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**DATA NETWORKS AND OPEN SYSTEM
COMMUNICATIONS**

Open Systems Interconnection – General

**INFORMATION TECHNOLOGY –
OPEN SYSTEMS INTERCONNECTION –
BASIC REFERENCE MODEL:
CONVENTIONS FOR THE DEFINITION
OF OSI SERVICES**

ITU-T Recommendation X.210

(Previously “CCITT Recommendation”)

Foreword

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The approval of Recommendations by the Members of ITU-T is covered by the procedure laid down in WTSC Resolution No. 1 (Helsinki, 1993). In addition, the World Telecommunication Standardization Conference (WTSC), which meets every four years, approves Recommendations submitted to it and establishes the study programme for the following period.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC. The text of ITU-T Recommendation X.210 was approved on 16th of November 1993. The identical text is also published as ISO/IEC International Standard 10731.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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Summary

The service conventions prescribed in this recommendation ensure that the services of OSI standards are defined in a uniform way, which is consistent with the OSI Reference Model and the application layer structure standard. The text was developed jointly with ISO/IEC. The main intent of this revision is to provide extended capabilities, which are useful in specifying services within the application layer and also to allow greater flexibility to accommodate new services among the layers in the future.

INTERNATIONAL STANDARD

ITU-T RECOMMENDATION

**INFORMATION TECHNOLOGY –
OPEN SYSTEMS INTERCONNECTION –
BASIC REFERENCE MODEL:
CONVENTIONS FOR THE DEFINITION OF OSI SERVICES**

1 Scope

This Recommendation | International Standard

- establishes definitions of terms and conventions for use by Recommendations | International Standards defining OSI-services within the scope of the Basic Reference Model of Open Systems Interconnection;
- specifies the application of these terms and conventions to the Recommendations | International Standards defining OSI-services within the Application Layer of the Basic Reference Model of Open Systems Interconnection;
- specifies the application of these terms and conventions to Recommendations | International Standards defining (N)-services for Layers 1 - 6 of the Basic Reference Model of Open Systems Interconnection.

2 Normative references

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

2.1 Identical Recommendations and International Standards

- ITU-T Recommendation X.207 (1993) | ISO/IEC 9545: 1993, *Information Technology – Open Systems Interconnection – Application Layer structure*.

2.2 Paired Recommendations | International Standards equivalent in technical content

- CCITT Recommendation X.200 (1988), *Reference model of open systems for CCITT applications*.
- ISO/IEC 7498:1984, *Information technology – Open Systems Interconnection – Basic Reference Model*.

3 Definitions

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

3.1 Terms defined in the OSI Basic Reference Model

This Recommendation | International Standard builds on the concepts developed in CCITT Rec. X.200 | ISO 7498 and makes use of the following terms defined in that Recommendation | International Standard:

- a) (N)-connection;
- b) (N)-connection-endpoint;
- c) (N)-entity;
- d) (N)-layer;

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- e) open system;
- f) (N)-service;
- g) (N)-service-access-point;
- h) (N)-subsystem.

3.2 Terms defined in the Application Layer Structure

This Recommendation | International Standard makes use of the following terms defined in ITU-T Rec. X.207 (1993) | ISO/IEC 9545:

- a) application-entity-invocation;
- b) application-service-element;
- c) application-service-object;
- d) control function.

3.3 Terms defined in this Recommendation | International Standard

NOTE – Several terms in the following list are structured with the prefix “OSI-”. The terms thus prefixed are intended to have a consistent meaning across all layers of OSI, including the Application Layer.

In the case of the OSI-services provided by the six lower layers, the prefix “OSI-” can be replaced by the equivalent prefix “(N)-” which particularises the concept to the generic (N)-layer.

Further particularisation is needed in other OSI standards, such as replacing “OSI-” with the abbreviation for one of the six lower layers, or replacing “OSI-” with the abbreviation for a particular application-service-element or group of application-service-elements which provide an OSI-service within the Application Layer.

3.3.1 OSI-service: The capability of an OSI-service-provider which is provided to OSI-service-users at the boundary between the OSI-service-provider and the OSI-service-users.

NOTE – The OSI-service defines the external behaviour of the OSI-service-provider independent of the mechanisms used to provide that behaviour. (N)-layers, (N)-entities, application-service-elements, etc. are components of an OSI-service-provider.

3.3.2 OSI-service-provider: An abstract representation of the totality of those entities which provide an OSI-service to OSI-service-users.

3.3.3 OSI-service-user: An entity in a single open system that makes use of an OSI-service.

NOTE – The OSI-service-user makes use of the OSI-service through a collection of OSI-service primitives defined for the OSI-service.

3.3.4 OSI-service primitive; primitive: An abstract, atomic, implementation-independent representation of an interaction between an OSI-service-user and its OSI-service-provider.

NOTE – The term “primitive” is used in some documents in place of the preferred form “OSI-service primitive”.

3.3.5 submit (primitive): An OSI-service primitive initiated by an OSI-service-user.

3.3.6 deliver (primitive): An OSI-service primitive initiated by an OSI-service-provider.

3.3.7 requestor: In a particular exchange of OSI-service-primitives, an OSI-service-user that issues a submit primitive and as a result may receive one or more deliver primitives.

3.3.8 acceptor: In a particular exchange of OSI-service-primitives, an OSI-service-user that receives a deliver primitive and as a result may issue one or more submit primitives.

3.3.9 request (primitive); requestor.submit (primitive): A submit primitive issued by a requestor.

3.3.10 indication (primitive); acceptor.deliver (primitive): A deliver primitive received by an acceptor.

3.3.11 response (primitive); acceptor.submit (primitive): A submit primitive issued by an acceptor.

3.3.12 confirm (primitive); requestor.deliver (primitive): A deliver primitive received by a requestor.

3.3.13 OSI-facility: A part of an OSI-service designated within a Recommendation | International Standard.

NOTES

1 There are existing Recommendations | International Standards for OSI-service definitions which use the form "...service" for terms relating to such a designated part of the total OSI-service. The form "...facility" is to be strongly preferred for all such usages.

2 The term "OSI-facility" defined here is distinguished from the term "facility" (without the qualification "OSI-") used, for example, in CCITT Rec. X.25 and ISO/IEC 8208.

3.3.14 OSI-mandatory-facility: An OSI-facility which is always provided.

3.3.15 OSI-provider-optional-facility: An OSI-facility which may or may not be provided.

3.3.16 OSI-user-optional-facility: An OSI-facility which is only used if all peer OSI-service-users agree.

3.3.17 OSI-confirmed-facility: An OSI-facility in the operation of which an explicit confirmation is given from the OSI-service-provider to the initiating OSI-service-user.

3.3.18 OSI-non-confirmed-facility: An OSI-facility in the operation of which no explicit confirmation is given from the OSI-service-provider to the initiating OSI-service-user.

3.3.19 OSI-provider-initiated-facility: An OSI-facility the operation of which is initiated by the OSI-service-provider.

3.3.20 OSI-local view: The shared behaviour of an OSI-service-user and an OSI-service-provider in terms of their interactions at an OSI-service boundary.

NOTE – In the case of (N)-services, the OSI-service boundary is to be understood as the set of (N)-service-access-points for the (N)-subsystem.

3.3.21 symmetrical service: An OSI-service for which the definitions of all OSI-local views are the same (i.e. there is only one type of OSI-local view).

3.3.22 asymmetrical service: An OSI-service for which the definitions of all OSI-local views are not all the same (i.e. there are several types of OSI-local view).

3.3.23 multi-peer: A mode of operation of an OSI-service which supports exchanges between more than two OSI-service-users.

4 Abbreviations

ASE application-service-element

ASO application-service-object

OSI Open Systems Interconnection

SECTION 1 – GENERAL MODEL AND CONVENTIONS

5 Model of service

5.1 The concept of OSI-service definition

5.1.1 An OSI-service is that capability of an OSI-service-provider which is offered to OSI-service-users at the boundary between the OSI-service-provider and the OSI-service-users.

5.1.2 An OSI-service definition is the complete expression of the behaviour of an OSI-service-provider as seen by its OSI-service-users. An OSI-service definition does not describe the internal behaviour of an OSI-service-provider. There are many mechanisms that may be specified to provide an OSI-service. It is thus fundamental that the conventions used to define an OSI-service allow an OSI-service definition to be expressed totally independently from any subsequent specification of the protocol or protocols which support that OSI-service.

5.1.3 To make proper use of an OSI-service, it is necessary for an OSI-service-user to reference the OSI-service definition. As a result, an OSI-service definition constrains the behaviour of the OSI-service-users. Nevertheless, it is not the purpose of an OSI-service definition to express the complete behaviour of OSI-service-users.

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5.2 The general model of an OSI-service definition

5.2.1 This clause describes a general model for the definition of an OSI-service which is applicable to all modes of communication (connectionless-mode, connection-mode, multi-peer, etc.) in all seven layers.

5.2.2 An OSI-service-user and an OSI-service-provider interact at a OSI-service boundary in an open system. The interactions between the OSI-service-user and the OSI-service-provider constitute an abstract interface at the OSI-service boundary. This abstract interface is the OSI-local view. The OSI-local view is defined in terms of the set of OSI-service primitives which the OSI-service user and the OSI-service-provider are allowed to exchange, together with the sequencing rules which apply to these exchanges.

5.2.3 An OSI-service primitive issued by an OSI-service-user to its OSI-service-provider is a definition of:

- a) the semantics of the information conveyed by the OSI-service primitive;
- b) the constraints imposed on the OSI-service-user in order to issue the OSI-service primitive; and
- c) the requirements for action that the OSI-service-provider shall meet as a result of receiving the OSI-service primitive.

5.2.4 An OSI-service primitive issued by an OSI-service-provider to one of its OSI-service-users is a definition of:

- a) the semantics of the information conveyed by the OSI-service primitive;
- b) the conditions to be fulfilled by the OSI-service-provider in order to issue the OSI-service primitive; and
- c) the possible expectations of the OSI-service-provider regarding the reactions of the OSI-service-user resulting from its receipt of the OSI-service primitive.

5.2.5 The semantics of these OSI-service primitives and the complete set of relationships among OSI-local views are described in a model which defines the virtual environment in which the OSI-service applies. A relationship exists among OSI-local views when there is a correlation among OSI-service primitives at each of these several OSI-local views.

NOTES

1 In some cases, the model is explicitly described in a standard, in other cases (e.g. (N)-layer-services) the model may be implicitly known.

2 The semantics of the OSI-service primitives may be described, for example, in terms of abstract actions on abstract objects.

3 In a simple case, the model of a peer-to-peer OSI-service establishes a one to one correspondence between the two OSI-local views; in a more complex case, the model of an OSI-service may establish a one to many correspondence among some of the OSI-local views participating in the OSI-service.

5.2.6 An OSI-service definition comprises:

- a) the definition of, or reference to, the model introduced in 5.2.5;
- b) the definition of the OSI-local views of relevance to the OSI-service (these definitions may all be the same: symmetrical service, or they may not: asymmetrical service);
- c) the definition of the correlation among OSI-service primitives for this set of OSI-local views.

5.2.7 The definition of the correlation among OSI-service primitives is itself formed by the following three components:

- a) the definition of, or reference to, the model introduced in 5.2.5
- b) the definition of the relationships among OSI-service primitives within the scope of each OSI-local view;
- c) based on the relationships among OSI-local views, the definition of the correlations among OSI-service primitives that pertain to separate (but related) OSI-local views.

NOTES

1 Aspects of such a definition of the correlations among OSI-service primitives seen by different OSI-service-users include

– the definition of the relationships among submit primitives originated at one OSI-local view and deliver primitives issued at other related OSI-local views;