



COVERING NOTE

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ITU – TELECOMMUNICATION
STANDARDIZATION SECTOR

Subject: Erratum 1

ITU-T Recommendation X.960 (1999) | ISO/IEC 14769:1999

**Information technology – Open Distributed Processing – Type repository
function**

Insert the following statement in the part "Source" of ITU-T Rec. X.960 (1999):

ITU-T Recommendation X.960 results from the adoption of the text of the OMG Modeling specifications, Meta-Object Facility and Unified Modeling Language, for which ownership of world-wide distribution and derivative works rights remain with the Object Management Group, OMG.



INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

X.960

(06/99)

SERIES X: DATA NETWORKS AND OPEN SYSTEM
COMMUNICATIONS

Open distributed processing

Information Technology – Open Distributed Processing – Type Repository Function

ITU-T Recommendation X.960

(Previously CCITT Recommendation)

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INTERNATIONAL STANDARD 14769

ITU-T RECOMMENDATION X.960

INFORMATION TECHNOLOGY – OPEN DISTRIBUTED PROCESSING – TYPE REPOSITORY FUNCTION

Summary

This Recommendation | International Standard defines a framework for describing and managing types of interest in ODP systems. Specifically:

- it determines what entities need to be typed and what needs to be defined about the identified types;
- it identifies and characterizes type languages sufficient to describe the types of interest;
- it specifies a generic type repository function which can be specialized to a specific type system or type notation, and which provides for storage, retrieval and management of type descriptions and relationships between types, for naming of types in a manner consistent with the ODP naming framework, and for interworking and federation of different type repositories.

Source

The ITU-T Recommendation X.960 was approved on 18 June 1999. The identical text is also published as ISO/IEC International Standard 14769.

FOREWORD

ITU (International Telecommunication Union) is the United Nations Specialized Agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of the ITU. The ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Conference (WTSC), which meets every four years, establishes the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1.

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.

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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As of the date of approval of this Recommendation, the ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

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Introduction

This Recommendation | International Standard prescribes the ODP Type Repository Function (subclause 14.4 of ITU-T Rec. X.903 | ISO/IEC 10746-3) to support the storage, retrieval and management of type descriptions within an identified framework for type descriptions.

ITU-T Rec. X.902 | ISO/IEC 10746-2 provides a general definition of type in subclause 9.7; this definition allows the description of types using any predicate. ITU-T Rec. X.903 | ISO/IEC 10746-3 introduces a number of target concepts specific to particular viewpoints. This Recommendation | International Standard supports the establishment of type definitions based on the concepts defined in the ODP family of Recommendations | International Standards.

This Recommendation | International Standard enables type descriptions for use by the ODP functions outlined in ISO/IEC 10746-3. Type descriptions can occur in specifications from any viewpoint, e.g. enterprise specification can introduce enterprise types. This Recommendation | International Standard specifically addresses the needs of the ODP computational and engineering viewpoint types, but is capable of supporting type descriptions coming from other viewpoint languages.

This Recommendation | International Standard permits the use of multiple type description languages. There are a number of widely used and standardized languages for type description, for example CORBA IDL, ASN.1, LOTOS, GDMO and SDL, which fulfil some of the requirements of type descriptions in ODP-RM. This Recommendation | International Standard does not define a single all-encompassing type language. Users can use either existing languages or languages defined within other ODP Recommendations | International Standards. Annex B is an informative annex outlining languages that support large sets of target concepts.

This Recommendation | International Standard supports type systems with a type Type (e.g. pass type as parameters as in the ODP computational language).

ITU-T Rec. X.903 | ISO/IEC 10746-3 defines a subtype relationship between computational operational interface signature types. This Recommendation | International Standards supports a wider variety of relationships between types, which might include the analysis of behaviour and environment contracts, but the definition of such relationships is not within the scope of this Recommendation | International Standard. Relationships between types can either be asserted or deduced. It is recognized that not all relationships (including equivalence) can always be automatically deduced. However, automatic deduction should be encouraged whenever applicable.

The type repository function supports the allocation of identifiers to types in order to allow the transmission of these "shorthand" representations across domains (i.e. between objects using different type repositories).

The type repository function addresses interworking and federation to support the distribution of the type repository function by clarifying the notion of type domains. This function supports both federation of type domains handling equivalent type systems and federation of type domains handling different type systems.

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INTERNATIONAL STANDARD

ITU-T RECOMMENDATION

INFORMATION TECHNOLOGY – OPEN DISTRIBUTED PROCESSING – TYPE REPOSITORY FUNCTION

1 Scope

The concept of "type" is fundamental to ODP systems; the interaction model of ODP-RM involves strongly-typed interactions.

This Recommendation | International Standard:

- defines a framework for describing types of interest in ODP systems by determining what entities need to be typed and what needs to be said about the identified types. The primary focus of this work is the computational interface type system;
- identifies and characterizes type languages sufficient to describe the types identified above in an informative annex;
- provides enterprise, information, and computational specifications of a generic type repository function within the type description framework which can be specialized to select a specific type system or type notation. The type repository function provides:
 - storage and retrieval of type descriptions;
 - management of type descriptions;
 - management of the relationship between types including matching of types;
 - naming of types (in a manner consistent with ODP Naming Framework);
 - interworking and federation of different type repositories.

This Recommendation | International Standard provides a standard method of accessing type descriptions used within open distributed processing systems, where the type descriptions can be in various concrete syntaxes and type languages used in these open distributed processing systems. This Recommendation | International Standard also facilitates the dynamic matching of types for interactions, binding and trading purposes.

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 International 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 edition of the Recommendations and Standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards. The Telecommunication Standardization Bureau of ITU maintains a list of the currently valid ITU-T Recommendations.

2.1 Identical Recommendations | International Standards

- ITU-T Recommendations X.680-series (1997) | ISO/IEC 8824 (all parts):1998, *Information technology – Abstract Syntax Notation One (ASN.1)*.
- ITU-T Recommendation X.725 (1995) | ISO/IEC 10165-7:1996, *Information technology – Open Systems Interconnection – Structure of management information: General relationship model*.

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- ITU-T Recommendation X.902 (1995) | ISO/IEC 10746-2:1996, *Information technology – Open Distributed Processing – Reference Model: Foundations*.
- ITU-T Recommendation X.903 (1995) | ISO/IEC 10746-3:1996, *Information technology – Open Distributed Processing – Reference Model: Architecture*.
- ITU-T Recommendation X.910 (1998) | ISO/IEC 14771:1999, *Information technology – Open Distributed Processing – Naming Framework*.
- ITU-T Recommendation X.920 (1997) | ISO/IEC 14750:1999, *Information technology – Open Distributed Processing – Interface definition language*.
- ITU-T Recommendation X.930 (1998) | ISO/IEC 14753:1999, *Information technology – Open Distributed Processing – Interface references and binding*.
- ITU-T Recommendation X.950 (1997) | ISO/IEC 13235-1:1998, *Information technology – Open Distributed Processing – Trading function: Specification*.

2.2 Additional References

- ISO/IEC 10027:1990, *Information technology – Information Resource Dictionary System (IRDS) framework*.
- ISO/IEC 13719 (all parts):1998, *Information technology – Portable Common Tool Environment (PCTE)*.
- ISO/IEC 15474 (all parts):...¹⁾, *Information technology – CDIF Framework*.

2.3 Specifications of the Object Management Group

This Recommendation | International Standard makes references to the following specifications:

- Object Management Group, ad/97-08-14 and ad/97-08-15, *Meta-Object Facility*, 1997.
- Object Management Group, ad/97-08-02 through ad/98-08-09, *Unified Modelling Language*, 1997.

Annex C identifies the clauses of this Recommendation | International Standard that reference text in the Meta-Object Facility.

3 Definitions

For the purposes of this Recommendation | International Standard, the following definitions apply, except for where the text is described as being common with the Meta-Object Facility.

3.1 Terms defined in other International Standards

This Recommendation | International Standard makes use of the following terms defined in ITU-T Rec. X.902 | ISO/IEC 10746-2 Open Distributed Processing – Reference Model: Foundations):

- action;
- behaviour;
- binding;
- client object;
- consumer object;
- creation (of an <X>);
- data type;
- deletion (of an <X>);
- domain;
- environment contract type;
- identifier;
- information;
- instance (of a type);

¹⁾ To be published.

- instantiation (of an <X>);
- interface;
- interface signature;
- name;
- obligation;
- ODP standard;
- ODP system;
- object;
- policy;
- role;
- subtype;
- supertype;
- state (of an object);
- <X> template;
- trading;
- type;
- viewpoint.

This Recommendation | International Standard makes use of the following terms defined in ITU-T Rec. X.903 | ISO/IEC 10746-3 (Open Distributed Processing – Reference Model: Architecture):

- announcement signature;
- binding object;
- community;
- compound binding;
- computational interface;
- computational interface signature;
- computational interface type;
- computational object signature;
- computational specification;
- computational viewpoint;

NOTE – Throughout this Recommendation | International Standard, the qualifier "computational" is frequently omitted.

- dynamic schema;
- engineering interface reference;
- enterprise specification;
- <X> federation;
- flow signature type;
- flow type;
- information specification;
- interrogation signature;
- invariant schema;
- invocation;
- operation;
- operation signature type;
- operational interface signature;
- primitive binding;
- primitive signal binding type;

- primitive stream binding type;
- service offer;
- signal interface signature type;
- signal signature type;
- static schema;
- stream interface signature type;
- termination signature type;
- trading function;
- type repository function.

This Recommendation | International Standard makes use of the following terms defined in ITU-T Rec. X.950 | ISO/IEC 13235-1 (Open Distributed Processing – Trading Function: Specification):

- service type;
- property type.

This Recommendation | International Standard makes use of the following terms defined in ITU-T Rec. X.930 | ISO/IEC 14753 (Open Distributed Processing – Interface References and Binding):

- additional information;
- behaviour;
- causality information;
- channel class;
- direct reference type;
- flow description type;
- flow type;
- group information;
- interface description type;
- interface reference;
- interface type;
- location information;
- non-interpreted reference type;
- null reference type;
- opaque information;
- operation description type;
- operation type;
- operational interface type;
- quality-of-service statement type;
- relocation information;
- security information;
- stream interface type.

3.2 Terms defined in this Recommendation | International Standard

This Recommendation | International Standard defines the following terms:

- 3.2.1 relationship:** A predicate involving two or more roles with assigned values.
- 3.2.2 relationship type:** A type of relationship which expresses the number and type of the roles.
- 3.2.3 relation:** A set of relationships of the same relationship type.