

Australian/New Zealand Standard™

**Information technology—CDIF
framework**

Part 2: Modelling and extensibility

AS/NZS ISO/IEC 15474.2:2003

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee IT-015, Software Engineering. It was approved on behalf of the Council of Standards Australia on 6 May 2003 and on behalf of the Council of Standards New Zealand on 8 May 2003. It was published on 19 June 2003.

The following are represented on Committee IT-015:

Australian Computer Society
Australian Information Industry Association
Australian Society for Technical Communication (NSW)
Australian Software Metrics Association
Griffith University
New Zealand Organisation for Quality
Quality Society of Australasia
Software Engineering Australia (QLD)
Software Quality Association (ACT)
Software Quality Association (NSW)
Software Verification Research Centre
Sydney SPIN Group (Software Process Improvement Network)
Systems Engineering Society of Australia
University of New South Wales
University of South Australia
University of Technology, Sydney

Keeping Standards up-to-date

Standards are living documents which reflect progress in science, technology and systems. To maintain their currency, all Standards are periodically reviewed, and new editions are published. Between editions, amendments may be issued. Standards may also be withdrawn. It is important that readers assure themselves they are using a current Standard, which should include any amendments which may have been published since the Standard was purchased.

Detailed information about joint Australian/New Zealand Standards can be found by visiting the Standards Australia web site at www.standards.com.au or Standards New Zealand web site at www.standards.co.nz and looking up the relevant Standard in the on-line catalogue.

Alternatively, both organizations publish an annual printed Catalogue with full details of all current Standards. For more frequent listings or notification of revisions, amendments and withdrawals, Standards Australia and Standards New Zealand offer a number of update options. For information about these services, users should contact their respective national Standards organization.

We also welcome suggestions for improvement in our Standards, and especially encourage readers to notify us immediately of any apparent inaccuracies or ambiguities. Please address your comments to the Chief Executive of either Standards Australia International or Standards New Zealand at the address shown on the back cover.

Australian/New Zealand Standard™

Information technology—CDIF framework

Part 2: Modelling and extensibility

First published as AS/NZS ISO/IEC 15474.2:2003.

COPYRIGHT

© Standards Australia/Standards New Zealand

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher.

Jointly published by Standards Australia International Ltd, GPO Box 5420, Sydney, NSW 2001 and Standards New Zealand, Private Bag 2439, Wellington 6020

ISBN 0 7337 5287 X

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 15474-2:2002, *Information technology—CDIF framework—Part 2: Modelling and extensibility*.

The objective of this Standard is to define the CDIF meta-metamodel and describe the rules and notations used throughout the CDIF family of standards. The rules for extending the CDIF semantic metamodel are also defined.

This Standard is Part 2 of AS/NZS ISO/IEC 15474, *Information technology—CDIF framework*, which is published in parts as follows:

Part 1: Overview

Part 2: Modelling and extensibility (this Standard)

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.
- (b) In the source text ‘this International Standard’ should read ‘this Australian/New Zealand Standard’.
- (c) A full point substitutes for a comma when referring to a decimal marker.

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

<i>Reference to International Standard</i>		<i>Australian/New Zealand Standard</i>	
ISO/IEC		AS/NZS	
15474	Information technology—CDIF framework	ISO/IEC 15474	Information technology—CDIF framework
15474-1	Part 1: Overview	ISO/IEC 15474-1	Part 1: Overview
15476	Information technology—CDIF semantic metamodel	ISO/IEC 15476	Information technology—CDIF semantic metamodel
15476-1	Part 1: Foundation	ISO/IEC 15476-1	Part 1: Foundation

CONTENTS

Page

1	Scope	1
2	Conformance	2
3	Normative references.....	2
4	Terms and definitions.....	3
4.1	From other standards.....	3
4.1.1	ISO/IEC 15474-1	3
4.1.2	ISO/IEC 13238-1	3
4.2	For this standard	3
5	Symbols (and abbreviated terms).....	4
5.1	Naming and diagramming conventions	4
5.2	Abbreviations	4
6	CDIF meta-metamodel concepts and facilities.....	4
6.1	Introduction	4
6.2	Modelling approach.....	4
6.2.1	Introduction	4
6.2.2	Subject areas	5
6.2.3	Many-to-many meta-relationships	5
6.2.4	Attributed meta-relationships	5
6.2.5	Subtyping of meta-entities	5
6.2.6	Multiple inheritance in meta-entities.....	6
6.2.7	Subtyping of meta-relationships	7
6.2.8	Multiple inheritance of meta-relationships.....	8
6.2.9	Arity of meta-relationships.....	8
6.2.10	Mutual exclusivity of meta-relationships.....	8
6.3	Subject areas	8
6.3.1	Explicit and implicit use of <i>CollectableMetaObjects</i> in subject areas	8
6.3.2	Rules for defining subject area.....	9
6.3.3	Working metamodel	10
6.3.4	Subject area diagrams	10
6.4	Metamodel extensibility	10
6.4.1	Introduction	10
6.4.2	Extensibility	11
6.5	Exporter responsibilities.....	12
6.5.1	Introduction	12
6.5.2	Extensibility	12
6.5.3	Maximum output.....	12
6.5.4	Meta-attributes.....	12
6.6	Importer responsibilities	12
6.6.1	Introduction	12
6.6.2	Information retention.....	12
6.6.3	Working metamodel	12
6.6.4	Meta-attributes.....	13
7	Modelling conventions.....	13
7.1	Naming of meta-objects	13
7.1.1	Names	13
7.1.2	Uniqueness of names.....	13
7.2	Meta-object graphical notation	13
7.2.1	Introduction	13
7.2.2	Meta-entity symbol	14

7.2.3	Meta-relationship symbol.....	14
7.2.4	Meta-relationship cardinality symbol	15
7.2.5	Meta-entity subtype hierarchy symbol	16
7.2.6	Meta-relationship subtype hierarchy.....	16
7.2.7	Mutual exclusivity of meta-relationships	17
7.2.8	Instance diagrams.....	17
7.3	Meta-object definition format.....	19
7.3.1	Introduction	19
7.3.2	Subject area definition	19
7.3.3	Meta-entity definition.....	20
7.3.4	Meta-attribute definition	21
7.3.5	Meta-relationship definition	22
7.4	Meta-object reference format.....	23
7.5	Meta-object summary format	24
7.5.1	Introduction	24
7.5.2	<i>AttributableMetaObject</i> classification hierarchy.....	24
7.5.3	MetaEntity and MetaRelationship summaries.....	24
8	Meta-metamodel overview	25
8.1	Introduction	25
8.2	Meta-metamodel description	25
8.3	Meta-metamodel diagram.....	26
9	Meta-metamodel summary.....	26
9.1	<i>AttributableMetaObject</i> classification hierarchy.....	26
9.1.1	Introduction	26
9.1.2	Classification hierarchy	27
9.2	Meta-meta-entity summary	27
9.3	Meta-meta-relationship summary	29
10	Meta-metamodel specification.....	30
10.1	Data types specification.....	30
10.1.1	Introduction	30
10.1.2	Boolean.....	30
10.1.3	Date	30
10.1.4	Enumerated	30
10.1.5	Float	31
10.1.6	Identifier.....	31
10.1.7	Integer.....	31
10.1.8	Point.....	31
10.1.9	String	31
10.1.10	Text	31
10.1.11	Time	31
10.2	Meta-meta-entity and Meta-meta-attribute specifications	32
10.2.1	<i>AttributableMetaObject</i>	32
10.2.2	<i>CollectableMetaObject</i>	33
10.2.3	<i>MetaAttribute</i>	33
10.2.4	<i>MetaEntity</i>	35
10.2.5	<i>MetaObject</i>	36
10.2.6	<i>MetaRelationship</i>	39
10.2.7	<i>SubjectArea</i>	41
10.3	Meta-meta-relationship specifications	42
10.3.1	<i>AttributableMetaObject.HasSubtype</i> . <i>AttributableMetaObject</i>	42
10.3.2	<i>CollectableMetaObject.IsDefinedIn</i> . <i>SubjectArea</i>	43
10.3.3	<i>CollectableMetaObject.IsUsedIn</i> . <i>SubjectArea</i>	44
10.3.4	<i>MetaAttribute.IsLocalMetaAttributeOf</i> . <i>AttributableMetaObject</i>	45
10.3.5	<i>MetaRelationship.HasDestination</i> . <i>MetaEntity</i>	45
10.3.6	<i>MetaRelationship.HasSource</i> . <i>MetaEntity</i>	46

Table of Illustrations

Figure 1 – CDIF family of standards	1
Figure 2 – Multiple inheritance	6
Figure 3 – Multiple inheritance: Invalid meta-attribute, <i>Z1</i>	7
Figure 4 – Example of CDIF graphical notation	14
Figure 5 – The meta-entity symbol	14
Figure 6 – The meta-relationship symbol	15
Figure 7 – A Reflexive meta-relationship	15
Figure 8 – The Meta-relationship cardinality symbol	15
Figure 9 – The Meta-entity subtype hierarchy symbol	16
Figure 10 – The Meta-entity subtype hierarchy symbol: Multiple inheritance	16
Figure 11 – Mutual exclusivity of meta-relationships	17
Figure 12 – Conceptual Diagram and an Instance Diagram	18
Figure 13 – The CDIF meta-metamodel	26

Table of Tables

Table 1 – Inheritance of meta-meta-attribute values by subtype meta-entities	6
Table 2 – Inheritance of meta-meta-attribute values by subtype meta-relationships	8
Table 3 – Contents of subject area definition	19
Table 4 – Contents of meta-entity definition	20
Table 5 – Contents of meta-attribute definition	21
Table 6 – Contents of meta-relationship definition	22
Table 7 – Contents of meta-entity references	23
Table 8 – Contents of meta-relationship references	23
Table 9 – Data types supported by CDIF	30

AUSTRALIAN/NEW ZEALAND STANDARD

Information technology — CDIF framework —**Part 2:
Modelling and extensibility****1 Scope**

The CDIF family of standards is primarily designed to be used as a description of a mechanism for transferring information between modelling tools. It facilitates a successful transfer when the authors of the importing and exporting tools have nothing in common except an agreement to conform to CDIF.

The CDIF family of standards includes a semantic metamodel and a transfer format definition. It also includes the specification of a meta-metamodel and associated rules that define a framework for the semantic metamodel and the transfer format. The language that is defined for the transfer format also has applicability as a general language for Import/Export for repositories. The CDIF semantic metamodel also has applicability as the basis of standard definitions for use in repositories.

The standards that form the complete family of CDIF Standards are documented in ISO/IEC 15474-1:2002, *Information technology - CDIF framework - Part 1: Overview*. These standards cover the overall framework, the transfer format and the CDIF semantic metamodel.

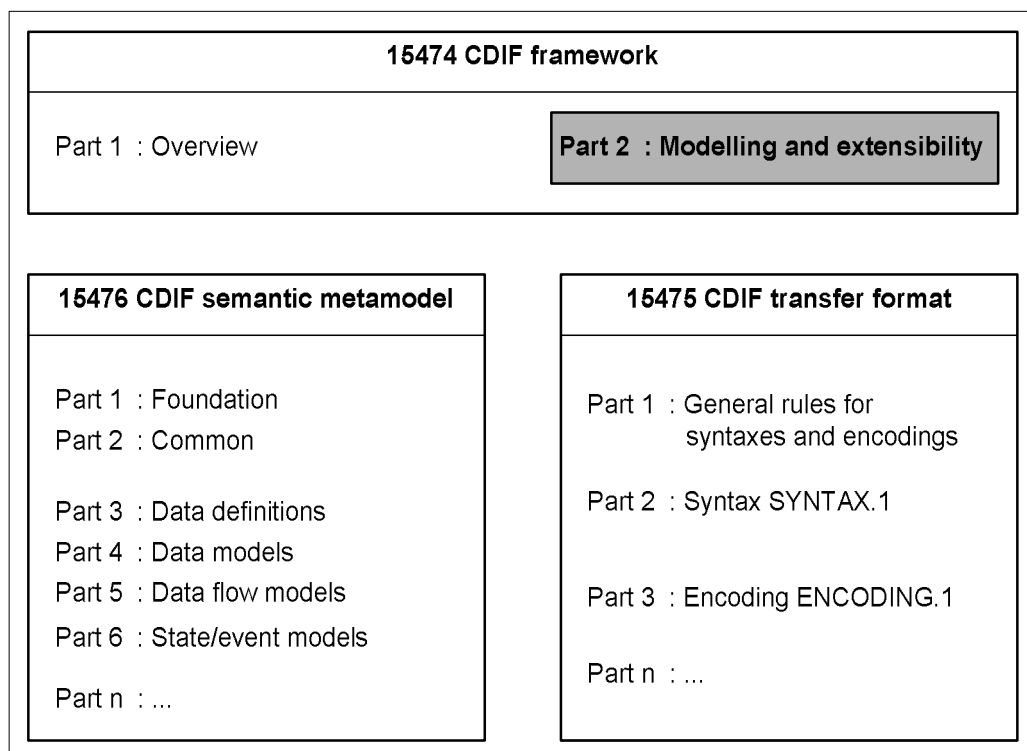


Figure 1 – CDIF family of standards

The diagram in Figure 1 depicts the various standards that comprise the CDIF family of standards. The shaded box depicts this Standard and its position in the CDIF family of standards.