies their generic structure and the shared state of the AEIs exchanging APDUs;

c) generation of APCI to coordinate interworking among its ASOI and ASOIs in other AEIs.

While an ASO or ASE may be defined in terms of a particular mapping to a supporting service, the CF of a parent ASO can modify the mapping to a different supporting service as long as the behaviour of the child ASO is not affected. This allows an ASO or ASE requiring a particular supporting service to be mapped to a different or equivalent supporting service without modifying the ASO or ASE.

5.6.6 In order to perform its various functions, the CF of an ASOI may maintain state information that relates to the local coordination of the activities of the components of the ASOI. In addition, the CF may maintain state information that relates to the coordination of the interactions of the component ASOIs and ASEIs with their peers in other AEIs.

5.7 ASO-associations

5.7.1 An ASO-association is a cooperative relationship among two or more ASOIs; it is analogous to an (N)-association. ASO-associations are formed among peer ASOIs in communicating AEIs. ASO-associations are abstractions which exist among ASOIs which exchange APDUs. An AEI that is participating in communications is party to at least one ASO-association.

5.7.2 An ASOI may have zero, one or multiple ASO-associations at a particular point in time. An ASOI may have multiple ASO-associations to a single peer ASOI. An ASOI may also have ASO-associations to multiple peer ASOIs; these peer ASOIs may be in one AEI or in different AEIs. Some ASOIs never have ASO-associations.

5.7.3 An ASOI may be a partner in a number of ASO-associations consecutively or concurrently (or both). The number of these ASO-associations may change with time. In particular, there may be periods of time when an ASOI is not a party to any ASO-associations.

5.7.4 ASO-associations may be connection-mode or connectionless-mode communications. Within the Application Layer, there are no architectural restrictions on mappings between connectionless-mode and connection-mode ASO-associations.

5.7.5 Some ASO-associations are explicitly established. In other cases, there may be no explicit establishment. Explicit ASO-association establishment occurs when ASOs exchange APDUs containing information relating to their association (e.g. naming information and the context of the ASOs).

NOTE – The use of common procedures for explicit ASO-association establishment may facilitate the re-use of ASO-types as components of other ASO-types.

5.7.6 Coordination among ASO-associations may be local to a single AEI and not part of a cooperative relationship. In such cases, the coordination is only defined by the CFs within the AEI and is not a part of the ASO-association.

5.7.7 The characteristics of an ASO-association are described by an ASO-context.

5.7.8 All ASO-associations that are not application-associations ultimately make use of underlying application-associations (including connectionless data transfer) for communication. Several ASO-associations may make use of the same application-association at the same time or different times, and any given ASO-association may make use of a number of application-associations. Constraints on the use of application-associations by ASO-associations are part of the ASO-type. The CF is responsible for coordinating the use of supporting ASO-associations by the ASOI components.

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5.7.9 ASOIs participating in an ASO-association share a common structure. This common structure is either the whole or subset of the structure of the communicating ASOIs. This is a property of the architecture and need not be visible in any implementation.

5.7.10 ASOIs participating in an ASO-association may have different roles and need not be of the same ASO-type; as a consequence they exhibit complementary rather than similar communication behaviours.

5.7.11 ASO-association-identifiers may be required to distinguish different ASO-associations within the same ASOI. ASO-association identifiers are unambiguous within the scope of the participating ASOIs. The CF may create and/or make use of these ASO-association-identifiers to coordinate the use of underlying ASO-associations by the ASOI components, including possibly exchanging them with peer-ASOIs in APCI.

5.8 ASO-context

5.8.1 Communicating ASOIs must have shared knowledge, and follow a common set of rules that governs their communication. Such a set of rules is called an ASO-context. An ASO-context describes the permissible collective communications behaviour of the ASOIs that are party to a particular ASO-association.

5.8.2 An ASO-context includes:

a) the enabled communications behaviour;

b) a set of rules and state information;

c) the number of ASOIs that may be party to this ASO-association;

d) the lifetime of the ASO-association and the ways in which it can be established and terminated.

5.8.3 An ASO-association has only one ASO-context. The set of rules that make up the ASO-context may contain rules for alteration of that set of rules. The set of rules may contain alternatives, together with rules for selecting among these alternatives according to the requirements of the AP-invocations.

NOTE – The use of a rule to select among alternative rules within an ASO-context does not constitute an alteration of the ASO-context. However, the use of a selection rule does change the state information maintained by ASOIs with respect to an ASO-association.

5.8.4 An ASO-context may contain shared rules that enable ASOIs to transfer information for multiple ASO-association coordination purposes.

5.8.5 When there is no explicit ASO-association establishment, the ASO-context is determined by other means, e.g. prior agreements, systems management, or other application protocols.

5.8.6 The ASO-context that applies to an ASO-association may be negotiated during establishment in either of the following ways:

a) by identifying a pre-existing ASO-context-definition; or

b) by transferring an actual description of the ASO-context.

In particular, a name may be used to identify a pre-existing ASO-context-definition.

NOTES

1 The predominant method of determining ASO-contexts is expected to be by reference to pre-existing ASO-context-definitions.

2 The allocation of names to pre-existing ASO-context-definitions will be the subject of registration procedures as described in clause 9 of this Application Layer Structure.

5.8.7 The communications behaviour of an ASOI over an ASO-association is constrained to be compatible with a generic behaviour defined by the ASO-context in use.

5.8.8 An ASO-context is defined in such a manner as to ensure that the ASE types and/or ASO types that it references specify compatible use of supporting OSI-services.

5.8.9 When an ASOI supports a number of concurrent ASO-associations, there is no architectural requirement that each of these ASO-associations use the same ASO-context.

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5.8.10 The ASO-context of a supporting ASO-association must accommodate the requirements of the ASO-contexts of all the supported ASO-associations.

5.9 ASO naming

5.9.1 When a particular ASO or ASOI needs to be identified for the purposes of communication, naming principles defined by CCITT Rec. X.650 | ISO 7498-3, supplemented by additional qualifiers and identifiers, can be used to name the particular ASO or ASOI. (See Table 1.)

There may be cases where identification remains unambiguous without assigning names to each element of the ASO/ASOI structure. Such unnamed elements are effectively omitted from the naming structure.

5.9.2 An ASO-name unambiguously identifies an ASO within the scope of an AP. An ASO-qualifier unambiguously identifies an ASO within the scope of its parent. An ASO-name is constructed as a sequence of one or more ASO-qualifiers. The ASO-name of the ASO that corresponds to the AE is the AE-qualifier.

5.9.3 Where ASOIs have to be identified, this is done by means of ASOI-identifiers that are unambiguous within the scope of the pair (parent invocation, ASO). When qualified with the ASO-qualifier, an ASOI-identifier is used to unambiguously identify an ASOI within the scope of its parent invocation. Thus, in the case where the ASOI is an AEI, the ASOI-identifier is unambiguous within the scope of the pair (API, AE). In all other cases, the ASOI-identifier is unambiguous within the scope (parent ASOI, ASO).

5.9.4 An ASOI-tag unambiguously identifies an ASOI within the scope of the API. An ASOI-tag is constructed as a sequence of one or more occurrences of the pair (ASO-qualifier, ASOI-identifier). The ASOI-tag of the ASOI that corresponds to the AEI is the pair (AE-qualifier, AEI-identifier).

Table 1

ITEM	IN THE SCOPE OF	IS UNAMBIGUOUSLY IDENTIFIED BY	WHICH CONSISTS OF
ASO	Parent	ASO-qualifier	
ASO	AP	ASO-name	Sequence of ASO-qualifiers
ASO	OSI environment	ASO-title	AP-title, sequence of ASO-qualifiers
ASOI	Parent-invocation	Pair (ASO-qualifier, ASOI-identifier)	
ASOI	Pair (parent-invocation, ASO)	ASOI identifier	
ASOI	AP-invocation	ASOI-tag	Sequence of pairs (ASO qualifier, ASOI-identifier)

5.9.5 An ASO-title unambiguously identifies the ASO within the OSI environment. It consists of the AP-title qualified by a sequence of ASO-qualifiers. If the ASO is an AE, there will be only one ASO-qualifier in the sequence.

5.9.6 When ASO-types have to be identified, this is done by means of an ASO-type-title that is unambiguous in the OSI environment.

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5.10 Application-associations

5.10.1 An application-association is a particular kind of ASO-association between two ASOIs which governs their bilateral use of the Presentation Service for the communication of information and coordination of their joint operation.

NOTE – The lifetime of an ASO-association may be less than, equal to or greater than the lifetime of an application-association.

5.10.2 An ASOI may support a number of application-associations consecutively or concurrently (or both), with one or more other ASOIs.

5.10.3 An application-association-identifier may be associated with an application-association. This application-association-identifier is unambiguous within the scope of the pair of associated ASOIs. It provides the means to identify the related state information in each ASOI.

5.11 Application-context

5.11.1 An application-context is a particular kind of ASO-context. It describes the permissible collective communications behaviour of the ASOIs that are party to a particular ASO-ssociation that is an application-association.

5.11.2 An application-context is defined in such a manner as to ensure that the ASE-types and/or ASO-types that it references specify compatible use of Presentation and ACSE services.

5.12 Names and directory functions

5.12.1 As specified in CCITT Rec. X.650 | ISO 7498-3, application-directory-functions process presentation-addresses, AE-titles, and application-protocol-addressing-information to provide mappings among these categories of information. To accommodate the concept of the ASO, these functions may also include the processing of ASO-titles. Thus, application-directory-functions provide mapping among categories of information including ASO-titles. Conceptually, these functions are performed by the AEI to derive the addressing information required.

5.12.2 Information on these mappings may be held locally and made available for access by application-directory-functions, or it may be held remotely. It is a local responsibility to retrieve the information and make it available to an application-directory-function. If this information is stored remotely, OSI protocols may be used to access that information.

NOTE – It is not required that every AE-type contain an ASE-type that provides for retrieval of this remote information; where necessary, local system management may obtain this capability from another AEI or ASOI, even another AEI or ASOI in another AP-invocation.

5.12.3 Application-directory-functions are application-functions that are modelled within the AE independent of any particular ASEs or ASOs. Other such application-functions may support aspects of security activities, management activities, etc.

5.12.4 In CCITT Rec. X.650 | ISO 7498-3, several kinds of name are described in order to enable the identification of certain objects in the Application Layer. These kinds of name are:

a) application-association-identifier;

b) application-entity-invocation-identifier;

c) application-entity-title;

d) application-entity-type-title;

e) application-process-invocation-identifier;

f) application-process-title.

The ways in which they may be used in the operation of application-directory-functions and the identification of specific Application Layer objects are described in CCITT Rec. X.650 | ISO 7498-3.

5.12.5 Additionally, the following kinds of names for Application Layer objects are defined in this Application Layer Structure and may be included as part of the operation of application-directory-functions:

a) AE-qualifier;

b) ASO-association-identifier;

c) ASOI-identifier;

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d) ASOI-tag;

e) ASO-name;

f) ASO-qualifier;

g) ASO-title; and

h) ASO-type-title.

6 Operation of application-entity-invocations

6.1 Use of application-associations

6.1.1 Capabilities for the establishment and termination of application-associations are contained in a specific ASE: the ACSE. Application-associations can only be established and terminated by use of ACSE.

6.1.2 In an ASO containing ACSE, it is the responsibility of the CF to coordinate the application-association needs of the various ASEs and ASOs. It is the CF that makes use of ACSE to establish and terminate the application-association.

6.1.3 In establishing an application-association, the location of the peer AE is identified to the Presentation Service by the presentation address of the peer AE. Additionally one or both of the following identifiers may be used for the selection of a peer AEI:

a) AP-invocation-identifier;

b) AE-invocation-identifier.

An application-association identifier may also be used to identify the application-association.

6.1.4 The termination of an application-association results from the action of the related ASOIs. ASOIs may take such action in response to a failure in communications visible in the Presentation Service.

6.2 Operation of ASO-invocations and ASE-invocations

6.2.1 Direct access to the Presentation Service only occurs from the CF of the outermost ASOI (that is from the AEI). The use of a Presentation service by the CF of such an outermost ASOI is mapped 1:1 to the actual Presentation Service.

6.2.2 The mapping of ASOI requirements for supporting Presentation services onto the actual Presentation service in a situation where the ASOI is in a deeply nested set of ASOI is dependent upon the combined actions of all the CFs on the path between it and the actual Presentation service. The resultant mapping may, but need not, be of a 1:1 nature.

6.2.3 When an ASOI contains ACSE invocations, that ASOI coordinates all communications activities on the ASO-associations established by the ACSE invocations. An ASOI containing ACSE holds the state information for the ASO-association. In addition, these ASO-associations can be used by other ASOIs via the OSI-services offered by the ASOI containing the ACSE invocation.

6.3 Interaction with the supporting service

6.3.1 An ASOI may interact with supporting services provided by the Presentation Layer or by other ASOI as coordinated and possibly remapped by the CF of the parent ASOI.

6.3.2 The communicating ASOIs use supporting services to transfer APDUs among each other. The method of use of supporting services is prescribed by the rules of the ASO-context of an ASO-association.

6.3.3 The structure of the APDUs of an ASE is specified by at least one named abstract syntax. To transfer these APDUs among ASOIs using the supporting services it is ultimately necessary to establish one or more presentation-contexts for each abstract syntax. Each presentation-context specifies a pairing of a particular abstract syntax with a transfer syntax. It is the responsibility of the control function to make sure that all the necessary presentation-contexts are established.

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6.4 Interaction with the Presentation Layer

6.4.1 For the purpose of communication, an application-association makes use of a single presentation-connection or a single use of the connectionless mode presentation-service. Other ASO-associations make use of one or more underlying ASO-associations.

6.4.2 An AE is attached to one or more presentation-service-access-points in order to make it addressable in the OSI environment. An AE is named in the OSI environment by its application-entity-title. The AE-title is associated with a presentation-address for purposes of establishing communication with the AE. The relation of the AE-title and presentation-address may be recorded in the OSI Directory Facility.

6.4.3 In requesting the establishment of a presentation-connection, an AEI identifies to the presentation-service, the location of a peer AE by its presentation-address.

6.4.4 In addition, related AEIs may transfer AP-title and AE-title information during the establishment of an application-association. This information identifies the peer AEs in a way that is independent of their presentation-addresses.

6.4.5 The communicating AEIs use the presentation-service to transfer APDUs among one other. The method of use of the presentation-service is prescribed by the rules of the application-context of an application-association.

6.4.6 An application-association is bound to a single presentation-connection. It does not span concurrent or consecutive supporting presentation-connections.

NOTE – In this way an application-association is a restricted use of the (N)-association concept. The general (N)-association concept allows such spanning. An ASO-association, on the other hand, is not bound by this restriction.

6.5 Error recovery and ASO-association

6.5.1 The action to be taken in the event of errors that are visible within an ASO-association is prescribed by rules in the ASO-context of the ASO-association. Following such errors, the ASO-association may be terminated or, in some cases, communication may be resumed from a mutually acceptable point.

6.5.2 An ASO-association-identifier may be used to denote a particular ASO-association as part of the error recovery procedures specified in an ASO-context.

7 Application Layer specifications

7.1 Categories of specification

7.1.1 The operation of the Application Layer is described by the following kinds of specifications:

a) ASE-type definitions;

b) ASO-type definitions including CF specifications;

NOTE 1 – An AE-type definition is a particular example of an ASO-type definition.

c) ASO-context definitions.

NOTE 2 – An application-context-definition is a special case of ASO-context-definition.

7.1.2 A Recommendation or International Standard which includes Application Layer functions within its scope may include combinations of one or more specifications from these categories. In addition it may reference one or more specifications from these categories in other Recommendations and International Standards.

NOTE – This does not imply that all ASE- or ASO-types must be defined in such a way that they can be referenced from other Recommendations and International Standards. Nevertheless the feasibility of using particular Application Layer specifications to support a variety of requirements is enhanced by structuring standards documentation in a way that separates specifications of different categories. For example, the publication of application-context-definitions as separate standards may be useful in this respect.

7.2 Relationships among specifications

7.2.1 An ASO-context-definition may reference one or more ASO-types in order to identify rules governing the mutual interactions of peer ASOIs. Alternatively, ASO-types may reference ASO-context-definitions.

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7.2.2 An ASO-type may reference other ASO-types. In addition, it may reference ASE-types and the Presentation Service definition (CCITT Rec. X.216 | ISO 8822).

7.2.3 An ASE-type may make general reference to other ASE-types and/or ASO-types; in addition, it may reference the Presentation Service definition (CCITT Rec. X.216 | ISO 8822).

7.3 Properties of specifications

7.3.1 ASE-type definitions

7.3.1.1 An ASE-type is defined in terms of an OSI-service definition and a protocol specification.

7.3.1.2 An important part of an ASE-type is the description of a model of the ASE. The model establishes the definitions of the objects being manipulated by the OSI-service and protocol and the definitions of the operations being performed on those objects. These objects and operations are abstractions of objects and operations in real systems. The model defines the abstract view of objects in real systems. Such a model may include reference to more general models. Their descriptions must remain conceptual, carrying the appearance within OSI of their real operation. No implementation conformance requirements can be derived from such models.

7.3.1.3 The definition of an ASE-type includes the following parts:

a) model or reference to a model;

b) an OSI-service definition;

c) a protocol specification;

d) a specification of the use of supporting OSI-services by this ASE;

NOTE 1 – Specification of the use of a supporting OSI-service does not constrain how that service is provided in a particular case.

e) and possibly rules concerning the use of the ASE services in conjunction with other ASE or ASO services.

NOTE 2 – In order to avoid unnecessary proliferation of ASE-types, developers of ASE-type definitions should consider:

a) grouping of functions into an ASE-type that specifies all the functions and the corresponding APDUs that are required for the operation of a protocol machine which is logically complete and consistent in itself;

b) grouping the specification of functions into different ASE-types such that the ASE-types can be specified independently of each of other.

7.3.1.4 An OSI-service definition conveys the understanding of the function carried out by an ASEI of the ASE-type. It is the first step that leads to the specification of the corresponding protocol.

NOTES

1 ITU-T Rec. X.210 | ISO/IEC 10731 describes conventions for the definition of OSI services.

2 The OSI-service definitions for ASE-types are conceptual and do not imply conformance.

7.3.1.5 A protocol specification defines the structure for the exchange of information among peer ASEIs. This may include the specification of the APDUs and of the procedures governing their exchange. The protocol specification defines the requirements for the mapping of the APDUs onto supporting OSI-services.

7.3.1.6 Any ASE-type may make reference to Presentation services in order to specify requirements for supporting OSI-services. There is one exception to this general rule: use of presentation connection management services is reserved for the sole use of the ACSE specification.

7.3.2 ASO-type definitions

7.3.2.1 An ASO-type includes:

a) a description of a model or reference to a model;

b) a description of the OSI-service provided by an ASOI of that type in conjunction with peer ASOIs;

c) references to the definitions of the component ASE-types and ASO-types;

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d) a specification of its control function;

e) a specification of the use of supporting OSI-services by this ASO;

NOTE – Specification of the use of a supporting OSI-service does not constrain how that service is provided in a particular case.

f) and, possibly, rules concerning the use of the ASO services in conjunction with other ASE or ASO services.

7.3.2.2 Any ASO-type may make reference to Presentation services in order to specify requirements for supporting OSI-services. There is one exception to this general rule: use of presentation connection management services is reserved for the sole use of the ACSE specification. An ASO-type that includes ACSE as one of its components is required to specify mechanisms for the coordination of all communication activities relating to an ASO-association that may be established by the operation of an ASOI conforming to the ASO-type. An ASO-type may map the requirements of its component ASOs and ASEs for use of ACSE services (and thus, indirectly of Presentation connection management services) onto other equivalent OSI-services.

7.3.2.3 The specification of a CF may include (but is not limited to):

a) specification of the dependencies among the ASEs and/or ASOs, beyond those dependencies contained within the ASE-types and/or ASO-types;

b) rules concerning the selection and use of optional features of the ASEs and/or ASOs;

c) any additional rules, beyond those contained in the ASE-types and/or ASO-types, governing the sequence of use of the OSI-service primitives, and in consequence the sequence of the APDUs, of each ASEI and/or ASOI;

d) rules for the coordinated operation of ASEIs and/or ASOIs (such as rules for the interleaving of OSI-service requests and APDUs from different ASEIs and/or ASOIs);

e) rules concerning the mapping of the APCI from ASEIs and/or ASOIs onto the supporting OSI-services of either the Presentation Layer and/or of other ASEIs and/or ASOIs;

f) rules concerning the mapping of APCI from the supporting OSI-services to component ASEIs and/or ASOIs;

g) designation of application-functions, such as application directory functions, and rules governing their use;

h) rules concerning information that has a lifetime that is greater than the lifetime of an ASO-association.

NOTE – The production of an ASO-type should take into account the requirement to identify those rules that are relevant to ASO-context definitions.

7.3.2.4 The specification of a CF for an ASO identifies the following:

a) for the OSI-service primitives provided by the ASO:

1) the conditions for generating the OSI-service primitive for all Deliver primitives (Indication and Confirm primitives); and

2) the action to be taken for all Submit primitives (Request and Response primitives);

b) for the OSI-service primitives required by the ASO:

1) the conditions for generating the OSI-service primitive for all Submit primitives (Request and Response primitives); and

2) the actions to be taken for all Deliver primitives (Indication and Confirm primitives);

c) for the OSI-service primitives provided by the component ASOs and ASEs:

1) the conditions for generating the OSI-service primitive for all Submit primitives (Request and Response primitives); and

2) the action to be taken for all Deliver primitives (Indication and Confirm primitives);

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d) for the OSI-service primitives required by the component ASOs and ASEs:

1) the conditions for generating the OSI-service primitive for all Deliver primitives (Indication and Confirm primitives); and

2) the action to be taken for all Submit primitives (Request and Response).

NOTE – When an ASOI is using more than one ASO-association, the corresponding CF specification must make clear which ASO-association(s) are associated with each service invocation.

7.3.3 ASO-context-definition

7.3.3.1 An ASO-context-definition specifies the set of rules for an ASO-context. This set of rules identifies ASE-types or ASO-types (or both) and may also include

a) all CF rules which are shared among ASOIs participating in the ASO-association;

b) specifications of the logical structure of information to be exchanged or referenced (i.e. abstract syntaxes).

7.3.3.2 The ASO-context-definition identifies the rules and constraints which apply to one ASO-association. The ASO-context may reference ASE-types and ASO-types which define operation over multiple ASO-associations. Where an ASE-type or ASO-type is referenced from more than one ASO-context-definition, then each such ASO-context-definition identifies those parts of the ASE-type or ASO-type that apply.

7.3.3.3 An ASO-context-definition may reference part or all of other ASO-context-definitions as well as directly defining its own rules.

7.3.3.4 An application-context-definition is a particular kind of an ASO-context-definition.

8 Abstract syntax definition

8.1 An abstract syntax is made up of those aspects of the rules used in the formal specification of data which are independent of the encoding techniques to represent the data.

8.2 For a given ASE-type the structure of the APDUs is specified by a set of one or more abstract syntaxes. The structure of any user information conveyed within these APDUs on an association is specified by another set of one or more abstract syntaxes.

8.3 A name may be assigned to the definition of an abstract syntax. Such a name may be used in the specification of requirements for the establishment of a presentation context by the presentation-service.

9 Registration requirements

9.1 The use of Application Layer Recommendations and International Standards requires the establishment of registration procedures for the assignment of names (which are unambiguous throughout the OSI environment) for the following objects:

a) The Application Layer related objects from the list in 13.1 of CCITT Rec. X.650 | ISO 7498-3;

b) The following additional objects:

1) abstract syntaxes;

2) ASO-contexts;

3) application-entities;

4) ASOs.

9.2 An abstract syntax definition or an ASO-context-definition that is registered may be a Recommendation and/or an International Standard, a national standard, a published definition developed by a community of interest, or a private agreement.

9.3 CCITT Rec. X.660 | ISO/IEC 9834-1, and its additional parts specify registration procedures to be used in each of these situations.

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Annex A

Some aspects of combining ASEs and ASOs

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

A.1 ASEs and ASOs as building blocks

In order that ASEs and ASOs may be used as building blocks in the construction of AEs and other ASOs, it is necessary that ASE specifications explicitly distinguish between the specification of the ASE itself and any mapping to supporting services. The ASE specification would typically include the specification of the form of the APDUs, the semantics associated with their transfer by reference to the services offered by the ASE, and the permitted sequences of APDU transfer and ASE service primitives.

A.2 Mapping to supporting services

The mapping to supporting services, that is, the means by which the APDUs are transferred, will form part of the specification of the control function (CF) of the ASO-types that include the ASE-type. The Application Layer standard that defines the ASE-type will identify constraints on the control function representing requirements to be met by any mapping specification.

A.3 Reference mapping

A reference mapping may be part of the specification of a basic ASO whose services are essentially those of the component ASE combined with only one or two other ASEs (e.g. RDA + ACSE, FTAM + ACSE).

The specification of ASOs whose components include the ASE under consideration along with other ASEs may or may not use the reference mapping of each of the component ASEs, depending on the requirements of the ASO as a whole and the degree to which the reference mappings can be combined. The control function (CF) of the ASO will meet the constraints specified for each of the component ASEs.

A.4 Shared use of ACSE and ASO services

The specification of an ASE-type or ASO-type takes into account any particular requirements for the corresponding invocation to operate in combination with other component invocations in an enclosing ASOI. Such requirements may concern the cooperative use of ASE or ASO services and presentation-services.

Assumptions regarding the way in which the establishment and termination of application-associations is achieved can seriously affect the feasibility of the combined operation of ASEIs and ASOIs. For instance, an ASEI may require access to ACSE services; alternatively, or perhaps optionally, it may be capable of using a pre-existing application-association.

A.5 Use of P-contexts

P-contexts must be established for the abstract syntaxes of each and every ASO participating in an application-association. In cases where multiple invocations of a single ASO-type share a single application-association, and therefore a single presentation-connection, it may be appropriate to establish separate P-contexts for each invocation. In such cases, the Presentation-context is used to distinguish which invocation is the destination for an incoming APDU. In other cases, the CF can determine the destination invocation for an incoming APDU by other methods such as :

- use of APCI;
- use of state and sequencing rules.

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A.6 Use of session-services

When multiple ASEIs share the use of an application-association, it is necessary to ensure that they make use of session-services, such as RESYNCH, in a compatible manner.

A.7 Specification of CF

Part of a CF specification, as described in 7.3, is concerned with the triggering of output events by input events on internal (component) and external (user, supporting) boundaries. The use of a formalism such as a state table will often be an effective means of specification.

A CF specification also includes the mapping of APDUs of its component ASOs and ASEs, and the parameters of the services offered by the ASO onto ASO-associations of the ASO. The separate PDUs can be conveyed by concatenation, embedding or serial (perhaps interleaved) reuse of the ASO-association. The CF specification will be constrained by the requirements of the specifications of the components.

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Annex B

Relationship between application-contexts and application profiles

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

B.1 Introduction

This annex describes the relationship between the ISP concept introduced in ISO/IEC TR 10000 and the application-context concept. Specifically, this annex addresses the relationship between application profiles (so-called A and B categories of ISP) and application-contexts.

B.2 General observations

There are both similarities and differences between the application-context and application (A and B) profile concepts as defined in this Application Layer Structure and ISO/IEC TR 10000 respectively.

They both specify how several standards can be used in combination in order to support distributed applications. However, the concepts are distinct in that the scope of an application-context is restricted to the Application Layer.

B.3 Inter-relationships

An application profile definition necessarily includes (possibly by reference) either a partial or a complete definition of an application-context.

In certain cases an application profile definition may include the definition of more than one application-context.

Moreover, several application profiles could (in principle) reference the same application-context-definition. For instance, this could occur if the application profiles had differing session and/or presentation protocol requirements.

The definition of an application-context may be explicitly part of an ISP or may be included in a standard that is referenced by the ISP.

NOTE – An application-context-definition does not necessarily have to be referenced by any ISP.

Some ISPs specify syntactic constraints upon the use of an application protocol that restrict the structural complexity of APDUs and/or restrict the range of values that are valid for particular components of an APDU. In these cases, some (or all) of these constraints may be considered as part of an application-context definition.

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Annex C

Relationship of the terms between this edition and the previous edition of ISO/IEC 9545

(This annex does not form an integral part of this Recommendation I International Standard)

This annex describes terms used in the previous edition of ALS and their relation to terms in this edition of ALS.

C.1 Single association object

C.1.1 A SAO is a particular kind of ASOI which only contains ASEIs and a control function and which, furthermore, only supports a single application-association.

C.1.2 An ASO-type for this particular kind of ASOI corresponds to an application-context-definition that only references ASE-types which are appropriate for communications within a single application-association.

C.2 Single association control function

C.2.1 A SACF is a particular kind of control function that occurs only in ASOIs for ASO-types that have SAO-like characteristics.

C.2.2 A SACF mbodies the rules of an application-context concerning interactions among ASEIs in an ASOI having SAO-like characteristics.

C.3 Multiple association control function

C.3.1 A MACF is a particular kind of control function that occurs in ASOIs that only contain ASOIs which have SAO-like characteristics. It determines the collective behaviour of these SAO-like ASOIs and consequently coordinates the interactions among the application-associations supported by these ASOIs.

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