

AS 1484.13.1:2020
Adoption of IEEE Std 1484.13.1(TM)-2012



IEEE

Adoption of an
IEEE Standard

STANDARDS
Australia



Standard for learning technology – Conceptual model for resource aggregation for learning, education, and training

This Australian Standard is an identical adoption of IEEE Std 1484.13.1(TM)-2012, Copyright © IEEE, and all rights reserved, 445 Hoes Lane Piscataway, NJ, USA. Reprinted pursuant to license agreement with IEEE. No part of this publication may be reproduced, in any form, without prior written consent of IEEE.

IEEE does not take responsibility, nor does it provide any warranty whatsoever, whether expressed nor implied, for any conflicts that may occur or any errors made in any country-specific changes made to the document. In all cases, the IEEE version, published in English, shall serve as the official document. IEEE is a trademark of The Institute of Electrical and Electronics Engineers, Incorporated (IEEE), New York, New York, USA, used under license.



currently in review, click buy full version

AS 1484.13.1:2020

This Australian Standard® was prepared by IT-019, Information and Documentation, Information Technology — Learning, Education, Training and Research. It was approved on behalf of the Council of Standards Australia on 19 November 2020.

This Standard was published on 18 December 2020.

The following are represented on Committee IT-019:

- Australian Computer Society
- Australian Library and Information Association
- Council of Australian University Librarians
- CSIRO
- Education Services Australia
- Flinders University
- Macquarie University
- Northern Territory Library
- NSW Department of Education
- Professional Scientists Australia
- University of Southern Queensland

This Standard was issued in draft form for comment as DR AS IEEE 1484.13.1:2020.

Keeping Standards up-to-date

Ensure you have the latest versions of our publications and keep up-to-date about Amendments, Rulings, Withdrawals, and new projects by visiting:

www.standards.org.au

ISBN 978 1 76113 101 1

Standard for learning technology — Conceptual model for resource aggregation for learning, education, and training

First published as AS 1484.13.1:2020.

COPYRIGHT

© Standards Australia Limited 2020. Copyright pursuant to license agreement with IEEE.

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, unless otherwise permitted under the Copyright Act 1968 (Cth).

Preface

This Standard was prepared by the Australian member of the Joint Standards Australia/Standards New Zealand Committee IT-019, Information and Documentation, Information Technology – Learning, Education, Training and Research.

After consultation with stakeholders in both countries, Standards Australia and Standards New Zealand decided to develop this document as an Australian Standard rather than an Australian/New Zealand Standard.

The objective of this document is to define a conceptual model for interpreting externalized representations of digital aggregations of resources for learning, education, and training. The conceptual model defines a set of concepts and the relationships among them and is expressed as a formal ontology. Internal compositions and uses of digital resources are not specified nor are processing methods for resource aggregations.

This document is identical with, and has been reproduced from, IEEE Std 1484.13.1(TM)—2012, *IEEE Standard for Learning Technology — Conceptual Model for Resource Aggregation for Learning, Education, and Training*.

As this document has been reproduced from an International Standard, the following applies:

- (a) In the source text “this Standard” should read “this document”.
- (b) A full point substitutes for a comma when referring to a decimal number.

Australian or Australian/New Zealand Standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific Standards.

The terms “normative” and “informative” are used in Standards to define the application of the appendices or annexes to which they apply. A “normative” appendix or annex is an integral part of a Standard, whereas an “informative” appendix or annex is only for information and guidance.

NOTES

Currently in preview, click buy full version

IEEE Standard for Learning Technology— Conceptual Model for Resource Aggregation for Learning, Education, and Training

IEEE Computer Society

Sponsored by the
Learning Technology Standards Committee

IEEE
3 Park Avenue
New York, NY 10016-5997
USA

IEEE Std 1484.13.1™-2012

29 June 2012

Currently in preview, click buy full version

IEEE Standard for Learning Technology— Conceptual Model for Resource Aggregation for Learning, Education, and Training

Sponsor

**Learning Technology Standards Committee
of the
IEEE Computer Society**

Approved 29 March 2012

IEEE-SA Standards Board

Permissions

Scope notes for the object properties `dcterms:hasPart` and `dcterms:isPartOf` in 8.2 and 8.6, respectively, are reprinted with permission from Dublin Core™ Metadata Initiative Recommendation (10 November 2010), *DCMI Metadata Terms*, <http://dublincore.org/documents/2010/10/11/dcmi-terms/>. Copyright © 2010. Dublin Core Metadata Initiative <http://www.dublincore.org/about/copyright/>. Licensed under <http://creativecommons.org/licenses/by/3.0/>.

The graphics legends shown in Figure F.1 and Figure G.1 in Annex F and Annex G, respectively, are reprinted with permission from Revelytix, Inc. © 2006–2012.

Abstract: A conceptual model for interpreting externalized representations of digital aggregations of resources for learning, education, and training is defined. The conceptual model is defined as an ontology. Internal compositions and uses of digital resources are not specified nor are processing methods for resource aggregations.

Keywords: aggregation format, conceptual model, content aggregation, digital aggregation, digital resource, IEEE 1484.13.1, resource aggregation, resource aggregation format

The Institute of Electrical and Electronics Engineers, Inc.
3 Park Avenue, New York, NY 10016-5997, USA

Copyright © 2012 by The Institute of Electrical and Electronics Engineers, Inc.
All rights reserved. Published 29 June 2012. Printed in the United States of America.

IEEE is a registered trademark in the U.S. Patent & Trademark Office, owned by The Institute of Electrical and Electronics Engineers, Incorporated.

Dublin Core is a trademark of the Dublin Core Metadata Initiative Limited (USPTO 2519654).

Knowledge is a registered trademark of Revelytix, Inc.

W3C is a registered trademark of the World Wide Web Consortium (registered in numerous countries). Marks of W3C are registered and held by its host institutions: Massachusetts Institute of Technology (MIT), European Research Consortium for Information and Mathematics (ERCIM), and Keio University, Japan.

PDF: ISBN 978-0-7381-7243-9 STD97230
Print: ISBN 978-0-7381-7244-6 STDPD97230

IEEE prohibits discrimination, harassment, and bullying. For more information, visit <http://www.ieee.org/web/aboutus/whatis/policies/p9-26.html>. No part of this publication may be reproduced in any form, in an electronic retrieval system or otherwise, without the prior written permission of the publisher.

Notice and Disclaimer of Liability Concerning the Use of IEEE Documents: IEEE Standards documents are developed within the IEEE Societies and the Standards Coordinating Committees of the IEEE Standards Association (IEEE-SA) Standards Board. IEEE develops its standards through a consensus development process, approved by the American National Standards Institute, which brings together volunteers representing varied viewpoints and interests to achieve the final product. Volunteers are not necessarily members of the Institute and serve without compensation. While IEEE administers the process and establishes rules to promote fairness in the consensus development process, IEEE does not independently evaluate, test, or verify the accuracy of any of the information or the soundness of any judgments contained in its standards.

Use of an IEEE Standard is wholly voluntary. IEEE disclaims liability for any personal injury, property or other damage, of any nature whatsoever, whether special, indirect, consequential, or compensatory, directly or indirectly resulting from the publication, use of, or reliance upon any IEEE Standard document.

IEEE does not warrant or represent the accuracy or content of the material contained in its standards, and expressly disclaims any express or implied warranty, including any implied warranty of merchantability or fitness for a specific purpose, in the use of the material contained in its standards is free from patent infringement. IEEE Standards documents are supplied "AS IS."

The existence of an IEEE Standard does not imply that there are no other ways to produce, test, measure, purchase, market, or provide other goods and services related to the scope of the IEEE standard. Furthermore, the viewpoint expressed at the time a standard is approved and issued is subject to change brought about through developments in the state of the art and comments received from users of the standard. Every IEEE standard is subjected to review at least every ten years. If a document is more than ten years old and has not undergone a revision process, it is reasonable to conclude that its contents, although still of some value, do not wholly reflect the present state of the art. Users are cautioned to check to determine that they have the latest edition of any IEEE standard.

In publishing and making its standards available, IEEE is not suggesting or rendering professional or other services for, or on behalf of, any person or entity. Nor is IEEE undertaking to perform any duty owed by any other person or entity to another. Any person utilizing any IEEE Standards document, should rely upon his or her own independent judgment in the exercise of reasonable care in any given circumstances or, as appropriate, seek the advice of a competent professional in determining the appropriateness of a given IEEE standard.

Translations: The IEEE consensus development process involves the review of documents in English only. In the event that an IEEE standard is translated, only the English version published by IEEE should be considered the approved IEEE standard.

Official Statements: A statement, written or oral, that is not processed in accordance with the IEEE-SA Standards Board Operations Manual shall not be considered the official position of IEEE or any of its committees and shall not be considered to be, nor be relied upon as, a formal position of IEEE. At conferences, symposia, seminars, or educational courses, an individual presenting information on IEEE standards shall make it clear that his or her views should be considered the personal views of that individual rather than the formal position of IEEE.

Comments on Standards: Comments for revision of IEEE Standards documents are welcome from any interested party, regardless of membership affiliation with IEEE. However, IEEE does not provide consulting information or advice pertaining to IEEE Standards documents. Suggestions for changes in documents should be in the form of a proposed change of text, together with appropriate supporting comments. Since IEEE standards represent a consensus of concerned interests, it is important to ensure that any response to comments and questions also receive the concurrence of a balance of interests. For this reason, IEEE and the members of its societies and Standards Coordinating Committees are not able to provide an instant response to comments or questions except in those cases where the matter has previously been addressed. Any person who would like to participate in evaluating comments or revisions to an IEEE standard is welcome to join the relevant IEEE working group at <http://standards.ieee.org/develop/wg/>.

Comments on standards should be submitted to the following address:

Secretary, IEEE-SA Standards Board
445 Hoes Lane
Piscataway, NJ 08854
USA

Photocopies: Authorization to photocopy portions of any individual standard for internal or personal use is granted by The Institute of Electrical and Electronics Engineers, Inc., provided that the appropriate fee is paid to Copyright Clearance Center. To arrange for payment of licensing fee, please contact Copyright Clearance Center, Customer Service, 222 Rosewood Drive, Danvers, MA 01923 USA; +1 978 750 8400. Permission to photocopy portions of any individual standard for educational classroom use can also be obtained through the Copyright Clearance Center.

Notice to users

Laws and regulations

Users of IEEE Standards documents should consult all applicable laws and regulations. Compliance with the provisions of any IEEE Standards document does not imply compliance to any applicable regulatory requirements. Implementers of the standard are responsible for observing or referring to the applicable regulatory requirements. IEEE does not, by the publication of its standards, intend to urge action that is not in compliance with applicable laws, and these documents may not be construed as doing so.

Copyrights

This document is copyrighted by the IEEE. It is made available for a wide variety of both public and private uses. These include both use, by reference, in laws and regulations, and use in private self-regulation, standardization, and the promotion of engineering practices and methods. By making this document available for use and adoption by public authorities and private users, the IEEE does not waive any rights in copyright to this document.

Updating of IEEE documents

Users of IEEE Standards documents should be aware that these documents may be superseded at any time by the issuance of new editions or may be amended from time to time through the issuance of amendments, corrigenda, or errata. An official IEEE document at any point in time consists of the current edition of the document together with any amendments, corrigenda, or errata then in effect. In order to determine whether a given document is the current edition and whether it has been amended through the issuance of amendments, corrigenda, or errata, visit the IEEE-SA Website at <http://standards.ieee.org/index.html> or contact the IEEE at the address listed previously. For more information about the IEEE Standards Association or the IEEE standards development process, visit IEEE-SA Website at <http://standards.ieee.org/index.html>.

Errata

Errata, if any, for this and all other standards can be accessed at the following URL: <http://standards.ieee.org/findstds/errata/index.html>. Users are encouraged to check this URL for errata periodically.

Patents

Attention is called to the possibility that implementation of this standard may require use of subject matter covered by patent rights. By publication of this standard, no position is taken by the IEEE with respect to the existence or validity of any patent rights in connection therewith. If a patent holder or patent applicant has filed a statement of assurance via an Accepted Letter of Assurance, then the statement is listed on the IEEE-SA Website at <http://standards.ieee.org/about/sasb/patcom/patents.html>. Letters of Assurance may indicate whether the Submitter is willing or unwilling to grant licenses under patent rights without compensation or under reasonable rates, with reasonable terms and conditions that are demonstrably free of any unfair discrimination to applicants desiring to obtain such licenses.

Essential Patent Claims may exist for which a Letter of Assurance has not been received. The IEEE is not responsible for identifying Essential Patent Claims for which a license may be required, for conducting inquiries into the legal validity or scope of Patents Claims, or determining whether any licensing terms or conditions provided in connection with submission of a Letter of Assurance, if any, or in any licensing agreements are reasonable or non-discriminatory. Users of this standard are expressly advised that determination of the validity of any patent rights, and the risk of infringement of such rights, is entirely their own responsibility. Further information may be obtained from the IEEE Standards Association.

Participants

At the time this IEEE standard was completed, the Resource Aggregation Models for Learning, Education, and Training (RAMLET) Working Group had the following membership:

Kerry Blinco, *Chair*
Scott Lewis, *Technical Editor*

Nancy Hoebelheinrich

Willem Kraan

Katrien Verbert

The following members of the individual balloting committee voted on this standard. Balloters may have voted for approval, disapproval, or abstention.

Charles Barest
Kerry Blinco
Mitchell Bonnett
Keith Chow
Geoffrey Darnton
Ryan Dellolio
David Fuschi
Randall Groves
Rutger A. Heunks
Nancy Hoebelheinrich

Werner Hoelzl
Don Holmes
Noriyuki Ikeuchi
Mark Jaeger
Piotr Karocki
Fanny Klett
Willem Kraan
Susan Land
Greg Luri
David Massart
Michael S. Newman

Daniel Rehak
Tyde Richards
Bartien Sayogo
Gil Shultz
Steven Smith
Thomas Starai
Gerald Stueve
Marcy Stutzman
Katrien Verbert
John Vergis

When the IEEE-SA Standards Board approved this standard on 29 March 2012, it had the following membership:

Richard H. Hulett, *Chair*
John Kulick, *Vice Chair*
Robert M. Grow, *Past Chair*

Satish Aggarwal
Masayuki Ariyoshi
Peter Balma
William Bartley
Ted Burse
Clint Chaplin
Wael Diab
Jean-Philippe Faure

Alexander Gelman
Paul Houz e
Jim Hughes
Young Kyun Kim
Joseph L. Koepfinger*
David J. Law
Thomas Lee
Hung Ling

Oleg Logvinov
Ted Olsen
Gary Robinson
Jon Walter Rosdahl
Mike Seavey
Yatin Trivedi
Phil Winston
Yu Yuan

*Member Emeritus

Also included are the following nonvoting IEEE-SA Standards Board liaisons:

Richard DeBlasio, *DOE Representative*
Michael Janezic, *NIST Representative*

Julie Alessi
IEEE Standards Program Manager, Document Development

Michael D. Kipness
IEEE Standards Program Manager, Technical Program Development

Introduction

This introduction is not part of IEEE Std 1484.13.1-2012, IEEE Standard for Learning Technology—Conceptual Model for Resource Aggregation for Learning, Education, and Training.

This standard defines a conceptual model for interpreting externalized representations of digital aggregations of resources for learning, education, and training. The conceptual model is defined as an ontology. Internal compositions and uses of digital resources are not specified nor are processing methods for resource aggregations.

Acknowledgments

The Resource Aggregation Models for Learning, Education, and Training (RAMLET) Working Group would like to thank the following people for their contributions and comments during the formative stages of this standard: Andy Heath, Rolf Lindner, Claude Ostyn, Daniel Rehak, Tyde Richards, Robby Robson, Christian Stracke, and Rob Wolfe. The Working Group would also like to thank Revelytix, Inc., for making available the Knoodl[®] ontology tools that were used to aid in the development and maintenance of the ontology files and to create the graphical representations in Annex G and Annex H.^a

^a Knoodl is a registered trademark of Revelytix, Inc. This information is given for the convenience of users of this standard and does not constitute an endorsement by the IEEE of these products. Equivalent products may be used if they can be shown to lead to the same results.

Contents

1. Overview	1
1.1 Scope	1
1.2 Purpose	1
2. Normative references.....	2
3. Definitions, acronyms, and abbreviations	2
3.1 Definitions	2
3.2 Acronyms and abbreviations	5
4. Special terms	7
5. Class and property prefix definitions.....	7
6. Conformance	7
6.1 Conforming aggregation instances	8
6.2 Conforming bindings.....	8
6.3 Conforming mappings	8
6.4 Conforming extensions of the core ontology.....	8
6.5 Conforming transforming implementations.....	8
7. Conceptual model—classes	9
7.1 ramlet:administrativeDescriptorObject.....	9
7.2 ramlet:admRef	9
7.3 ramlet:aggregationID.....	10
7.4 ramlet:aggregationSchema	10
7.5 ramlet:aggregationSchemaVersion.....	11
7.6 ramlet:aggregationType.....	11
7.7 ramlet:alternateID	11
7.8 ramlet:altResourceRef	12
7.9 ramlet:anchor	12
7.10 ramlet:anchorType.....	13
7.11 ramlet:assertion.....	13
7.12 ramlet:beginPoint.....	14
7.13 ramlet:cardinalityLabel.....	14
7.14 ramlet:checksum	14
7.15 ramlet:checksumType.....	15
7.16 ramlet:choice	15
7.17 ramlet:componentTarget.....	16
7.18 ramlet:condition.....	16
7.19 ramlet:coordinates	16
7.20 ramlet:creationDate	17
7.21 ramlet:defaultSelection.....	17
7.22 ramlet:descriptiveDescriptorObject.....	18
7.23 ramlet:descriptiveRef.....	18
7.24 ramlet:descriptorObject	18
7.25 ramlet:descriptorTypeIndicator	20
7.26 ramlet:digitalResource.....	20
7.27 ramlet:digitalResourceFragment.....	20
7.28 ramlet:dynamicStructure.....	21
7.29 ramlet:dynamicStructureID	21

7.30 ramlet:dynamicStructureType	22
7.31 ramlet:elementID	22
7.32 ramlet:encodingType	23
7.33 ramlet:endPoint	23
7.34 ramlet:except	24
7.35 ramlet:extent	24
7.36 ramlet:false	24
7.37 ramlet:fileDescriptor	25
7.38 ramlet:fileSize	25
7.39 ramlet:functionalResourceGroup	26
7.40 ramlet:generatingTool	26
7.41 ramlet:generatingToolVersion	26
7.42 ramlet:groupingID	27
7.43 ramlet:hasOrder	27
7.44 ramlet:hasRank	28
7.45 ramlet:humanLanguage	28
7.46 ramlet:icon	29
7.47 ramlet:identifierType	29
7.48 ramlet:intendedUse	29
7.49 ramlet:interfaceDefLink	30
7.50 ramlet:intraAggregationLink	30
7.51 ramlet:inventory	31
7.52 ramlet:localRef	31
7.53 ramlet:locator	32
7.54 ramlet:locatorDescriptor	32
7.55 ramlet:maxSelections	33
7.56 ramlet:mimeType	33
7.57 ramlet:minSelections	34
7.58 ramlet:modificationDate	34
7.59 ramlet:nodeID	34
7.60 ramlet:nodeVisibility	35
7.61 ramlet:note	35
7.62 ramlet:parallel	36
7.63 ramlet:party	36
7.64 ramlet:partyEmail	37
7.65 ramlet:partyName	37
7.66 ramlet:partyRole	37
7.67 ramlet:partyType	38
7.68 ramlet:partyURI	38
7.69 ramlet:provenance	39
7.70 ramlet:remoteDescriptorObject	39
7.71 ramlet:remoteNode	39
7.72 ramlet:remoteResource	40
7.73 ramlet:remoteTopNode	40
7.74 ramlet:require	41
7.75 ramlet:resourceAggregation	41
7.76 ramlet:resourceGroup	41
7.77 ramlet:resourceIntraAggregationLink	42
7.78 ramlet:resourceProcessing	42
7.79 ramlet:resourceProcessingAlgorithm	43
7.80 ramlet:resourceProcessingBehavior	43
7.81 ramlet:resourceProcessingKey	44
7.82 ramlet:resourceProcessingSet	44
7.83 ramlet:resourceProcessingType	45
7.84 ramlet:resourceType	45
7.85 ramlet:resourceWrapper	45

7.86 ramlet:resourceWrapperSet	46
7.87 ramlet:rights	46
7.88 ramlet:selection	47
7.89 ramlet:shapeIndicator	47
7.90 ramlet:source	47
7.91 ramlet:staticStructure	48
7.92 ramlet:staticStructureSet	48
7.93 ramlet:staticStructureType	49
7.94 ramlet:status	49
7.95 ramlet:stream	50
7.96 ramlet:streamType	50
7.97 ramlet:structRef	50
7.98 ramlet:structureNode	51
7.99 ramlet:structureNodeType	51
7.100 ramlet:technicalDescriptorObject	52
7.101 ramlet:textType	52
7.102 ramlet:title	53
7.103 ramlet:topNode	53
7.104 ramlet:transformOrdering	55
7.105 ramlet:true	55
7.106 ramlet:virtualResourceGroup	56
7.107 ramlet:wholeAggregationDescriptorObject	56
8. Conceptual model—object properties	57
8.1 ramlet:describes	57
8.2 dcterms:hasPart	57
8.3 ramlet:includes	58
8.4 ramlet:isDescribedBy	58
8.5 ramlet:isIncludedBy	58
8.6 dcterms:isPartOf	58
8.7 ramlet:isReferencedBy	59
8.8 ramlet:references	59
9. Conceptual model—data types	59
9.1 xsd:anyURI	60
9.2 xsd:base64Binary	60
9.3 xsd:positiveInteger	60
9.4 xsd:string	60
9.5 xsd:token	60
Annex A (informative) Bibliography	61
Annex B (informative) Conceptual overview	64
Annex C (informative) Ontologies—a brief primer	69
Annex D (informative) Use cases	71
Annex E (informative) Mapping of the XML Linking Language mapping ontology to the conceptual model for resource aggregation	82
Annex F (informative) Graphical representations of RAMLET classes	88

Annex G (informative) Graphical representations of RAMLET properties	130
Annex H (normative) Internet availability and use of the Turtle representations of the conceptual model and XLink mapping	133
Annex I (informative) Internet availability and use of the RDF/XML representations of the conceptual model and XLink mapping	134

IEEE Standard for Learning Technology— Conceptual Model for Resource Aggregation for Learning, Education, and Training

IMPORTANT NOTICE: IEEE Standards documents are not intended to ensure safety, health, or environmental protection, or ensure against interference with or from other devices or networks. Implementers of IEEE Standards documents are responsible for determining and complying with all appropriate safety, security, environmental, health, and interference protection practices and all applicable laws and regulations.

This IEEE document is made available for use subject to important notices and legal disclaimers. These notices and disclaimers appear in all publications containing this document and may be found under the heading “Important Notice” or “Important Notices and Disclaimers Concerning IEEE Documents.” They can also be obtained on request from IEEE or viewed at <http://standards.ieee.org/IPR/disclaimers.html>.

1. Overview

1.1 Scope

This standard defines a conceptual model for interpreting externalized representations of digital aggregations of resources for learning, education, and training. The conceptual model defines a set of concepts and the relationships among them and is expressed as a formal ontology. Internal compositions and uses of digital resources are not specified nor are processing methods for resource aggregations.

1.2 Purpose

Currently, resource aggregations used in learning, education, and training are defined in a variety of standards and specifications. The conceptual model defined in this standard facilitates interoperability by providing an ontology that can be used to represent a variety of aggregation formats. Interoperability may be achieved by the creation of crosswalks among the various aggregation standards and specifications. In addition, this standard may serve as a common reference for the development and evolution of standards and specifications for resource aggregations and may assist the development of profiles that maximize interoperability between the various aggregation formats.