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AS/NZS ISO/IEC 14769

Australian/New Zealand Standard™

Information technology—Open distributed processing—Type repository function

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RECONFIRMATION

OF
AS/NZS ISO/IEC 14769:2003
Information technology—Open distributed processing—Type repository function

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee IT-015, Software Engineering.

This Standard is identical with, and has been reproduced from ISO/IEC 14769:2001, *Information technology—Open distributed processing—Type repository function*.

The objective of this Standard is to provide a method of accessing type description used within open distributed processing systems, where the type descriptions can be in various concrete syntaxes and type languages used in these distributed processing systems.

The terms 'normative' and 'informative' are used to define the application of the annex to which they apply. A normative annex is an integral part of a standard, whereas an informative annex is only for information and guidance.

As this Standard is reproduced from an international standard, the following applies:

(a) Its number appears on the cover and title page while the international standard number appears only on the cover.

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References to International Standards should be replaced by references to Australian or Australian/New Zealand Standards, as follows:

Reference to International Standard		*Australian/New Zealand Standard*	
ISO/IEC		AS/NZS	
10027	Information technology—Information resource dictionary system (IRDS) framework	4101	Information technology—Information resource dictionary system framework
14750	Information technology—Open distributed processing—Interface definition language	ISO/IEC 14750	Information technology—Open distributed processing—Interface definition language
14753	Information technology—Open distributed processing—Interface references and binding	ISO/IEC 14753	Information technology—Open distributed processing—Interface references and binding
14771	Information technology—Open distributed processing—Naming framework	ISO/IEC 14771	Information technology—Open distributed processing—Naming framework

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AUSTRALIAN/NEW ZEALAND STANDARD

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);

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- 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;

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- 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.

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3.3 Terms defined in the OMG Meta-Object Facility

In text described as common with the Meta-Object Facility, this Recommendation | International Standard uses the following definition.

3.3.1 Meta-Object Facility: a specification of the Object Management Group for repositories of type information for arbitrary type systems.

4 Abbreviations

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

IDL	Interface Definition Language
MOF	Meta-Object Facility
ODP	Open Distributed Processing
ODP-RM	Open Distributed Processing: Reference Model
OMG	Object Management Group
TR	ODP Type Repository

The following additional abbreviations occur in sections of the OMG Meta-Object Facility specification which are incorporated by reference in this Recommendation | International Standard:

CORBA	Common Object Request Broker Architecture
MODL	Meta-Object Definition Language
OCL	Object Constraint Language
UML	Unified Modelling Language

5 Overview and Motivation

Open distributed processing in multi-organizational environments requires that various kinds of meta-level information are available at run-time in each interoperating system.

Especially, information is needed about types and type systems, for determining:

- conformity of information presentation during compilation;
- similarity of offered and requested services in trading;
- conformity and substitutability of servers during service invocation;
- required configuration of objects for object binding;

Cooperation between autonomous systems requires knowledge about the relationships between types or type systems.

5.1 Type Repository

The type repository stores type definitions, type relations, and information about the type system itself.

A type system is structured by a set of target concepts. It should be noted that the set of target concepts may grow during the lifetime of the type system. For example, the ODP-RM computational type system includes the following target concepts: object, type, template, service, interface, operation, stream, flow, signal. Based on these target concepts, a banking application could define types applicable for banking, e.g. a BankAccount interface with operations deposit, withdraw, and balance.

No single type system or type language can be assumed. There are already a multiplicity of type systems in use (including many standardized ones) and often many type languages for each type system. For example, protocol data units can be described in ASN.1, data types in ACT-ONE, relational schemata in SQL, file formats in COBOL, interfaces in ODP IDL, pipes in ISO RPC IDL. A canonical type system or canonical type language would have to be a superset of all existing type systems and type languages. Furthermore, the set of target concepts is open-ended and so every new target concept would require the extension of the canonical type language. This is technically and politically infeasible.

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