Darwin Information Typing Architecture (DITA) Version 2.0

Working Draft 01

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Technical Committee:
OASIS Darwin Information Typing Architecture (DITA) TC

Chair:
Kristen James Eberlein (kris@eberleinconsulting.com), Eberlein Consulting LLC

Editors:
Robert D. Anderson (robander@us.ibm.com), IBM
Kristen James Eberlein (kris@eberleinconsulting.com), Eberlein Consulting LLC

Additional artifacts:
This prose specification is one component of a work product that also includes:

- http://docs.oasis-open.org/dita/dita/v2.0/wd01/dita-v2.0-wd01-dita.zip (DITA source)
- http://docs.oasis-open.org/dita/dita/v2.0/wd01/dita-v2.0-wd01-grammars.zip (grammar files)

Related work:
This specification replaces or supersedes *Darwin Information Typing Architecture (DITA) Version 1.3*, a multi-part OASIS that includes:

- Darwin Information Typing Architecture (DITA) Version 1.3 Part 0: Overview. Latest version: http://docs.oasis-open.org/dita/dita/v1.3/dita-v1.3-part0-overview.html
- Darwin Information Typing Architecture (DITA) Version 1.3 Part 1: Base Edition. Latest version: http://docs.oasis-open.org/dita/dita/v1.3/dita-v1.3-part1-base.html
- Darwin Information Typing Architecture (DITA) Version 1.3 Part 2: Technical Content Edition. Latest version: http://docs.oasis-open.org/dita/dita/v1.3/dita-v1.3-part2-tech-content.html
- Darwin Information Typing Architecture (DITA) Version 1.3 Part 3: All-Inclusive Edition. Latest version: http://docs.oasis-open.org/dita/dita/v1.3/dita-v1.3-part3-all-inclusive.html

Abstract:

The Darwin Information Typing Architecture (DITA) 2.0 specification defines both a) a set of document types for authoring and organizing topic-oriented information; and b) a set of mechanisms for combining, extending, and constraining document types.

Status:

This document was last revised or approved by the OASIS Darwin Information Typing Architecture (DITA) TC on the above date. The level of approval is also listed above. Check the “Latest version” location noted above for possible later revisions of this document. Any other numbered Versions and other technical work produced by the Technical Committee (TC) are listed at https://www.oasis-open.org/committees/tc_home.php?wg_abbrev=dita#technical.

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1 Introduction

The Darwin Information Typing Architecture (DITA) specification defines a set of document types for authoring and aggregating topic-oriented information, as well as a set of mechanisms for combining, extending, and constraining document types.

1.1 About the DITA 2.0 specification

The DITA specification includes grammar files and the written specification.

1.1.1 XML grammar files

The XML grammar files are available in RELAX NG (RNG), and XML Document-Type Definitions (DTD).

While the files should define the same DITA elements, the RELAX NG grammars are normative if there is a discrepancy.

1.1.2 Written specification

The specification is written for implementers of the DITA standard, including tool developers and XML architects who develop specializations.

The specification contains several parts:

- Introduction
- Architectural specification
- Language reference
- Conformance statement
- Appendices

The specification is available in the following formats:

- DITA source
- PDF
- XHTML (available from the OASIS Web site, authoritative)
- ZIP of XHTML (optimized for local use)

1.2 Terminology

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT, "RECOMMEND", "MAY", and "OPTIONAL" in this document are to be interpreted as described in **[RFC 2119]** and **[RFC8174]** when, and only when, they appear in all capitals, as shown here..

1.3 IPR policy

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1.4 Normative references

Normative references are references to external documents or resources to which implementers of DITA **MUST** comply.

[RFC 2119]

Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, DOI 10.17487/RFC2119, March 1997, <http://www.rfc-editor.org/info/rfc2119>.

[RFC 3986]

Berners-Lee, T., Fielding, R., and L. Masinter, "Uniform Resource Identifier (URI): Generic Syntax", STD 66, RFC 3986, DOI 10.17487/RFC3986, January 2005, <http://www.rfc-editor.org/info/rfc3986>.

[RFC 5646]

Phillips, A., Ed., and M. Davis, Ed., "Tags for Identifying Languages", BCP 47, RFC 5646, DOI 10.17487/RFC5646, September 2009, <http://www.rfc-editor.org/info/rfc5646>.

[RFC8174]

Leiba, B., "Ambiguity of Uppercase vs Lowercase in RFC 2119 Key Words", BCP 14, RFC 8174, DOI 10.17487/RFC8174, May 2017, <http://www.rfc-editor.org/info/rfc8174>.

[XML 1.0]

Extensible Markup Language (XML) 1.0 (Fifth Edition), T. Bray, J. Paoli, M. , E. Maler, F. Yergeau, Editors, W3C Recommendation, 26 November 2008, http://www.w3.org/TR/2008/REC-xml-20081126/ . Latest version available at http://www.w3.org/TR/xml .

[XML 1.1]

Extensible Markup Language (XML) 1.1 (Second Edition), T. Bray, J. Paoli, M. , E. Maler, F. Yergeau, J. Cowan, Editors, W3C Recommendation, 16 August 2006, http://www.w3.org/TR/2006/REC-xml11-20060816/ . Latest version available at http://www.w3.org/TR/xml11/ .

1.5 Non-normative references

Non-normative references are references to external documents or resources that implementers of DITA might find useful.

[ISO 8601]

ISO/TC 154, *Data elements and interchange formats—Information interchange—Representation of dates and times*, 3rd edition, http://www.iso.org/iso/catalogue_detail?csnumber=40874, 12 December 2004.

[ISO/IEC 19757-3]

ISO/IEC JTC 1/SC 34 Document description and processing languages, *Information technology—Document Schema Definition Languages (DSDL)—Part 3: Rule-based validation—Schematron*, http://www.iso.org/iso/catalogue_detail.htm?csnumber=40833, 1 June 2006.

[Namespaces in XML 1.0]

Namespaces in XML 1.0 (Third Edition), T. Bray, D. Hollander, A. Layman, R. Tobin, H. S. Thompson, Editors, W3C Recommendation, 8 December 2009, http://www.w3.org/TR/2009/REC-xml-names-20091208/ . Latest version available at http://www.w3.org/TR/xml-names .

[Namespaces in XML 1.1]

Namespaces in XML 1.1 (Second Edition), T. Bray, D. Hollander, A. Layman, R. Tobin, Editors, W3C Recommendation, 16 August 2006, http://www.w3.org/TR/2006/REC-xml-names11-20060816/ . Latest version available at http://www.w3.org/TR/xml-names11/ .

[OASIS Table Model]

XML Exchange Table Model Document Type Definition. Edited by Norman Walsh, 1999. Technical Memorandum TR 9901:1999. https://www.oasis-open.org/specs/tm9901.htm.

[RELAX NG]

J. Clark and M. Murata, editors, *RELAX NG Specification*, http://www.oasis-open.org/committees/relax-ng/spec-20011203.html, OASIS Committee Specification, 3 December 2001.

[RELAX NG Compact Syntax]

J. Clark, editor, *RELAX NG Compact Syntax*, http://www.oasis-open.org/committees/relax-ng/compact-20021121.html, OASIS Committee Specification, 21 November 2002.

[RELAX NG DTD Compatibility]

J. Clark and M. Murata, editors, *RELAX NG DTD Compatibility*, http://www.oasis-open.org/committees/relax-ng/compatibility-20011203.html, OASIS Committee Specification, 3 December 2001.

[XHTML 1.0]

XHTML™ 1.0 The Extensible HyperText Markup Language (Second Edition), S. Pemberton, Editor, W3C Recommendation, 1 August 2002, http://www.w3.org/TR/2002/REC-xhtml1-20020801 . Latest version available at http://www.w3.org/TR/xhtml1 .

[XHTML 1.1]

XHTML™ 1.1 - Module-based XHTML - Second Edition, S. McCarron, M. Ishikawa, Editors, W3C Recommendation, 23 November 2010, http://www.w3.org/TR/2010/REC-xhtml11-20101123 . Latest version available at http://www.w3.org/TR/xhtml11/ .

[XPointer 1.0]

XML Pointer Language (XPointer), S. J. DeRose, R. Daniel, P. Grosso, E. Maler, J. Marsh, N. Walsh, Editors, W3C Working Draft (work in progress), 16 August 2002, http://www.w3.org/TR/2002/WD-xptr-20020816/ . Latest version available at http://www.w3.org/TR/xptr/ .

[XML Catalogs 1.1]

OASIS Standard, *XML Catalogs Version 1.1*, 7 October 2005, https://www.oasis-open.org/committees/download.php/14809/xml-catalogs.html.

[xml:tm 1.0]

A. Zydroń, R. Raya, and B. Bogacki, editors, *XML Text Memory (xml:tm) 1.0 Specification*, http://www.gala-global.org/oscarStandards/xml-tm/, The Localization Industry Standards Association (LISA) xml:tm 1.0, 26 February 2007.

[XSL 1.0]

Extensible Stylesheet Language (XSL) Version 1.0, S. Adler, A. Berglund, J. , S. Deach, T. Graham, P. Grosso, E. Gutentag, A. Milowski, S. Parnell, J. Richman, S. Zilles, Editors, W3C Recommendation, 15 October 2001, http://www.w3.org/TR/2001/REC-xsl-20011015/ . Latest version available at http://www.w3.org/TR/xsl/ .

[XSL 1.1]

Extensible Stylesheet Language (XSL) Version 1.1, A. Berglund, Editor, W3C Recommendation, 5 December 2006, http://www.w3.org/TR/2006/REC-xsl11-20061205/ . Latest version available at http://www.w3.org/TR/xsl11/ .

[XSLT 2.0]

XSL Transformations (XSLT) Version 2.0, M. Kay, Editor, W3C Recommendation, 23 January 2007, http://www.w3.org/TR/2007/REC-xslt20-20070123/ . Latest version available at http://www.w3.org/TR/xslt20 .

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[XTM 1.0]

S. Pepper and G. Moore, editors, *XML Topic Maps (XTM) 1.0*, http://www.topicmaps.org/xtm/index.html, TopicMaps.Org XTM 1.0, 2001.

1.6 Formatting conventions in the XHTML version of the specification

Given the size and complexity of the specification, it is not generated as a single XHTML file. Instead, each DITA topic is rendered as a separate XHTML file.

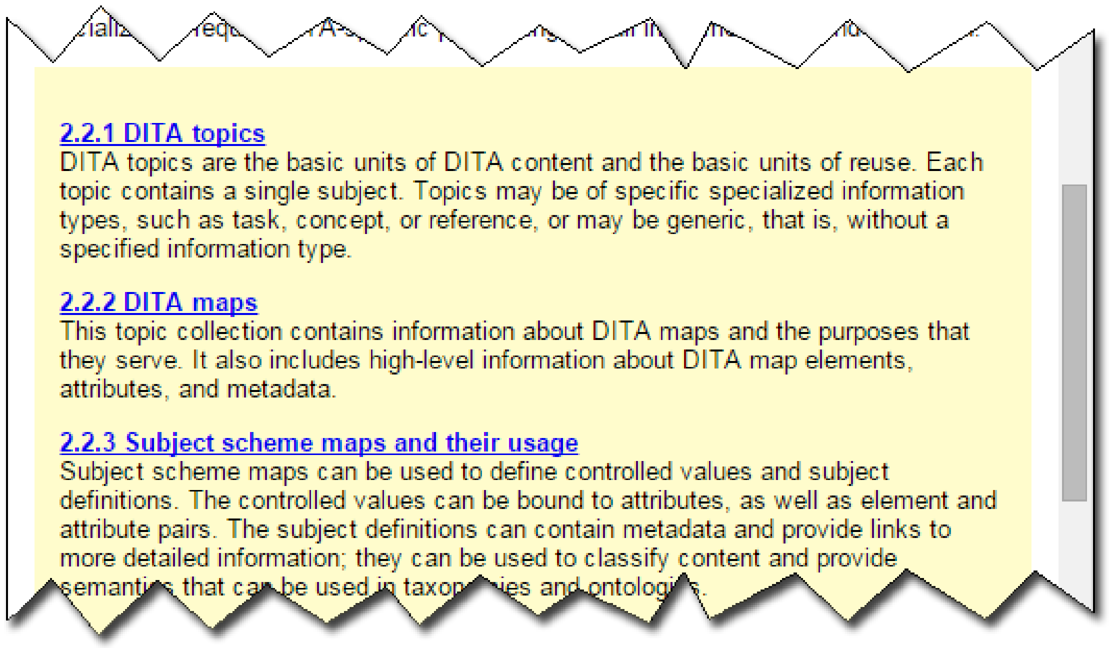
The XHTML version of the specification uses certain formatting conventions to aid readers in navigating through the specification and locating material easily: Link previews and navigation links.

1.6.1 Link previews

The DITA specification uses the content of the DITA `<shortdesc>` element to provide link previews for its readers. These link previews are visually highlighted by a border and a colored background.

The link previews serve as enhanced navigation aids, enabling readers to more easily locate content. This usability enhancement is one of the ways in which the specification illustrates the capabilities of DITA and exemplifies DITA best practices.

The following screen capture illustrates how link previews are displayed in the XHTML version of the specification:



2.2.1 DITA topics
DITA topics are the basic units of DITA content and the basic units of reuse. Each topic contains a single subject. Topics may be of specific specialized information types, such as task, concept, or reference, or may be generic, that is, without a specified information type.

2.2.2 DITA maps
This topic collection contains information about DITA maps and the purposes that they serve. It also includes high-level information about DITA map elements, attributes, and metadata.

2.2.3 Subject scheme maps and their usage
Subject scheme maps can be used to define controlled values and subject definitions. The controlled values can be bound to attributes, as well as element and attribute pairs. The subject definitions can contain metadata and provide links to more detailed information; they can be used to classify content and provide semantics that can be used in taxonomies and ontologies.

Figure 1: Link previews

1.6.2 Navigation links

To ease readers in navigating from one topic to another, each XHTML file generated by a DITA topic contains navigation links at the bottom.

Parent topic

Takes readers to the parent topic, which is the topic referenced by the closest topic in the containment hierarchy

Previous topic

Takes readers to the previous topic in the reading sequence

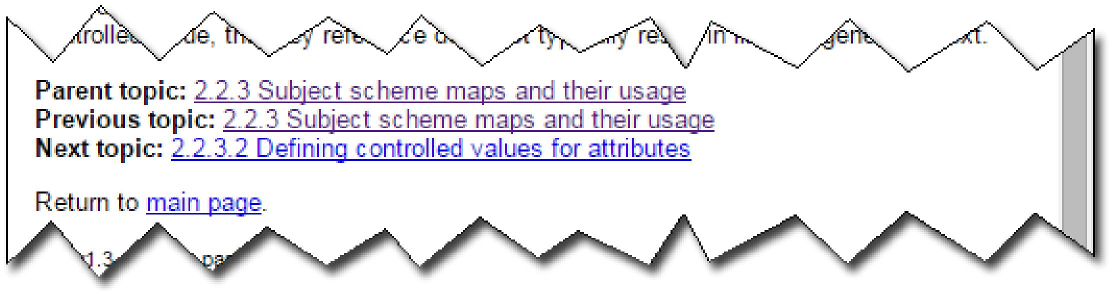
Next topic

Takes readers to the next topic in the reading sequence

Return to main page

Takes readers to the place in the table of contents for the current topic in the reading sequence

The following screen capture illustrates how navigation links are displayed in the XHTML version of the specification:



Parent topic: 2.2.3 Subject scheme maps and their usage
Previous topic: 2.2.3 Subject scheme maps and their usage
Next topic: 2.2.3.2 Defining controlled values for attributes

Return to main page.

Figure 2: Navigation links

When readers hover over the navigation links, the short description of the DITA topic also is displayed.

2 Overview of DITA

The Darwin Information Typing Architecture (DITA) is an XML-based architecture for authoring, producing, and delivering topic-oriented, information-typed content that can be reused and single-sourced in a variety of ways. While DITA historically has been driven by the requirements of large-scale technical documentation authoring, management, and delivery, it is a standard that is applicable to any kind of publication or information that might be presented to readers, including interactive training and educational materials, standards, reports, business documents, trade books, travel and nature guides, and more.

DITA is designed for creating new document types and describing new information domains based on existing types and domains. The process for creating new types and domains is called specialization. Specialization enables the creation of specific, targeted XML grammars that can still use tools and design rules that were developed for more general types and domains; this is similar to how classes in an object-oriented system can inherit the methods of ancestor classes.

Because DITA topics are conforming XML documents, they can be readily viewed, edited, and validated using standard XML tools, although realizing the full potential of DITA requires using DITA-aware tools.

2.1 DITA terminology and notation

The DITA specification uses specific notation and terms to define the components of the DITA standard.

Notation

The following conventions are used throughout the specification:

attribute types

Attribute names are preceded by @ to distinguish them from elements or surrounding text, for example, the `@props` or the `@class` attribute.

element types

Element names are delimited with angle brackets (< and >) to distinguish them from surrounding text, for example, the `<keyword>` or the `<prolog>` element.

In general, the unqualified use of the term *map* or *topic* can be interpreted to mean "a `<map>` element and any specialization of a `<map>` element " or "a `<topic>` element or any specialization of a `<topic>` element." Similarly, the unqualified use of an element type name (for example, `<p>`) can be interpreted to mean the element type or any specialization of the element type.

Normative and non-normative information

The DITA specification contains normative and non-normative information:

Normative information

Normative information is the formal portion of the specification that describes the rules and requirements that make up the DITA standard and which must be followed.

Non-normative information

Non-normative information includes descriptions that provide background, examples, notes, and other useful information that are not formal requirements or rules that must be followed.

All information in the specification should be considered normative unless it is an example, a note, an appendix, or is explicitly labeled as non-normative. The DITA specification contains examples to help clarify or illustrate specific aspects of the specification. Because examples are specific rather than general, they might not illustrate all aspects or be the only way to accomplish or implement an aspect of the specification. Therefore all examples are non-normative.

Basic DITA terminology

The following terminology is used to discuss basic DITA concepts:

DITA document

An XML document that conforms to the requirements of this specification. A DITA document **MUST** have as its root element one of the following elements:

- `<map>` or a specialization of the `<map>` element
- `<topic>` or a specialization of the `<topic>` element
- `<dita>`, which cannot be specialized, but which allows documents with multiple sibling topics

DITA document type

A unique set of structural modules, domain modules, and constraint modules that taken together provide the XML element and attribute declarations that define the structure of DITA documents.

DITA document-type shell

A set of DTD, XSD, or RELAX NG declarations that implement a DITA document type by using the rules and design patterns that are included in the DITA specification. A DITA document-type shell includes and configures one or more structural modules, zero or more domain modules, and zero or more constraint modules. With the exception of the optional declarations for the `<dita>` element and its attributes, DITA document-type shells do not declare any element or attribute types directly.

DITA element

An XML element instance whose type is a DITA element type. DITA elements must exhibit a `@class` attribute that has a value that conforms to the rules for specialization hierarchy specifications.

DITA element type

An element type that is either one of the base element types that are defined by the DITA specification, or a specialization of one of the base element types.

map instance

An occurrence of a map type in a DITA document.

map type

A map or a specialization of map that defines a set of relationships among topic instances.

structural type instance

An occurrence of a topic type or a map type in a DITA document.

topic instance

An occurrence of a topic type in a DITA document.

topic type

A topic or a specialization of topic that defines a complete unit of content.

Specialization terminology

The following terminology is used to discuss DITA specialization:

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base type

An element or attribute type that is not a specialization. All base types are defined by the DITA specification.

extension element

Within a vocabulary module, an element type that can be extended, replaced, or constrained for use in a DITA document type.

generalization

The process by which a specialized element is transformed into a less-specialized ancestor element or a specialized attribute is transformed into a less-specialized ancestor attribute. The original specialization-hierarchy information can be preserved in the generalized instance; this allows the original specialized type to be recreated from the generalized instance.

specialization

(1) The act of defining new element or attribute types as a semantic refinement of existing element or attribute types

(2) An element or attribute type that is a specialization of a base type

(3) A process by which a generalized element is transformed into one of its more specialized element types or a generalized attribute is transformed into a more specialized attribute.

specialization hierarchy

The sequence of element or attribute types, from the most general to most specialized, from which a given element or attribute type is specialized. The specialization hierarchy for a DITA element is formally declared through its `@class` attribute.

structural type

A topic type or map type.

DITA modules

The following terminology is used to discuss DITA modules:

attribute domain module

A domain module that defines a specialization of either the `@base` or `@props` attribute.

constraint module

A set of declarations that imposes additional constraints onto the element or attribute types that are defined in a specific vocabulary module.

domain module

A vocabulary module that defines a set of element types or an attribute type that supports a specific subject or functional area.

element domain module

A domain module that defines one or more element types for use within maps or topics.

structural module

A vocabulary module that defines a top-level map type or topic type.

vocabulary module

A set of element or attribute declarations.

Linking and addressing terms

The following terminology is used to discuss linking and addressing terms:

referenced element

An element that is referenced by another DITA element. See also *referencing element*.

Example

Consider the following code sample from a `installation-reuse.dita` topic. The `<step>` element that it contains is a referenced element; other DITA topics reference the `<step>` element by using the `@conref` attribute.

```
<step id="run-startcmd-script">
    <cmd>Run the startcmd script that is applicable to your operating-system
environment.</cmd>
</step>
```

referencing element

An element that references another DITA element by specifying an addressing attribute. See also *referenced element* and *addressing attribute*

Example

The following `<step>` element is a referencing element. It uses the `@conref` attribute to reference a `<step>` element in the `installation-reuse.dita` topic.

```
<step conref="installation-reuse.dita#reuse/run-startcmd-script">
    <cmd/>
</step>
```

addressing attribute

An attribute, such as `@conref`, `@conkeyref`, `@keyref`, and `@href`, that specifies an address.

Terminology related to keys

The following terminology is used to discuss keys:

resource

For the purposes of keys and key resolution, one of the following:

- An object addressed by URI
- Metadata specified on a resource, such as a `@scope` or `@format` attribute
- Text or metadata located within a `<topicmeta>` element

key

A name for a resource. See Using keys for addressing (68) for more information.

key definition

A `<topicref>` element that binds one or more key names to zero or more resources.

key reference

An attribute that references a key, such as `@keyref` or `@conkeyref`.

key space

A list of key definitions that are used to resolve key references.

effective key definition

The definition for a key within a key space that is used to resolve references to that key. A key might have multiple definitions within a key space, but only one of those definitions is effective.

key scope

A map or section of a map that defines its own key space and serves as the resolution context for its key references.

Map terms

root map

The DITA map that is provided as input for a processor.

submap

A DITA map that is referenced with a `@scope` attribute that evaluates as "local". The value of the scope attribute might be explicitly set, be defaulted, or cascade from another element.

peer map

A DITA map that is referenced with a `@scope` attribute that evaluates as "peer". The value of the scope attribute might be explicitly set, be defaulted, or cascade from another element.

map branch

A `<topicref>` element or a specialization of `<topicref>`, along with any child elements and all resources that are referenced by the original element or its children.

2.2 Basic concepts

DITA has been designed to satisfy requirements for information typing, semantic markup, modularity, reuse, interchange, and production of different deliverable forms from a single source. These topics provide an overview of the key DITA features and facilities that serve to satisfy these requirements.

DITA topics

In DITA, a topic is the basic unit of authoring and reuse. All DITA topics have the same basic structure: a title and, optionally, a body of content. Topics can be generic or more specialized; specialized topics represent more specific information types or semantic roles, for example, `<concept>`, `<task>`, or `<reference>` See DITA topics for more information.

DITA maps

DITA maps are documents that organize topics and other resources into structured collections of information. DITA maps specify hierarchy and the relationships among the topics; they also provide the contexts in which keys are defined and resolved. DITA maps **SHOULD** have `.ditamap` as the file extension. See DITA maps for more information.

Information typing

Information typing is the practice of identifying types of topics, such as concept, reference, and task, to clearly distinguish between different types of information. Topics that answer different reader questions (How ...? What is ...?) can be categorized with different information types. The base information types provided by DITA specializations (for example, technical content, machine industry, and learning and training) provide starter sets of information types that can be adopted immediately by many technical and business-related organizations. See Information typing for more information.

DITA addressing

DITA provides two addressing mechanisms. DITA addresses either are direct URI-based addresses, or they are indirect key-based addresses. Within DITA documents, individual elements are addressed by unique identifiers specified on the `@id` attribute. DITA defines two fragment-identifier syntaxes; one is the full fragment-identifier syntax, and the other is an abbreviated fragment-identifier syntax that can be used when addressing non-topic elements from within the same topic. See DITA addressing for more information.

Content reuse

The DITA `@conref`, `@conkeyref`, `@conrefend`, and `@conaction` attributes provide mechanisms for reusing content within DITA topics or maps. These mechanisms can be used both to pull and push content. See Content reuse for more information

Conditional processing

Conditional processing, also known as profiling, is the filtering or flagging of information based on processing-time criteria. See Conditional processing for more information.

Configuration

A document type shell is an XML grammar file that specifies the elements and attributes that are allowed in a DITA document. The document type shell integrates structural modules, domain modules, and constraint modules. In addition, a document type shell specifies whether and how topics can nest. See Configuration (127) for more information.

Specialization

The specialization feature of DITA allows for the creation of new element types and attributes that are explicitly and formally derived from existing types. This facilitates interchange of conforming DITA content and ensures a minimum level of common processing for all DITA content. It also allows specialization-aware processors to add specialization-specific processing to existing base processing. See Specialization for more information.

Constraints

Constraint modules define additional constraints for vocabulary modules in order to restrict content models or attribute lists for specific element types, remove certain extension elements from an integrated domain module, or replace base element types with domain-provided, extension element types. See Constraints for more information.

2.3 File extensions

DITA uses certain file extensions for topics, maps, and conditional processing profiles.

Files that contain DITA content **SHOULD** use the following file extensions:

DITA topics

- *.dita (preferred)
- *.xml

DITA maps

*.ditamap

Conditional processing profiles

`*.ditaval`

2.4 Producing different deliverables from a single source

DITA is designed to enable the production of multiple deliverable formats from a single set of DITA content. This means that many rendition details are specified neither in the DITA specification nor in the DITA content; the rendition details are defined and controlled by the processors.

Like many XML-based applications for human-readable documentation, DITA supports the separation of content from presentation. This is necessary when content is used in different contexts, since authors cannot predict how or where the material that they author will be used. The following features and mechanisms enable users to produce different deliverable formats from a single source:

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DITA maps

Different DITA maps can be optimized for different delivery formats. For example, you might have a book map for printed output and another DITA map to generate online help; each map uses the same content set.

Specialization

The DITA specialization facility enables users to create XML elements that can provide appropriate rendition distinctions. Because the use of specializations does not impede interchange or interoperability, DITA users can safely create the specializations that are demanded by their local delivery and rendition requirements, with a minimum of additional impact on the systems and business processes that depend on or use the content. While general XML practices suggest that element types should be semantic, specialization can be used to define element types that are purely presentational in nature. The highlighting domain is an example of such a specialization.

Conditional processing

Conditional processing makes it possible to have a DITA topic or map that contains delivery-specific content.

Content referencing

The conref mechanism makes it possible to construct delivery-specific maps or topics from a combination of generic components and delivery-context-specific components.

Key referencing

The keyref mechanism makes it possible to have key words be displayed differently in different deliverables. It also allows a single link to resolve to different targets in different deliverables.

@outputclass attribute

The `@outputclass` attribute provides a mechanism whereby authors can indicate specific rendition intent where necessary. Note that the DITA specification does not define any values for the `@outputclass` attribute; the use of the `@outputclass` attribute is processor specific.

While DITA is independent of any particular delivery format, it is a standard that supports the creation of human-readable content. As such, it defines some fundamental document components including paragraphs, lists, and tables. When there is a reasonable expectation that such basic document components be rendered consistently, the DITA specification defines default or suggested renderings.

3 DITA markup

Topics and maps are the basic building blocks of the Darwin Information Typing Architecture (DITA). Metadata attributes and values can be added to DITA topics and maps, as well as to elements within topics, to allow for conditional publishing and content reuse.

DITA topics and maps are XML documents that conform to the XML specification. As such, they can be viewed, edited, validated, and processed with standard XML tools, although some DITA-specific features, such as content reference, key reference, and specialization require DITA-specific processing for full implementation and validation.

3.1 DITA topics

DITA topics are the basic units of DITA content and the basic units of reuse. Each topic contains a single subject.

3.1.1 The topic as the basic unit of information

In DITA, a topic is the basic unit of authoring and reuse. All DITA topics have the same basic structure: a title and, optionally, a body of content. Topics can be generic or more specialized; specialized topics represent more specific information types or semantic roles, for example, `<concept>`, `<task>`, or `<reference>`

DITA topics consist of content units that can be as generic as sets of paragraphs and unordered lists or as specific as sets of instructional steps in a procedure or cautions to be considered before a procedure is performed. Content units in DITA are expressed using XML elements and can be conditionally processed using metadata attributes.

Classically, a DITA topic is a titled unit of information that can be understood in isolation and used in multiple contexts. It should be short enough to address a single subject or answer a single question but long enough to make sense on its own and be authored as a self-contained unit. However, DITA topics also can be less self-contained units of information, such as topics that contain only titles and short descriptions and serve primarily to organize subtopics or links or topics that are designed to be nested for the purposes of information management, authoring convenience, or interchange.

DITA topics are used by reference from DITA maps. DITA maps enable topics to be organized in a hierarchy for publication. Large units of content, such as complex reference documents or book chapters, are created by nesting topic references in a DITA map. The same set of DITA topics can be used in any number of maps.

DITA topics also can be used and published individually; for example, one can represent an entire deliverable as a single DITA document that consists of a root topic and nested topics. This strategy can accommodate the migration of legacy content that is not topic-oriented; it also can accommodate information that is not meaningful outside the context of a parent topic. However, the power of DITA is most fully realized by storing each DITA topic in a separate XML document and using DITA maps to organize how topics are combined for delivery. This enables a clear separation between how topics are authored and stored and how topics are organized for delivery.

3.1.2 The benefits of a topic-based architecture

Topics enable the development of usable and reusable content.

While DITA does not require the use of any particular writing practice, the DITA architecture is designed to support authoring, managing, and processing of content that is designed to be reused. Although DITA provides significant value even when reuse is not a primary requirement, the full value of DITA is realized

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when content is authored with reuse in mind. To develop topic-based information means creating units of standalone information that are meaningful with little or no surrounding context.

By organizing content into topics that are written to be reusable, authors can achieve several goals:

- Content is readable when accessed from an index or search, not just when read in sequence as part of an extended narrative. Since most readers do not read technical and business-related information from beginning to end, topic-oriented information design ensures that each unit of information can be read independently.
- Content can be organized differently for online and print delivery. Authors can create task flows and concept hierarchies for online delivery and create a print-oriented hierarchy to support a narrative content flow.
- Content can be reused in different collections. Since a topic is written to support random access (as by search), it should also be understandable when included as part of various product deliverables. Topics permit authors to refactor information as needed, including only the topics that apply to each unique scenario.
- Content is more manageable in topic form whether managed as individual files in a traditional file system or as objects in a content management system.
- Content authored in topics can be translated and updated more efficiently and less expensively than information authored in larger or more sequential units.
- Content authored in topics can be filtered more efficiently, encouraging the assembly and deployment of information subsets from shared information repositories.

Topics written for reuse should be small enough to provide opportunities for reuse but large enough to be coherently authored and read. When each topic is written to address a single subject, authors can organize a set of topics logically and achieve an acceptable narrative content flow.

3.1.3 Disciplined, topic-oriented writing

Topic-oriented writing is a disciplined approach to writing that emphasizes modularity and reuse of concise units of information: topics. Well-designed DITA topics can be reused in many contexts, as long as writers are careful to avoid unnecessary transitional text.

Conciseness and appropriateness

Readers who are trying to learn or do something quickly appreciate information that is written in a structure that is easy to follow and contains only the information needed to complete that task or grasp a fact. Recipes, encyclopedia entries, car repair procedures--all serve up a uniquely focused unit of information. The topic contains everything required by the reader.

Locational independence

A well-designed topic is reusable in other contexts to the extent that it is context free, meaning that it can be inserted into a new document without revision of its content. A context-free topic avoids transitional text. Phrases like "As we considered earlier ..." or "Now that you have completed the initial step ..." make little sense if a topic is reused in a new context in which the relationships are different or no longer exist. A well-designed topic reads appropriately in any new context because the text does not refer the reader outside the topic.

Navigational independence

Most print publications or web pages are a mixture of content and navigation. Internal links lead a reader through a sequence of choices as he or she navigates through a website. DITA supports the separation of navigation from content by assembling independent topics into DITA maps. Nonetheless, writers might want to provide links within a topic to additional topics or external resources. DITA does not prohibit such linking within individual topics. The DITA relationship table enables links between topics and to external content. Since it is defined in the DITA map, it is managed independently of the topic content.

Links in the content are best used for cross-references within a topic. Links from within a topic to additional topics or external resources should be avoided because they limit the reusability of the topic. To link from a term or keyword to its definition, use the DITA keyref facility to avoid creating topic-to-topic dependencies that are difficult to maintain. See Key-based addressing.

3.1.4 Information typing

Information typing is the practice of identifying types of topics, such as concept, reference, and task, to clearly distinguish between different types of information. Topics that answer different reader questions (How ...? What is ...?) can be categorized with different information types. The base information types provided by DITA specializations (for example, technical content, machine industry, and learning and training) provide starter sets of information types that can be adopted immediately by many technical and business-related organizations.

Information typing has a long history of use in the technical documentation field to improve information quality. It is based on extensive research and experience, including Robert Horn's Information Mapping and Hughes Aircraft's STOP (Sequential Thematic Organization of Proposals) technique. Note that many DITA topic types are not necessarily closely connected with traditional Information Mapping.

Information typing is a practice designed to keep documentation focused and modular, thus making it clearer to readers, easier to search and navigate, and more suitable for reuse. Classifying information by type helps authors perform the following tasks:

- Develop new information more consistently
- Ensure that the correct structure is used for closely related kinds of information (retrieval-oriented structures like tables for reference information and simple sequences of steps for task information)
- Avoid mixing content types, thereby losing reader focus
- Separate supporting concept and reference information from tasks, so that users can read the supporting information if needed and ignore if it is not needed
- Eliminate unimportant or redundant detail
- Identify common and reusable subject matter

DITA currently defines a small set of well-established information types that reflects common practices in certain business domains, for example, technical communication and instruction and assessment. However, the set of possible information types is unbounded. Through the mechanism of specialization, new information types can be defined as specializations of the base topic type (`<topic>`) or as refinements of existing topics types, for example, `<concept>`, `<task>`, `<reference>`, or `<learningContent>`.

You need not use any of the currently-defined information types. However, where a currently-defined information type matches the information type of your content, the currently-defined information type should be used, either directly, or as a base for specialization. For example, information that is procedural in nature should use the task information type or a specialization of task. Consistent use of established information types helps ensure smooth interchange and interoperability of DITA content.

3.1.5 Generic topics

The element type `<topic>` is the base topic type from which all other topic types are specialized. All topics have the same basic structure.

For authors, typed content is preferred to support consistency in writing and presentation to readers. The generic topic type should only be used if authors are not trained in information typing or when a specialized topic type is inappropriate. The OASIS DITA standard provides several specialized topic types, including concept, task, and reference that are critical for technical content development.

For those pursuing specialization, new specialized topic types should be specialized from appropriate ancestors to meet authoring and output requirements.

3.1.6 Topic structure

All topics have the same basic structure, regardless of topic type: title, description or abstract, prolog, body, related links, and nested topics.

All DITA topics must have an XML identifier (the `@id` attribute) and a title. The basic topic structure consists of the following parts, some of which are optional:

Topic element

The topic element holds the required `@id` attribute and contains all other elements.

Title

The title contains the subject of the topic.

Alternate titles

Titles specifically for use in navigation or search. When not provided, the base title is used for all contexts.

Short description or abstract

A short description of the topic or a longer abstract with an embedded short description. The short description might be used both in topic content (as the first paragraph), in generated summaries that include the topic, and in links to the topic. Alternatively, the abstract lets you create more complex introductory content and uses an embedded short description element to define the part of the abstract that is suitable for summaries and link previews.

While short descriptions aren't required, they can make a dramatic difference to the usability of an information set and should generally be provided for all topics.

Prolog

The prolog is the container for topic metadata, such as change history, audience, product, and so on.

Body

The topic body contains the topic content: paragraphs, lists, sections, and other content that the information type permits.

Related links

Related links connect to other topics. When an author creates a link as part of a topic, the topic becomes dependent on the other topic being available. To reduce dependencies between topics and thereby increase the reusability of each topic, authors can use DITA maps to define and manage links between topics, instead of embedding links directly in each related topic.

Nested topics

Topics can be defined inside other topics. However, nesting requires special care because it can result in complex documents that are less usable and less reusable. Nesting might be appropriate for information that is first converted from desktop publishing or word processing files or for topics that are unusable independent from their parent or sibling topics.

The rules for topic nesting can be configured in a document-type shells. For example, the standard DITA configuration for concept topics only allows nested concept topics. However, local configuration of the concept topic type could allow other topic types to nest or disallow topic nesting entirely. In addition, the `@chunk` attribute enables topics to be equally re-usable regardless of whether they are separate or nested. The standard DITA configuration for ditabase document-type documents allows unrestricted topic nesting and can be used for holding sets of otherwise unrelated topics that hold re-usable content. It can also be used to convert DITA topics from non-DITA legacy source without first determining how individual topics should be organized into separate XML documents.

3.1.7 Topic content

The content of all topics, regardless of topic type, is built on the same common structures.

Topic body

The topic body contains all content except for that contained in the title or the short description/ abstract. The topic body can be constrained to remove specific elements from the content model; it also can be specialized to add additional specialized elements to the content model. The topic body can be generic while the topic title and prolog are specialized.

Sections and examples

The body of a topic might contain divisions, such as sections and examples. They might contain block-level elements like titles and paragraphs and phrase-level elements like API names or text. It is recommend that sections have titles, whether they are entered directly into the `<title>` element or rendered using a fixed or default title.

Either body divisions or untitled sections or examples can be used to delimit arbitrary structures within a topic body. However, body divisions can nest, but sections and examples cannot contain sections.

<sectiondiv>

The `<sectiondiv>` element enables the arbitrary grouping of content within a section for the purpose of content reuse. The `<sectiondiv>` element does not include a title. Content that requires a title should use `<section>` or `<example>`.

<bodydiv>

The `<bodydiv>` element enables the arbitrary grouping of content within the body of a topic for the purpose of content reuse. The `<bodydiv>` element does not include a title. Content that requires a title should use `<section>` or `<example>`.

<div>

The `<div>` element enables the arbitrary grouping of content within a topic. The `<div>` element does not include a title. Content that requires a title should use `<section>` or `<example>` or, possibly, `<fig>`.

Block-level elements

Paragraphs, lists, figures, and tables are types of "block" elements. As a class of content, they can contain other blocks, phrases, or text, though the rules vary for each structure.

Phrases and keywords

Phrase level elements can contain markup to label parts of a paragraph or parts of a sentence as having special semantic meaning or presentation characteristics, such as `<uicontrol>` or `<b>`. Phrases can usually contain other phrases and keywords as well as text. Keywords can only contain text.

Images

Images can be inserted to display photographs, illustrations, screen captures, diagrams, and more. At the phrase level, they can display trademark characters, icons, toolbar buttons, and so forth.

Multimedia

The `<object>` element enables authors to include multimedia, such as diagrams that can be rotated and expanded. The `<foreign>` element enables authors to include media within topic content, for example, SVG graphics, MathML equations, and so on.

3.2 DITA maps

This topic collection contains information about DITA maps and the purposes that they serve. It also includes high-level information about DITA map elements, attributes, and metadata.

3.2.1 Definition of DITA maps

DITA maps are documents that organize topics and other resources into structured collections of information. DITA maps specify hierarchy and the relationships among the topics; they also provide the contexts in which keys are defined and resolved. DITA maps **SHOULD** have `.ditamap` as the file extension.

Maps draw on a rich set of existing best practices and standards for defining information models, such as hierarchical task analysis. They also support the definition of non-hierarchical relationships, such as matrices and groups, which provide a set of capabilities that has similarities to Resource Description Framework (RDF) and ISO topic maps.

DITA maps use `<topicref>` elements to reference DITA topics, DITA maps, and non-DITA resources, for example, HTML and TXT files. The `<topicref>` elements can be nested or grouped to create relationships among the referenced topics, maps, and non-DITA files; the `<topicref>` elements can be organized into hierarchies in order to represent a specific order of navigation or presentation.

DITA maps impose an architecture on a set of topics. Information architects can use DITA maps to specify what DITA topics are needed to support a given set of user goals and requirements; the sequential order of the topics; and the relationships that exist among those topics. Because DITA maps provide this context for topics, the topics themselves can be relatively context-free; they can be used and reused in multiple different contexts.

DITA maps often represent a single deliverable, for example, a specific Web site, a printed publication, or the online help for a product. DITA maps also can be subcomponents for a single deliverable, for example, a DITA map might contain the content for a chapter in a printed publication or the troubleshooting information for an online help system. The DITA specification provides specialized map types; book maps represent printed publications, subject scheme maps represent taxonomic or ontological classifications, and learning maps represent formal units of instruction and assessment. However, these map types are only a starter set of map types reflecting well-defined requirements.

DITA maps establish relationships through the nesting of `<topicref>` elements and the application of the `@collection-type` attribute. Relationship tables also can be used to associate topics with each other based on membership in the same row; for example, task topics can be associated with supporting concept and reference topics by placing each group in cells of the same row. During processing, these relationships can be rendered in different ways, although they typically result in lists of "Related topics" or "For more information" links. Like many aspects of DITA, the details about how such linking relationships are presented is determined by the DITA processor.

DITA maps also define keys and organize the contexts (*key scopes*) in which key references are resolved.

3.2.2 Purpose of DITA maps

DITA maps enable the scalable reuse of content across multiple contexts. They can be used by information architects, writers, and publishers to plan, develop, and deliver content.

DITA maps support the following uses:

Defining an information architecture

Maps can be used to define the topics that are required for a particular audience, even before the topics themselves exist. DITA maps can aggregate multiple topics for a single deliverable.

Defining what topics to build for a particular output

Maps reference topics that are included in output processing. Information architects, authors, and publishers can use maps to specify a set of topics that are processed at the same time, instead of processing each topic individually. In this way, a DITA map can serve as a manifest or bill of materials.

Defining navigation

Maps can define the online navigation or table of contents for a deliverable.

Defining related links

Maps define relationships among the topics they reference. These relationships are defined by the nesting of elements in the DITA map, relationship tables, and the use of elements on which the `@collection-type` attribute is set. On output, these relationships might be expressed as related links or the hierarchy of a table of contents (TOC).

Defining an authoring context

The DITA map can define the authoring framework, providing a starting point for authoring new topics and integrating existing ones.

Defining keys and key scopes

Maps can define keys, which provide an indirect addressing mechanism that enhances portability of content. The keys are defined by `<topicref>` elements or specializations of `<topicref>` elements, such as `<keydef>`. The `<keydef>` element is a convenience element; it is a specialized type of a `<topicref>` element with the following attributes:

- A required `@keys` attribute
- A `@processing-role` attribute with a default value of "resource-only".

Maps also define the context or contexts for resolving key-based references, such as elements that specify the `@keyref` or `@conkeyref` attribute. Elements within a map structure that specify a `@keyscope` attribute create a new context for key reference resolution. Key references within such elements are resolved against the set of effective key definitions for that scope.

Specialized maps can provide additional semantics beyond those of organization, linking, and indirection. For example, the subjectScheme map specialization adds the semantics of taxonomy and ontology definition.

3.2.3 DITA map elements

A DITA map describes the relationships among a set of DITA topics. The DITA map and map-group domain elements organize topics into hierarchies, groups, and relationships; they also define keys.

A DITA map is composed of the following elements:

<map>

The `<map>` element is the root element of the DITA map.

<topicref>

The `<topicref>` elements are the basic elements of a map. A `<topicref>` element can reference a DITA topic, a DITA map, or a non-DITA resource. A `<topicref>` element also can have a title, short description, and the same kind of prolog-level metadata that is available in topics.

The `<topicref>` elements can be nested to create a hierarchy, which can be used to define a table of contents (TOC) for print output, online navigation, and parent/child links. Hierarchies can be annotated using the `@collection-type` attribute to define a particular type of relationship, such as a set of choices, a sequence, or a family. These collection types can affect link generation, and they might be interpreted differently for different outputs.

<reltable>

Relationship tables are defined with the `<reltable>` element. Relationship tables can be used to define relationships among DITA topics or among DITA topics and non-DITA resources. In a relationship table, the columns define common attributes, metadata, or information types (for example, task or troubleshooting) for the resources that are referenced in that column. The rows define relationships between the resources in different cells of the same row.

The `<relrow>`, `<relcell>`, `<relheader>`, and `<relcolspec>` elements are used to define the components of the relationship table. Relationships defined in the relationship table also can be further refined by using the `@collection-type` attribute.

<topicgroup>

The `<topicgroup>` element defines a group or collection outside of a hierarchy or relationship table. It is a convenience element that is equivalent to a `<topicref>` element without an `@href` attribute or navigation title. Groups can be combined with hierarchies and relationship tables, for example, by including a `<topicgroup>` element within a set of siblings in a hierarchy or within a table cell. The `<topicref>` elements so grouped can then share inherited attributes and linking relationships with no effect on the navigation or table of contents.

<topicmeta>

Most map-level elements, including the map itself, can contain metadata inside the `<topicmeta>` element. Metadata typically is applied to an element and its descendants.

<ux-window>

The `<ux-window>` element enables authors to define windowing information for the display of output topics that are appropriate to the delivery platform. Window management is important in user assistance and help system outputs, as well as for other hypertext and electronic delivery modes.

<topichead>

The `<topichead>` element provides a navigation title; it is a convenience element that is equivalent to a `<topicref>` element with a navigation title but no associated resource.

<anchor>

The `<anchor>` element provides an integration point that another map can reference in order to insert its navigation into the referenced map's navigation tree. For those familiar with Eclipse help systems, this serves the same purpose as the `<anchor>` element in that system. It might not be supported for all output formats.

<navref>

The `<navref>` element represents a pointer to another map which is preserved as a transcluding link in the result deliverable rather than resolved when the deliverable is produced. Output formats that support such linking can integrate the referenced resource when displaying the referencing map to an end user.

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<keydef>

Enables authors to define keys. This element is a convenience element; it is a specialization of `<topicref>` that sets the default value of the `@processing-role` attribute to "resource-only". Setting the `@processing-role` attribute to resource-only ensures that the resource referenced by the key definition is not directly included in the navigation that is defined by the map.

<mapref>

Enables authors to reference an entire DITA map, including hierarchy and relationship tables. This element is a convenience element; it is a specialization of `<topicref>` that sets the default value of the `@format` attribute to "ditamap". The `<mapref>` element represents a reference from a parent map to a subordinate map.

<topicset>

Enables authors to define a branch of navigation in a DITA map so that it can be referenced from another DITA map.

<topicsetref>

Enables authors to reference a navigation branch that is defined in the current map or in another DITA map.

<anchorref>

Enables authors to define a map fragment that is pushed to the location defined by an anchor.

3.2.4 DITA map attributes

DITA maps have unique attributes that are designed to control the way that relationships are interpreted for different output purposes. In addition, DITA maps share many metadata and linking attributes with DITA topics.

DITA maps often encode structures that are specific to a particular medium or output, for example, Web pages or a PDF document. Attributes, such as `@deliveryTarget` and `@toc`, are designed to help processors interpret the DITA map for each kind of output. Many of these attributes are not available in DITA topics; individual topics, once separated from the high-level structures and dependencies associated with a particular kind of output, should be entirely reusable regardless of the intended output format.

@collection-type

The `@collection-type` attribute specifies how the children of a `<topicref>` element relate to their parent and to each other. This attribute, which is set on the parent element, typically is used by processors to determine how to generate navigation links in the rendered topics. For example, a `@collection-type` value of "sequence" indicates that children of the specifying `<topicref>` element represent an ordered sequence of topics; processors might add numbers to the list of child topics or generate next/previous links for online presentation. This attribute is available in topics on the `<linklist>` and `<linkpool>` elements, where it has the same behavior. Where the `@collection-type` attribute is available on elements that cannot directly contain elements, the behavior of the attribute is undefined.

@linking

By default, the relationships between the topics that are referenced in a map are reciprocal:

- Child topics link to parent topics and vice versa.
- Next and previous topics in a sequence link to each other.
- Topics in a family link to their sibling topics.

- Topics referenced in the table cells of the same row in a relationship table link to each other. A topic referenced within a table cell does not (by default) link to other topics referenced in the same table cell.

This behavior can be modified by using the `@linking` attribute, which enables an author or information architect to specify how a topic should participate in a relationship. The following values are valid:

linking="none"
: Specifies that the topic does not exist in the map for the purposes of calculating links.

linking="sourceonly"
: Specifies that the topic will link to its related topics but not vice versa.

linking="targetonly"
: Specifies that the related topics will link to it but not vice versa.

linking="normal"
: Default value. It specifies that linking will be reciprocal (the topic will link to related topics, and they will link back to it).

Authors also can create links directly in a topic by using the `<xref>` or `<link>` elements, but in most cases map-based linking is preferable, because links in topics create dependencies between topics that can hinder reuse.

Note that while the relationships between the topics that are referenced in a map are reciprocal, the relationships merely *imply* reciprocal links in generated output that includes links. The rendered navigation links are a function of the presentation style that is determined by the processor.

@toc

Specifies whether topics are excluded from navigation output, such as a Web site map or an online table of contents. By default, `<topicref>` hierarchies are included in navigation output; relationship tables are excluded.

@locktitle

If `@locktitle` is set to "yes", the `<navtitle>` element is used if it is present. Otherwise, the `<navtitle>` element is ignored and the navigation title is retrieved from the referenced file.

@search

Specifies whether the topic should be included in search indexes.

@chunk

Specifies that the processor generates an interim set of DITA topics that are used as the input for the final processing. This can produce the following output results:

- Multi-topic files are transformed into smaller files, for example, individual HTML files for each DITA topic.
- Individual DITA topics are combined into a single file.

Specifying a value for the `@chunk` attribute on a `<map>` element establishes chunking behavior that applies to the entire map, unless overridden by `@chunk` attributes that are set on more specific elements in the DITA map. For a detailed description of the `@chunk` attribute and its usage, see Chunking (117).

@copy-to

In most situations, specifies whether a duplicate version of the topic is created when it is transformed. This duplicate version can be either literal or virtual. The value of the `@copy-to` attribute specifies the uniform resource identifier (URI) by which the topic can be referenced by a `@conref` attribute, `<topicref>` element, or `<xref>` element. The duplication is a convenience for output processors that use the URI of the topic to generate the base address of the output. The `@keys` and `@keyref` attributes provide an alternative mechanism; they enable references to topics in specific-use contexts.

The `@copy-to` attribute also can be used to specify the name of a new chunk when topics are being chunked; it also can be used to determine the name of the stub topic that is generated from a `<topicref>` element that contains a title but does not specify a target. In both of those cases, no duplicate version of the topic is generated.

For information on how the `@copy-to` attribute can be used with the `@chunk` attribute, see Chunking (117).

@processing-role

Specifies whether the topic or map referenced should be processed normally or treated as a resource that is only included in order to resolve key or content references.

processing-role="normal"

The topic is a readable part of the information set. It is included in navigation and search results. This is the default value for the `<topicref>` element.

processing-role="resource-only"

The topic should be used only as a resource for processing. It is not included in navigation or search results, nor is it rendered as a topic. This is the default value for the `<keydef>` element.

If the `@processing-role` attribute is not specified locally, the value cascades from the closest element in the containment hierarchy.

@cascade

Specifies whether the default rules for the cascading of metadata attributes in a DITA map apply. In addition to the following specified values, processors also **MAY** define additional values.

cascade="merge"

The metadata attributes cascade; the values of the metadata attributes are additive. This is the processing default for the `@cascade` attribute and was the only defined behavior for DITA 1.2 and earlier.

cascade="nomerge"

The metadata attributes cascade; however, they are not additive for `<topicref>` elements that specify a different value for a specific metadata attribute. If the cascading value for an attribute is already merged based on multiple ancestor elements, that merged value continues to cascade until a new value is encountered (that is, setting `cascade="nomerge"` does not undo merging that took place on ancestors).

For more information, see Example: How the cascade attribute functions (34).

@keys

Specifies one or more key names.

@keyscope

Defines a new scope for key definition and resolution, and gives the scope one or more names. For more information about key scopes, see Indirect key-based addressing (65).

Attributes in the list above are used exclusively or primarily in maps, but many important map attributes are shared with elements in topics. DITA maps also use many of the following attributes that are used with linking elements in DITA topics, such as `<link>` and `<xref>`:

- `@format`
- `@href`
- `@keyref`
- `@scope`
- `@type`

The following metadata and reuse attributes are used by both DITA maps and DITA topics:

- `@rev`, `@status`, `@importance`
- `@dir`, `@xml:lang`, `@translate`
- `@id`, `@conref`, `@conrefend`, `@conkeyref`, `@conaction`
- `@props` and any attribute specialized from `@props` (including those integrated by default in OASIS shells: `@audience`, `@deliveryTarget`, `@platform`, `@product`, `@otherprops`)
- `@search`

When new attributes are specialized from `@props` or `@base` as a domain, they can be incorporated into both map and topic structural types.

3.2.5 Examples of DITA maps

This section of the specification contains simple examples of DITA maps. The examples illustrate a few of the ways that DITA maps are used.

3.2.5.1 Example: DITA map that references a subordinate map

This example illustrates how one map can reference a subordinate map using either `<mapref>` or the basic `<topicref>` element.

The following code sample illustrates how a DITA map can use the specialized `<mapref>` element to reference another DITA map:

```
<map>
  <title>DITA work at OASIS</title>
  <topicref href="oasis-dita-technical-committees.dita">
    <topicref href="dita_technical_committee.dita"/>
    <topicref href="dita_adoption_technical_committee.dita"/>
  </topicref>
  <mapref href="oasis-processes.ditamap"/>
  <!-- ... -->
</map>
```

The `<mapref>` element is a specialized `<topicref>` intended to make it easier to reference another map; use of `<mapref>` is not required for this task. This map also could be tagged in the following way:

```
<map>
  <title>DITA work at OASIS</title>
  <topicref href="oasis-dita-technical-committees.dita">
    <topicref href="dita_technical_committee.dita"/>
    <topicref href="dita_adoption_technical_committee.dita"/>
  </topicref>
<topicref href="oasis-processes.ditamap" format="ditamap"/>
```

```
<!-- ... -->
</map>
```

With either of the above examples, during processing, the map is resolved in the following way:

```
<map>
  <title>DITA work at OASIS</title>
  <topicref href="oasis-dita-technical-committees.dita">
    <topicref href="dita_technical_committee.dita"/>
    <topicref href="dita_adoption_technical_committee.dita"/>
  </topicref>
  <!-- Contents of the oasis-processes.ditamap file -->
  <topicref href="oasis-processes.dita">
    <!-- ... -->
  </topicref>
  <!-- ... -->
</map>
```

3.2.5.2 Example: DITA map with a simple relationship table

This example illustrates how to interpret a basic three-column relationship table used to maintain links between concept, task, and reference material.

The following example contains the markup for a simple relationship table:

```
<map>
<!-- ... -->
<reltable>
  <relheader>
    <relcolspec type="concept"/>
    <relcolspec type="task"/>
    <relcolspec type="reference"/>
  </relheader>
  <relrow>
    <relcell>
      <topicref href="A.dita"/>
    </relcell>
    <relcell>
      <topicref href="B.dita"/>
    </relcell>
    <relcell>
      <topicref href="C1.dita"/>
      <topicref href="C2.dita"/>
    </relcell>
  </relrow>
</reltable>
</map>
```

A DITA-aware tool might represent the relationship table graphically:

type="concept"	type="task"	type="reference"
A	B	C1 C2

When the output is generated, the topics contain the following linkage:

A

Links to B, C1, and C2

B

Links to A, C1, and C2

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C1, C2

Links to A and B

3.2.5.3 Example: How the @collection-type and @linking attributes determine links

In this scenario, a simple map establishes basic hierarchical and relationship table links. The `@collection-type` and `@linking` attributes are then added to modify how links are generated.

The following example illustrates how linkage is defined in a DITA map:

```
<topicref href="A.dita" collection-type="sequence">
  <topicref href="A1.dita"/>
  <topicref href="A2.dita"/>
</topicref>
<reltable>
  <relrow>
    <relcell><topicref href="A.dita"/></relcell>
    <relcell><topicref href="B.dita"/></relcell>
  </relrow>
</reltable>
```

Figure 3: Simple linking example

When the output is generated, the topics contain the following linkage. Sequential (next/previous) links between A1 and A2 are present because of the `@collection-type` attribute on the parent:

A

Links to A1, A2 as children

Links to B as related

A1

Links to A as a parent

Links to A2 as next in the sequence

A2

Links to A as a parent

Links to A1 as previous in the sequence

B

Links to A as related

The following example illustrates how setting the `@linking` attribute can change the default behavior:

```
<topicref href="A.dita" collection-type="sequence">
  <topicref href="B.dita" linking="none"/>
  <topicref href="A1.dita"/>
  <topicref href="A2.dita"/>
</topicref>
<reltable>
  <relrow>
    <relcell><topicref href="A.dita"/></relcell>
    <relcell linking="sourceonly"><topicref href="B.dita"/></relcell>
  </relrow>
</reltable>
```

Figure 4: Linking example with the @linking attribute

When the output is generated, the topics contain the following linkage:

A

Links to A1, A2 as children

Does not link to B as a child or related topic

A1

Links to A as a parent

Links to A2 as next in the sequence

Does not link to B as previous in the sequence

A2

Links to A as a parent

Links to A1 as previous in the sequence

B

Links to A as a related topic

3.2.5.4 Example: How the @cascade attribute functions

The following example illustrates how the `@cascade` attribute can be used to fine tune how the values for the `@platform` attribute apply to topics referenced in a DITA map.

Here a DITA map contains a collection of topics that apply to Windows, Linux, and Macintosh OS; it also contains a topic that is only applicable to users running the application on Linux.

```
<map product="PuffinTracker" platform="win linux mac" cascade="nomerge">
  <title>Puffin Tracking Software</title>
  <topicref href="introduction.dita"/>
  <topicref href="setting-up-the-product.dita"/>
  <topicref href="linux-instructions.dita" platform="linux"/>
</map>
```

The values of the `@platform` attribute set at the map level cascade throughout the map and apply to the `introduction.dita` and `setting-up-the-product.dita` topics. However, since the value of the `@cascade` attribute is set to "nomerge", the value of the `@platform` attribute for the `linux-instructions.dita` topic does not merge with the values that cascade from above in the DITA map. The effective value of the `@platform` attribute for `linux-instructions.dita` is "linux".

The same results are produced by the following mark-up:

```
<map product="PuffinTracker" platform="win linux mac">
  <title>Puffin Tracking Software</title>
  <topicref href="introduction.dita"/>
  <topicref href="setting-up-the-product.dita"/>
  <topicref href="linux-instructions.dita" platform="linux" cascade="nomerge"/>
</map>
```

3.3 Subject scheme maps and their usage

Subject scheme maps can be used to define controlled values and subject definitions. The controlled values can be bound to attributes, as well as element and attribute pairs. The subject definitions can contain metadata and provide links to more detailed information; they can be used to classify content and provide semantics that can be used in taxonomies and ontologies.

A DITA map can reference a subject scheme map by using a `<mapref>` element. Processors also **MAY** provide parameters by which subject scheme maps are referenced.

3.3.1 Subject scheme maps

Subject scheme maps use key definitions to define collections of controlled values and subject definitions.

Controlled values are keywords that can be used as values for attributes. For example, the `@audience` attribute can take a value that identifies the users that are associated with a particular product. Typical values for a medical-equipment product line might include "therapist", "oncologist", "physicist", and "radiologist". In a subject scheme map, an information architect can define a list of these values for the `@audience` attribute. Controlled values can be used to classify content for filtering and flagging at build time.

Subject definitions are classifications and sub-classifications that compose a tree. Subject definitions provide semantics that can be used in conjunction with taxonomies and ontologies. In conjunction with the classification domain, subject definitions can be used for retrieval and traversal of the content at run time when used with information viewing applications that provide such functionality.

Key references to controlled values are resolved to a key definition using the same precedence rules as apply to any other key. However, once a key is resolved to a controlled value, that key reference does not typically result in links or generated text.

3.3.2 Defining controlled values for attributes

Subject scheme maps can define controlled values for DITA attributes without having to define specializations or constraints. The list of available values can be modified quickly to adapt to new situations.

Each controlled value is defined using a `<subjectdef>` element, which is a specialization of the `<topicref>` element. The `<subjectdef>` element is used to define both a subject category and a list of controlled values. The parent `<subjectdef>` element defines the category, and the children `<subjectdef>` elements define the controlled values.

The subject definitions can include additional information within a `<topicmeta>` element to clarify the meaning of a value:

- The `<navtitle>` element can provide a more readable value name.
- The `<shortdesc>` element can provide a definition.

In addition, the `<subjectdef>` element can reference a more detailed definition of the subject, for example, another DITA topic or an external resource..

The following behavior is expected of processors:

- Authoring tools **SHOULD** use these lists of controlled values to provide lists from which authors can select values when they specify attribute values.
- Authoring tools **MAY** give an organization a list of readable labels, a hierarchy of values to simplify selection, and a shared definition of the value.
- An editor **MAY** support accessing and displaying the content of the subject definition resource in order to provide users with a detailed explanation of the subject.
- Tools **MAY** produce a help file, PDF, or other readable catalog to help authors better understand the controlled values.

Example: Controlled values that provide additional information about the subject

The following code fragment illustrates how a subject definition can provide a richer level of information about a controlled value:

```
<subjectdef keys="terminology" href="https://www.oasis-open.org/policies-guidelines/keyword-
guidelines">
  <subjectdef keys="rfc2119" href="rfc-2119.dita">
    <topicmeta>
      <navtitle>RFC-2119 terminology</navtitle>
      <shortdesc>The normative terminology that the DITA TC uses for the DITA
specification</shortdesc>
    </topicmeta>
  </subjectdef>
  <subjectdef keys="iso" href="iso-terminology.dita">
    <topicmeta>
      <navtitle>ISO keywords</navtitle>
      <shortdesc>The normative terminology used by some other OASIS technical committees</
shortdesc>
    </topicmeta>
  </subjectdef>
</subjectdef>
```

The content of the `<navtitle>` and `<shortdesc>` elements provide additional information that a processor might display to users as they select attribute values or classify content. The resources referenced by the `@href` attributes provide even more detailed information; a processor might render clickable links as part of a user interface that implements a progressive disclosure strategy

3.3.3 Binding controlled values to an attribute

The controlled values defined in a subject scheme map can be bound to an attribute or an element and attribute pair. This affects the expected behavior for processors and authoring tools.

The `<enumerationdef>` element binds the set of controlled values to an attribute. Valid attribute values are those that are defined in the set of controlled values; invalid attribute values are those that are not defined in the set of controlled values. An enumeration can specify an empty `<subjectdef>` element. In that case, no value is valid for the attribute. An enumeration also can specify an optional default value by using the `<defaultSubject>` element.

If an enumeration is bound, processors **SHOULD** validate attribute values against the controlled values that are defined in the subject scheme map. For authoring tools, this validation prevents users from entering misspelled or undefined values. Recovery from validation errors is implementation specific.

The default attribute values that are specified in a subject scheme map apply only if a value is not otherwise specified in the DITA source or as a default value by the XML grammar.

To determine the effective value for a DITA attribute, processors check for the following in the order outlined:

1. An explicit value in the element instance
2. A default value in the XML grammar
3. Cascaded value within the document
4. Cascaded value from a higher level document to the document
5. A default controlled value, as specified in the `<defaultSubject>` element
6. A value set by processing rules

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Example: Binding a list of controlled values to the @audience attribute

The following example illustrates the use of the `<subjectdef>` element to define controlled values for types of users. It also binds the controlled values to the `@audience` attribute:

```
<subjectScheme>
  <!-- Define types of users -->
  <subjectdef keys="users">
    <subjectdef keys="therapist"/>
    <subjectdef keys="oncologist"/>
    <subjectdef keys="physicist"/>
    <subjectdef keys="radiologist"/>
  </subjectdef>

  <!-- Bind the "users" subject to the @audience attribute.
       This restricts the @audience attribute to the following
       values: therapist, oncologist, physicist, radiologist -->
  <enumerationdef>
    <attributedef name="audience"/>
    <subjectdef keyref="users"/>
  </enumerationdef>
</subjectScheme>
```

When the above subject scheme map is used, the only valid values for the `@audience` attribute are "therapist", "oncologist", "physicist", and "radiologist". Note that "users" is not a valid value for the `@audience` attribute; it merely identifies the parent or container subject.

Example: Binding an attribute to an empty set

The following code fragment declares that there are no valid values for the `@outputclass` attribute.

```
<subjectScheme>
  <enumerationdef>
    <attributedef name="outputclass"/>
    <subjectdef/>
  </enumerationdef>
</subjectScheme>
```

3.3.4 Processing controlled attribute values

An enumeration of controlled values can be defined with hierarchical levels by nesting subject definitions. This affects how processors perform filtering and flagging.

The following algorithm applies when processors apply filtering and flagging rules to attribute values that are defined as a hierarchy of controlled values and bound to an enumeration:

Processors **SHOULD** apply the following algorithm when they apply filtering and flagging rules to attribute values that are defined as a hierarchy of controlled values and bound to an enumeration:

1. If an attribute specifies a value in the taxonomy, and a DITAVAL or other categorization tool is configured with that value, the rule matches.
2. Otherwise, if the parent value in the taxonomy has a rule, that matches.
3. Otherwise, continue up the chain in the taxonomy until a matching rule is found.

The following behavior is expected of processors:

- Processors **SHOULD** be aware of the hierarchies of attribute values that are defined in subject scheme maps for purposes of filtering, flagging, or other metadata-based categorization.

- Processors **SHOULD** validate that the values of attributes that are bound to controlled values contain only valid values from those sets. (The list of controlled values is not validated by basic XML parsers.) If the controlled values are part of a named key scope, the scope name is ignored for the purpose of validating the controlled values.
- Processors **SHOULD** check that all values listed for an attribute in a DITAVAL file are bound to the attribute by the subject scheme before filtering or flagging. If a processor encounters values that are not included in the subject scheme, it **SHOULD** issue a warning.

Example: A hierarchy of controlled values and conditional processing

The following code sample shows a set of controlled values that contains a hierarchy.

```
<subjectScheme>
  <subjectdef keys="users">
    <subjectdef keys="therapist">
      <subjectdef keys="novice-therapist"/>
      <subjectdef keys="expert-therapist"/>
    </subjectdef>
    <subjectdef keys="oncologist"/>
    <subjectdef keys="physicist"/>
    <subjectdef keys="radiologist"/>
  </subjectdef>
  <enumerationdef>
    <attributedef name="audience"/>
    <subjectdef keyref="users"/>
  </enumerationdef>
</subjectScheme>
```

Processors that are aware of the hierarchy that is defined in the subject scheme map will handle filtering and flagging in the following ways:

- If "therapist" is excluded, both "novice-therapist" and "expert-therapist" are by default excluded (unless they are explicitly set to be included).
- If "therapist" is flagged and "novice-therapist" is not explicitly flagged, processors automatically should flag "novice-therapist" since it is a type of therapist.

3.3.5 Extending subject schemes

The `<schemeref>` element provides a mechanism for extending a subject scheme. This makes it possible to add new relationships to existing subjects and extend enumerations of controlled values.

The `<schemeref>` element provides a reference to another subject scheme map. Typically, the referenced subject-scheme map defines a base set of controlled values that are extended by the current subject-scheme map. The values in the referenced subject-scheme map are merged with the values in the current subject-scheme map; the result is equivalent to specifying all of the values in a single subject scheme map.

3.3.6 Scaling a list of controlled values to define a taxonomy

Optional classification elements make it possible to create a taxonomy from a list of controlled values.

A taxonomy differs from a controlled values list primarily in the degree of precision with which the metadata values are defined. A controlled values list sometimes is regarded as the simplest form of taxonomy. Regardless of whether the goal is a simple list of controlled values or a taxonomy:

- The same core elements are used: `<subjectScheme>` and `<subjectdef>`.
- A category and its subjects can have a binding that enumerates the values of an attribute.

Beyond the core elements and the attribute binding elements, sophisticated taxonomies can take advantage of some optional elements. These optional elements make it possible to specify more precise relationships among subjects. The `<hasNarrower>`, `<hasPart>`, `<hasKind>`, `<hasInstance>`, and `<hasRelated>` elements specify the kind of relationship in a hierarchy between a container subject and its contained subjects.

While users who have access to sophisticated processing tools benefit from defining taxonomies with this level of precision, other users can safely ignore this advanced markup and define taxonomies with hierarchies of `<subjectdef>` elements that are not precise about the kind of relationship between the subjects.

Example: A taxonomy defined using subject scheme elements

The following example defines San Francisco as both an instance of a city and a geographic part of California.

```
<subjectScheme>
  <hasInstance>
    <subjectdef keys="city">
      <subjectdef keys="la"/>
      <subjectdef keys="nyc"/>
      <subjectdef keys="san-francisco"/>
    </subjectdef>
    <subjectdef keys="state">
      <subjectdef keys="ca"/>
      <subjectdef keys="ny"/>
    </subjectdef>
  </hasInstance>
  <hasPart>
    <subjectdef keys="place">
      <subjectdef keyref="ca">
        <subjectdef keyref="la"/>
        <subjectdef keyref="sf"/>
      </subjectdef>
      <subjectdef keyref="ny">
        <subjectdef keyref="nyc"/>
      </subjectdef>
    </subjectdef>
  </hasPart>
</subjectScheme>
```

Sophisticated tools can use this subject scheme map to associate content about San Francisco with related content about other California places or with related content about other cities (depending on the interests of the current user).

The subject scheme map also can define relationships between subjects that are not hierarchical. For instance, cities sometimes have "sister city" relationships. An information architect could add a `<subjectRelTable>` element to define these associative relationships, with a row for each sister-city pair and the two cities in different columns in the row.

3.3.7 Classification maps

A classification map is a DITA map in which the classification domain has been made available.

The classification domain provides elements that enable map authors to indicate information about the subject matter of DITA topics. The subjects are defined in subjectScheme maps, and the map authors reference the subjects using the `@keyref` attribute.

3.3.8 Examples of subject scheme maps

This section contains examples and scenarios that illustrate the use of subject scheme maps.

3.3.8.1 Example: How hierarchies defined in a subject scheme map affect filtering

This scenario demonstrates how a processor evaluates attribute values when it performs conditional processing for an attribute that is bound to a set of controlled values.

A company defines a subject category for "Operating system", with a key set to "os". There are sub-categories for Linux, Windows, and z/OS, as well as specific Linux variants: Red Hat Linux and SuSE Linux. The company then binds the values that are enumerated in the "Operating system" category to the `@platform` attribute.

```
<subjectScheme>
    <subjectdef keys="os">
        <topicmeta>
            <navtitle>Operating systems</navtitle>
        </topicmeta>
        <subjectdef keys="linux">
            <topicmeta>
                <navtitle>Linux</navtitle>
            </topicmeta>
            <subjectdef keys="redhat">
                <topicmeta>
                    <navtitle>RedHat Linux</navtitle>
                </topicmeta>
            </subjectdef>
            <subjectdef keys="suse">
                <topicmeta>
                    <navtitle>SuSE Linux</navtitle>
                </topicmeta>
            </subjectdef>
        </subjectdef>
        <subjectdef keys="windows">
        <topicmeta>
            <navtitle>Windows</navtitle>
        </topicmeta>
    </subjectdef>
    <subjectdef keys="zos">
        <topicmeta>
            <navtitle>z/OS</navtitle>
        </topicmeta>
    </subjectdef>
    </subjectdef>
    <enumerationdef>
        <attributedef name="platform"/>
        <subjectdef keyref="os"/>
    </enumerationdef>
</subjectScheme>
```

The enumeration limits valid values for the `@platform` attribute to the following: "linux", "redhat", "suse", "windows", and "zos". If any other values are encountered, processors validating against the scheme should issue a warning.

The following table illustrates how filtering and flagging operate when the above map is processed by a processor. The first two columns provide the values specified in the DITAVAL file; the third and fourth columns indicate the results of the filtering or flagging operation

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att="platform" val="linux"	**att="platform" val="redhat"**	**How platform="redhat" is evaluated**	**How platform="linux" is evaluated**
action="exclude"	action="exclude"	Excluded.	Excluded.
	action="include" or action="flag"	Excluded. This is an error condition, because if all "linux" content is excluded, "redhat" also is excluded. Applications can recover by generating an error message.	Excluded.
	Unspecified	Excluded, because "redhat" is a kind of "linux", and "linux" is excluded.	Excluded.
action="include"	action="exclude"	Excluded, because all "redhat" content is excluded.	Included.
	action="include"	Included.	Included.
	action="flag"	Included and flagged with the "redhat" flag.	Included.
	Unspecified	Included, because all "linux" content is included.	Included.
action="flag"	action="exclude"	Excluded, because all "redhat" content is excluded.	Included and flagged with the "linux" flag.
	action="include"	Included and flagged with the "linux" flag, because "linux" is flagged and "redhat" is a type of "linux".	Included and flagged with the "linux" flag.
	action="flag"	Included and flagged with the "redhat" flag, because a flag is available that is specifically for "redhat".	Included and flagged with the "linux" flag.
	Unspecified	Included and flagged with the "linux" flag, because "linux" is flagged and "redhat" is a type of linux	Included and flagged with the "linux" flag.

att="platform" val="linux"	**att="platform" val="redhat"**	**How platform="redhat" is evaluated**	**How platform="linux" is evaluated**
Unspecified	action="exclude"	Excluded, because all "redhat" content is excluded	If the default for `@platform` values is "include", this is included. If the default for `@platform` values is "exclude", this is excluded.
	action="include"	Included.	Included, because all "redhat" content is included, and general Linux content also applies to RedHat
	action="flag"	Included and flagged with the "redhat" flag.	Included, because all "redhat" content is included, and general Linux content also applies to RedHat
	Unspecified	If the default for `@platform` values is "include", this is included. If the default for `@platform` values is "exclude", this is excluded.	If the default for `@platform` values is "include", this is included. If the default for `@platform` values is "exclude", this is excluded.

3.3.8.2 Example: Extending a subject scheme

You can extend a subject scheme by creating another subject scheme map and referencing the original map using a `<schemeref>` element. This enables information architects to add new relationships to existing subjects and extend enumerations of controlled values.

A company uses a common subject scheme map (`baseOS.ditamap`) to set the values for the `@platform` attribute.

```
<subjectScheme>
    <subjectdef keys="os">
        <topicmeta>
            <navtitle>Operating systems</navtitle>
        </topicmeta>
        <subjectdef keys="linux">
            <topicmeta>
                <navtitle>Linux</navtitle>
            </topicmeta>
            <subjectdef keys="redhat">
                <topicmeta>
                    <navtitle>RedHat Linux</navtitle>
                </topicmeta>
            </subjectdef>
            <subjectdef keys="suse">
                <topicmeta>
                    <navtitle>SuSE Linux</navtitle>
                </topicmeta>
            </subjectdef>
        </subjectdef>
        <subjectdef keys="windows">
        <topicmeta>
            <navtitle>Windows</navtitle>
        </topicmeta>
    </subjectdef>
    <subjectdef keys="zos">
        <topicmeta>
            <navtitle>z/OS</navtitle>
        </topicmeta>
    </subjectdef>
    </subjectdef>
    <enumerationdef>
        <attributedef name="platform"/>
        <subjectdef keyref="os"/>
    </enumerationdef>
</subjectScheme>
```

The following subject scheme map extends the enumeration defined in `baseOS.ditamap`. It adds "macos" as a child of the existing "os" subject; it also adds special versions of Windows as children of the existing "windows" subject:

```
<subjectScheme>
  <schemeref href="baseOS.ditamap"/>
  <subjectdef keyref="os">
    <subjectdef keys="macos"/>
    <subjectdef keyref="windows">
      <subjectdef keys="winxp"/>
      <subjectdef keys="winvis"/>
    </subjectdef>
  </subjectdef>
</subjectScheme>
```

Note that the references to the subjects that are defined in `baseOS.ditamap` use the `@keyref` attribute. This avoids duplicate definitions of the keys and ensures that the new subjects are added to the base enumeration.

The effective result is the same as the following subject scheme map:

```
<subjectScheme>
  <subjectdef keys="os">
    <subjectdef keys="linux">
      <subjectdef keys="redhat"/>
      <subjectdef keys="suse"/>
    </subjectdef>
    <subjectdef keys="macos">
    <subjectdef keys="windows">
      <subjectdef keys="winxp"/>
      <subjectdef keys="winvis"/>
    </subjectdef>
    <subjectdef keys="zos"/>
  </subjectdef>
  <enumerationdef>
    <attributedef name="platform"/>
    <subjectdef keyref="os"/>
  </enumerationdef>
</subjectScheme>
```

3.3.8.3 Example: Extending a subject scheme upwards

You can broaden the scope of a subject category by creating a new subject scheme map that defines the original subject category as a child of a broader category.

The following subject scheme map creates a "Software" category that includes operating systems as well as applications. The subject scheme map that defines the operation system subjects is pulled in by reference, while the application subjects are defined directly in the subject scheme map below.

```
<subjectScheme>
  <schemeref href="baseOS.ditamap"/>
  <subjectdef keys="software">
    <subjectdef keyref="os"/>
    <subjectdef keys="applications">
      <subjectdef keys="apache-web-server""/>
      <subjectdef keys="my-sql"/>
    </subjectdef>
  </subjectdef>
</subjectScheme>
```

If the subject scheme that is defined in `baseOS.ditamap` binds the "os" subject to the `@platform` attribute, the app subjects that are defined in the extension subject scheme do not become part of that enumeration, since they are not part of the "os" subject

To enable the upward extension of an enumeration, information architects can define the controlled values in one subject scheme map and bind the controlled values to the attribute in another subject scheme map. This approach will let information architects bind an attribute to a different set of controlled values with less rework.

An adopter would use the extension subject scheme as the subject scheme that governs the controlled values. Any subject scheme maps that are referenced by the extension subject scheme are effectively part of the extension subject scheme.

3.3.8.4 Example: Defining values for @deliveryTarget

You can use a subject scheme map to define the values for the `@deliveryTarget` attribute. This filtering attribute, which is new in DITA 1.3, is intended for use with a set of hierarchical, controlled values.

In this scenario, one department produces electronic publications (EPUB, EPUB2, EPUB3, Kindle, etc.) while another department produces traditional, print-focused output. Each department needs to exclude a certain category of content when they build documentation deliverables.

The following subject scheme map provides a set of values for the `@deliveryTarget` attribute that accommodates the needs of both departments.

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE subjectScheme PUBLIC "-//OASIS//DTD DITA Subject Scheme Map//EN"
"subjectScheme.dtd">
<subjectScheme>
  <subjectHead>
    <subjectHeadMeta>
      <navtitle>Example of values for the @deliveryTarget attribute</navtitle>
      <shortdesc>Provides a set of values for use with the
        @deliveryTarget conditional-processing attribute. This set of values is
        illustrative only; you can use any values with the @deliveryTarget
        attribute.</shortdesc>
    </subjectHeadMeta>
  </subjectHead>
  <subjectdef keys="deliveryTargetValues">
    <topicmeta><navtitle>Values for @deliveryTarget attributes</navtitle></topicmeta>
    <!-- A tree of related values -->
    <subjectdef keys="print">
      <topicmeta><navtitle>Print-primary deliverables</navtitle></topicmeta>
      <subjectdef keys="pdf">
        <topicmeta><navtitle>PDF</navtitle></topicmeta>
      </subjectdef>
      <subjectdef keys="css-print">
        <topicmeta><navtitle>CSS for print</navtitle></topicmeta>
      </subjectdef>
      <subjectdef keys="xsl-fo">
        <topicmeta><navtitle>XSL-FO</navtitle></topicmeta>
      </subjectdef>
      <subjectdef keys="afp">
        <topicmeta><navtitle>Advanced Function Printing</navtitle></topicmeta>
      </subjectdef>
      <subjectdef keys="ms-word">
        <topicmeta><navtitle>Microsoft Word</navtitle></topicmeta>
      </subjectdef>
      <subjectdef keys="indesign">
        <topicmeta><navtitle>Adobe InDesign</navtitle></topicmeta>
      </subjectdef>
      <subjectdef keys="open-office">
        <topicmeta><navtitle>Open Office</navtitle></topicmeta>
      </subjectdef>
    </subjectdef>
    <subjectdef keys="online">
      <topicmeta><navtitle>Online deliverables</navtitle></topicmeta>
      <subjectdef keys="html-based">
        <topicmeta><navtitle>HTML-based deliverables</navtitle></topicmeta>
        <subjectdef keys="html">
          <topicmeta><navtitle>HTML</navtitle></topicmeta>
          <subjectdef keys="html5">
            <topicmeta><navtitle>HTML5</navtitle></topicmeta>
          </subjectdef>
        </subjectdef>
        <subjectdef keys="help">
          <topicmeta><navtitle>Contextual help</navtitle></topicmeta>
          <subjectdef keys="htmlhelp">
            <topicmeta><navtitle>HTML Help</navtitle></topicmeta>
          </subjectdef>
          <subjectdef keys="webhelp">
            <topicmeta><navtitle>Web help</navtitle></topicmeta>
          </subjectdef>
          <subjectdef keys="javahelp">
            <topicmeta><navtitle>Java Help</navtitle></topicmeta>
          </subjectdef>
          <subjectdef keys="eclipseinfocenter">
            <topicmeta><navtitle>Eclipse InfoCenter</navtitle></topicmeta>
          </subjectdef>
        </subjectdef>
        <subjectdef keys="epub">
          <topicmeta><navtitle>EPUB</navtitle></topicmeta>
          <subjectdef keys="epub2">
            <topicmeta><navtitle>EPUB2</navtitle></topicmeta>
          </subjectdef>
          <subjectdef keys="epub3">
            <topicmeta><navtitle>EPUB3</navtitle></topicmeta>
          </subjectdef>
          <subjectdef keys="ibooks">
            <topicmeta><navtitle>iBooks</navtitle></topicmeta>
          </subjectdef>
          <subjectdef keys="nook">
            <topicmeta><navtitle>nook</navtitle></topicmeta>
          </subjectdef>
        </subjectdef>
        <subjectdef keys="kindle">
          <topicmeta><navtitle>Amazon Kindle</navtitle></topicmeta>
          <subjectdef keys="kindle8">
            <topicmeta><navtitle>Kindle Version 8</navtitle></topicmeta>
          </subjectdef>
        </subjectdef>
      </subjectdef>
    </subjectdef>
  </subjectdef>
  <enumerationdef>
    <attributedef name="deliveryTarget"/>
    <subjectdef   keyref="deliveryTargetValues"/>
  </enumerationdef>
</subjectScheme>
```

3.4 DITA metadata

Metadata can be applied in both DITA topics and DITA maps. Metadata that is assigned in DITA topics can be supplemented or overridden by metadata that is assigned in a DITA map; this design facilitates the reuse of DITA topics in different DITA maps and use-specific contexts.

3.4.1 Metadata elements

The metadata elements, many of which map to Dublin core metadata, are available in topics and DITA maps. This design enables authors and information architects to use identical metadata markup in both topics and maps.

The `<metadata>` element is a wrapper element that contains many of the metadata elements. In topics, the `<metadata>` element is available in the `<prolog>` element. In maps, the `<metadata>` element is available in the `<topicmeta>` element.

In DITA maps, the metadata elements also are available directly in the `<topicmeta>` element. Collections of metadata can be shared between DITA maps and topics by using the conref or keyref mechanism.

In general, specifying metadata in a `<topicmeta>` element is equivalent to specifying it in the `<prolog>` element of a referenced topic. The value of specifying the metadata at the map level is that the topic then can be reused in other maps where different metadata might apply. Many items in the `<topicmeta>` element also cascade to nested `<topicref>` elements within the map.

Note: Not all metadata elements are available in the `<metadata>` element. However, they are available in either the topic `<prolog>` element or the map `<topicmeta>` element.

Note: Not all metadata elements are available in the `<metadata>` element. However, they are available in either the topic `<prolog>` element or the map `<topicmeta>` element.

Related information

Dublin Core Metadata Initiative (DCMI)

3.4.2 Metadata attributes

Certain attributes are common across most DITA elements. These attributes support content referencing, conditional processing, application of metadata, and globalization and localization.

3.4.2.1 Conditional processing attributes

The metadata attributes specify properties of the content that can be used to determine how the content should be processed. Specialized metadata attributes can be defined to enable specific business-processing needs, such as semantic processing and data mining.

Metadata attributes typically are used for the following purposes:

- Filtering content based on the attribute values, for example, to suppress or publish profiled content
- Flagging content based on the attribute values, for example, to highlight specific content on output
- Performing custom processing, for example, to extract business-critical data and store it in a database

Typically `@audience`, `@platform`, `@product`, `@otherprops`, `@props`, `@deliveryTarget`, and specializations of the `@props` attributes are used for filtering; the same attributes plus the `@rev` attribute are used for flagging. The `@status` and `@importance` attributes, as well as custom attributes specialized from `@base`, are used for application-specific behavior, such as identifying metadata to aid in search and retrieval.

Filtering and flagging attributes

The following conditional-processing attributes are available on most elements:

@product
: The product that is the subject of the discussion.

@platform
: The platform on which the product is deployed.

@audience
: The intended audience of the content.

@deliveryTarget
: The intended delivery target of the content, for example "html", "pdf", or "epub".

  The `@deliveryTarget` attribute is specialized from the `@props` attribute. It is defined in the deliveryTargetAttDomain, which is integrated into all OASIS-provided document-type shells. If this domain is not integrated into a given document-type shell, the `@deliveryTarget` attribute will not be available.

@rev
: The revision or draft number of the current document. (This is used only for flagging.)

@otherprops
: Other properties that do not require semantic identification.

@props
: A generic conditional processing attribute that can be specialized to create new semantic conditional-processing attributes.

Other metadata attributes

Other attributes are still considered metadata on an element, but they are not designed for filtering or flagging.

@importance
: The degree of priority of the content. This attribute takes a single value from an enumeration.

@status
: The current state of the content. This attribute takes a single value from an enumeration.

@base
: A generic attribute that has no specific purpose, but is intended to act as the basis for specialized attributes that have a simple value syntax like the conditional processing attributes (one or more alphanumeric values separated by whitespace or parenthesized groups of values).

@outputclass
: Provides a label on one or more element instances, typically to specify a role or other semantic distinction. As the `@outputclass` attribute does not provide a formal type declaration or the structural consistency of specialization, it should be used sparingly, usually only as a temporary

measure while a specialization is developed. For example, `<uicontrol>` elements that define button labels could be distinguished by adding an `@outputclass` attribute:

```
<uicontrol outputclass="button">Cancel</uicontrol>
```

The value of the `@outputclass` attribute can be used to trigger XSLT or CSS rules, while providing a mapping to be used for future migration to a more specialized set of user interface elements.

Related concepts

5.5.3 Conditional processing (profiling) (97)
Conditional processing, also known as profiling, is the filtering or flagging of information based on processing-time criteria.

Related reference

8.8.8.1.2 Metadata attribute group (357)
The metadata attribute group includes common metadata attributes, several of which support conditional processing (filtering and flagging) or the creation of new attribute domain specializations.

8.8.7.2 DITAVAL elements (347)
A conditional processing profile (DITAVAL file) is used to identify which values are to be used for conditional processing during a particular output, build, or some other purpose. The profile should have an extension of `.ditaval`.

3.4.2.2 Translation and localization attributes

DITA elements have several attributes that support localization and translation.

@xml:lang

Identifies the language of the content, using the standard language and country codes. For instance, French Canadian is identified by the value fr-CA. The `@xml:lang` attribute asserts that all content and attribute values within the element bearing the attribute are in the specified language, except for contained elements that declare a different language.

@translate

Determines whether the element requires translation. A default value can often be inferred from the element type. For example, `<apiname>` might be untranslated by default, whereas `<p>` might be translated by default.

@dir

Determines the direction in which the content should be rendered.

3.4.2.3 Architectural attributes

The architectural attributes specify the version of DITA that the content supports; they also identify the DITA domains, structural types, and specializations that are in use by the content.

The architectural attributes should not be marked up in the source DITA map and topics. Instead, the values of the architectural attributes are handled by the processor when the content is processed, preferably through defaults set in the XML grammar. This practice ensures that the DITA content instances do not specify invalid values for the architectural attributes.

The architectural attributes are as follows:

@class

This attribute identifies the specialization hierarchy for the element type. Every DITA element (except the `<dita>` element that is used as the root of a ditabase document) **MUST** declare a `@class` attribute.

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@domains

This attribute identifies the domain modules (and optionally the structural modules) that are used in a map or topic. Each module also declares its module dependencies. The root element of every topic and map **MUST** declare a `@domains` attribute.

@DITAArchVersion

This attribute identifies the version of the DITA architecture that is used by the XML grammar. The root element of every topic and map **MUST** declare a `@DITAArchVersion` attribute. The attribute is declared in a DITA namespace to allow namespace-sensitive tools to detect DITA markup.

To make the document instance usable in the absence of an XML grammar, a normalization process can set the architectural attributes in the document instance.

Related concepts

5.5.7 Processing documents with different values of the domains attribute (125)
When DITA elements are copied from one document to another, processors need to determine the validity of the copied elements. This copying might occur as the result of a content reference (conref) or key reference (keyref), or it might occur in the context of an author editing a DITA document.

3.4.3 Metadata in maps and topics

Topic metadata can be specified in a DITA map as well as in the topics that the map references. By default, metadata in the map supplements or overrides metadata that is specified at the topic level, unless the `@lockmeta` attribute of the `<topicmeta>` element is set to "no".

Where metadata about topics can be specified

Information about topics can be specified as metadata on the map, as attributes on the `<topicref>` element, or as metadata attributes or elements in the topic itself:

DITA map: Metadata elements

At the map level, properties can be set by using metadata elements. They can be set for an individual topic, for a set of topics, or globally for the entire document. The metadata elements are authored within a `<topicmeta>` element, which associates metadata with the parent element and its children. Because the topics in a branch of the hierarchy typically have some common subjects or properties, this is a convenient mechanism to define properties for a set of topics. For example, the `<topicmeta>` element in a `<relcolspec>` can associate metadata with all the topics that are referenced in the `<reltable>` column.

A map can override or supplement everything about a topic except its primary title and body content. All the metadata elements that are available in a topic also are available in a map. In addition, a map can provide alternate titles and a short description. The alternate titles can override their equivalent titles in the topic. The short description in the map **MAY** override the short description in the topic if the `<topicref>` element specifies a `@copy-to` attribute.

DITA map: Attributes of the <topicref> element

At the map level, properties can be set as attributes of the `<topicref>` element.

DITA topic

Within a topic, authors can either set metadata attributes on the root element or add metadata elements in the `<prolog>` element.

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How metadata set at both the map and topic level intersects

In a topic, the metadata elements apply to the entire topic. In a map, they supplement or override any metadata that is provided in the referenced topics. When the same metadata element or attribute is specified in both a map and a topic, by default the value in the map takes precedence; the assumption here is that the author of the map has more knowledge of the reusing context than the author of the topic. The `@lockmeta` attribute on the `<topicmeta>` element controls whether map-specified values override values in the referenced topic.

The `<navtitle>` element is an exception to the rule of how metadata specified by the `<topicmeta>` element cascades. The content of the `<navtitle>` element is used as a navigation title only if the `@locktitle` attribute of the parent `<topicref>` element is set to "yes".

3.4.4 Cascading of metadata attributes in a DITA map

Certain map-level attributes cascade throughout a map, which facilitates attribute and metadata management. When attributes *cascade*, they apply to the elements that are children of the element where the attributes were specified. Cascading applies to a containment hierarchy, as opposed to a element-type hierarchy.

The following attributes cascade when set on the `<map>` element or when set within a map:

- `@rev`
- `@props` and any attribute specialized from `@props` (including those integrated by default in OASIS shells: `@audience`, `@deliveryTarget`, `@platform`, `@product`, `@otherprops`)
- `@linking`, `@toc`, `@search`
- `@format`, `@scope`, `@type`
- `@xml:lang`, `@dir`, `@translate`
- `@processing-role`
- `@cascade`

Cascading is additive for attributes that accept multiple values, except when the `@cascade` attribute is set to avoid adding values to attributes. For attributes that take a single value, the closest value defined on a containing element takes effect. In a relationship table, row-level metadata is considered more specific than column-level metadata, as shown in the following containment hierarchy:

- `<map>` (most general)
  - `<topicref>` container (more specific)
    - `<topicref>` (most specific)
  - `<reltable>` (more specific)
    - `<relcolspec>` (more specific)
      - `<relrow>` (more specific)
        - `<topicref>` (most specific)

Merging of cascading attributes

The `@cascade` attribute can be used to modify the additive nature of attribute cascading (though it does not turn off cascading altogether). The attribute has two predefined values: "merge" and "nomerge".

cascade="merge"

The metadata attributes cascade; the values of the metadata attributes are additive. This is the processing default for the `@cascade` attribute and was the only defined behavior for DITA 1.2 and earlier.

cascade="nomerge"

The metadata attributes cascade; however, they are not additive for `<topicref>` elements that specify a different value for a specific metadata attribute. If the cascading value for an attribute is already merged based on multiple ancestor elements, that merged value continues to cascade until a new value is encountered (that is, setting `cascade="nomerge"` does not undo merging that took place on ancestors).

Implementers **MAY** define their own custom, implementation-specific tokens. To avoid name conflicts between implementations or with future additions to the standard, implementation-specific tokens **SHOULD** consist of a prefix that gives the name or an abbreviation for the implementation followed by a colon followed by the token or method name.

For example, a processor might define the token "appToken:audience" in order to specify cascading and merging behaviors for **only** the `@audience` attribute. The following rules apply:

- The predefined values for the `@cascade` attribute **MUST** precede any implementation-specific tokens, for example, `cascade="merge appToken:audience"`.
- Tokens can apply to a set of attributes, specified as part of the `@cascade` value. In that case, the syntax for specifying those values consists of the implementation-specific token, followed by a parenthetical group that uses the same syntax as groups within the `@audience`, `@platform`, `@product`, and `@otherprops` attributes. For example, a token that applies to only `@platform` and `@product` could be specified as `cascade="appname:token(platform product)"`.

Examples of the @cascade attribute in use

Consider the following code examples:

```
<map audience="a b" cascade="merge">
     <topicref href="topic.dita" audience="c"/>
</map>
```

Figure 5: Map A

```
<map audience="a b" cascade="nomerge">
     <topicref href="topic.dita" audience="c"/>
</map>
```

Figure 6: Map B

For map A, the values for the attribute are merged, and the effective value of the `@audience` attribute for `topic.dita` is "a b c". For map B, the values for the attribute are not additive, and the effective value of the `@audience` attribute for `topic.dita` is "c".

In the following example, merging is active at the map level but turned off below:

```
<map platform="a" product="x" cascade="merge">
  <topicref href="one.dita" platform="b" product="y">
    <topicref href="two.dita" cascade="nomerge" product="z"/>
  </topicref>
</map>
```

Figure 7: Map C

In map C, the reference to `one.dita` has effective merged values of "a b" for `@platform` and "x y" for `@product`.

The reference to `two.dita` turns off merging, so the explicit `@product` value of "z" is used (it does not merge with ancestor values). The `@platform` attribute is not present, so the already-merged value of "a b" continues to cascade and is the effective value of `@platform` on this reference.

Order for processing cascading attributes in a map

When determining the value of an attribute, processors **MUST** evaluate each attribute on each individual element in a specific order; this order is specified in the following list. Applications **MUST** continue through the list until a value is established or until the end of the list is reached (at which point no value is established for the attribute). In essence, the list provides instructions on how processors can construct a map where all attribute values are set and all cascading is complete.

For example, in the case of `<topicref toc="yes">`, applications **MUST** stop at item 2 (52) in the list; a value is specified for `@toc` in the document instance, so `@toc` values from containing elements will not cascade to that specific `<topicref>` element. The `toc="yes"` setting on that `<topicref>` element will cascade to contained elements, provided those elements reach item 5 (52) below when evaluating the `@toc` attribute.

For attributes within a map, the following processing order **MUST** occur:

1. The `@conref` and `@keyref` attributes are evaluated.
2. The explicit values specified in the document instance are evaluated. For example, a `<topicref>` element with the `@toc` attribute set to "no" will use that value.
3. The default or fixed attribute values are evaluated. For example, the `@toc` attribute on the `<reltable>` element has a default value of "no".
4. The default values that are supplied by a controlled values file are evaluated.
5. The attributes cascade.
6. The processing-supplied default values are applied.
7. After the attributes are resolved within the map, they cascade to referenced maps.

Note: The processing-supplied default values do not cascade to other maps. For example, most processors will supply a default value of `toc="yes"` when no `@toc` attribute is specified. However, a processor-supplied default of `toc="yes"` **MUST** not override a value of `toc="no"` that is set on a referenced map. If the `toc="yes"` value is explicitly specified, is given as a default through a DTD, XSD, RNG, or controlled values file, or cascades from a containing element in the map, it **MUST** override a `toc="no"` setting on the referenced map. See Map-to-map cascading behaviors (56) for more details.

Note: The processing-supplied default values do not cascade to other maps. For example, most processors will supply a default value of `toc="yes"` when no `@toc` attribute is specified. However, a processor-supplied default of `toc="yes"` **MUST** not override a value of `toc="no"` that is set on a referenced map. If the `toc="yes"` value is explicitly specified, is given as a default through a DTD, XSD, RNG, or controlled values file, or cascades from a containing

element in the map, it **MUST** override a `toc="no"` setting on the referenced map. See Map-to-map cascading behaviors (56) for more details.

8. Repeat steps 1 (52) to 4 (52) for each referenced map.
9. The attributes cascade within each referenced map.
10. The processing-supplied default values are applied within each referenced map.
11. Repeat the process for maps referenced within the referenced maps.

Related reference

8.8.3.1.3 topicmeta (241)

Topic metadata is metadata that applies to a topic based on its context in a map.

3.4.5 Reconciling topic and map metadata elements

The `<topicmeta>` element in maps contains numerous elements that can be used to declare metadata. These metadata elements have an effect on the parent `<topicref>` element, any child `<topicref>` elements, and – if a direct child of the `<map>` element – on the map as a whole.

For each element that can be contained in the `<topicmeta>` element, the following table addresses the following questions:

How does it apply to the topic?

This column describes how the metadata specified within the `<topicmeta>` element interacts with the metadata specified in the topic. In most cases, the properties are additive. For example, when the `<audience>` element is set to "user" at the map level, the value "user" is added during processing to any audience metadata that is specified within the topic.

Does it cascade to other topics in the map?

This column indicates whether the specified metadata value cascades to nested `<topicref>` elements. For example, when an `<audience>` element is set to "user" at the map level, all child `<topicref>` elements implicitly have an `<audience>` element set to "user" also. Elements that can apply only to the specific `<topicref>` element, such as `<linktext>`, do not cascade.

What is the purpose when specified on the <map> element?

The map element allows metadata to be specified for the entire map. This column describes what effect, if any, an element has when specified at this level.

Table 1: Topicmeta elements and their properties

Element	How does it apply to the topic?	Does it cascade to child `<topicref>` elements?	What is the purpose when set on the `<map>` element?
`<audience>`	Add to the topic	Yes	Specify an audience for the entire map
`<author>`	Add to the topic	Yes	Specify an author for the entire map
`<category>`	Add to the topic	Yes	Specify a category for the entire map
`<copyright>`	Add to the topic	Yes	Specify a copyright for the entire map
`<critdates>`	Add to the topic	Yes	Specify critical dates for the entire map

Element	How does it apply to the topic?	Does it cascade to child `<topicref>` elements?	What is the purpose when set on the `<map>` element?
`<data>`	Add to the topic	No, unless specialized for a purpose that cascades	No stated purpose, until the element is specialized
`<data-about>`	Add the property to the specified target	No, unless specialized for a purpose that cascades	No stated purpose, until the element is specified
`<foreign>`	Add to the topic	No, unless specialized for a purpose that cascades	No stated purpose, until the element is specified
`<keywords>`	Add to the topic	No	No stated purpose
`<linktext>`	Not added to the topic; applies only to links created based on this occurrence in the map	No	No stated purpose
`<metadata>`	Add to the topic	Yes	Specify metadata for the entire map
`<navtitle>`	Not added to the topic; applies only to navigation that is created based on this occurrence in the map. The navigation title will be used whenever the `@locktitle` attribute on the containing `<topicref>` element is set to "yes".	No	No stated purpose
`<othermeta>`	Add to the topic	No	Define metadata for the entire map
`<permissions>`	Add to the topic	Yes	Specify permissions for the entire map
`<prodinfo>`	Add to the topic	Yes	Specify product info for the entire map
`<publisher>`	Add to the topic	Yes	Specify a publisher for the map
`<resourceid>`	Add to the topic	No	Specify a resource ID for the map

Element	How does it apply to the topic?	Does it cascade to child `<topicref>` elements?	What is the purpose when set on the `<map>` element?
`<searchtitle>`	Replace the one in the topic. If multiple `<searchtitle>` elements are specified for a single target, processors can choose to issue a warning.	No	No stated purpose
`<shortdesc>`	Only added to the topic when the `<topicref>` element specifies a `@copy-to` attribute. Otherwise, it applies only to links created based on this occurrence in the map. **Note:** Processors **MAY** or **MAY NOT** implement this behavior. **Note:** Processors **MAY** or **MAY NOT** implement this behavior.	No	Provide a description of the map
`<source>`	Add to the topic	No	Specify a source for the map
`<unknown>`	Add to the topic	No, unless specialized for a purpose that cascades	No stated purpose, until the element is specified
`<ux-window>`	Not added to the topic	No	Definitions are global, so setting at map level is equivalent to setting anywhere else.

Example of metadata elements cascading in a DITA map

The following code sample illustrates how an information architect can apply certain metadata to all the DITA topics in a map:

```
<map title="DITA maps" xml:lang="en-us">
    <topicmeta>
        <author>Kristen James Eberlein</author>
        <copyright>
            <copyryear year="2009"/>
            <copyrholder>OASIS</copyrholder>
        </copyright>
    </topicmeta>
    <topicref href="dita_maps.dita">
        <topicref href="definition_ditamaps.dita"/>
        <topicref href="purpose_ditamaps.dita"/>
        <!-- ... -->
      </topicref>
</map>
```

The author and copyright information cascades to each of the DITA topics referenced in the DITA map. When the DITA map is processed to XHTML, for example, each XHTML file contains the metadata information.

Related reference

8.8.3.1.3 topicmeta (241)
Topic metadata is metadata that applies to a topic based on its context in a map.

3.4.6 Map-to-map cascading behaviors

When a DITA map (or branch of a DITA map) is referenced by another DITA map, by default, certain rules apply. These rules pertain to the cascading behaviors of attributes, metadata elements, and roles assigned to content (for example, the role of "Chapter" assigned by a `<chapter>` element). Attributes and elements that cascade within a map generally follow the same rules when cascading from one map to another map, but there are some exceptions and additional rules that apply.

3.4.6.1 Cascading of attributes from map to map

Certain elements cascade from map to map, although some of the attributes that cascade within a map do not cascade from map to map.

The following attributes cascade from map to map:

- `@rev`
- `@props` and any attribute specialized from `@props` (including those integrated by default in OASIS shells: `@audience`, `@deliveryTarget`, `@platform`, `@product`, `@otherprops`)
- `@linking`, `@toc`, `@print`, `@search`
- `@type`
- `@translate`
- `@processing-role`
- `@cascade`

Note that the above list excludes the following attributes:

@format

The `@format` attribute must be set to "ditamap" in order to reference a map or a branch of a map, so it cannot cascade through to the referenced map.

@xml:lang and @dir

Cascading behavior for `@xml:lang` is defined in The xml:lang attribute (122). The `@dir` attribute work the same way.

@scope

The value of the `@scope` attribute describes the map itself, rather than the content. When the `@scope` attribute is set to "external", it indicates that the referenced map itself is external and unavailable, so the value cannot cascade into that referenced map.

The `@class` attribute is used to determine the processing roles that cascade from map to map. See Cascading of roles from map to map (58) for more information.

As with values that cascade within a map, the cascading is additive if the attribute permits multiple values (such as `@audience`). When the attribute only permits one value, the cascading value overrides the top-level element.

Example of attributes cascading between maps

For example, assume the following references in `test.ditamap`:

```
<map>
  <topicref href="a.ditamap" format="ditamap" toc="no"/>
  <mapref   href="b.ditamap" audience="developer"/>
  <mapref   href="c.ditamap#branch2" platform="myPlatform"/>
</map>
```

- The map `a.ditamap` is treated as if `toc="no"` is specified on the root `<map>` element. This means that the topics that are referenced by `a.ditamap` do not appear in the navigation generated by `test.ditamap` (except for branches within the map that explicitly set `toc="yes"`).
- The map `b.ditamap` is treated as if `audience="developer"` is set on the root `<map>` element. If the `@audience` attribute is already set on the root `<map>` element within `b.ditamap`, the value "developer" is added to any existing values.
- The element with `id="branch2"` within the map `c.ditamap` is treated as if `platform="myPlatform"` is specified on that element. If the `@platform` attribute is already specified on the element with `id="branch"`, the value "myPlatform" is added to existing values.

3.4.6.2 Cascading of metadata elements from map to map

Elements that are contained within `<topicmeta>` or `<metadata>` elements follow the same rules for cascading from map to map as the rules that apply within a single DITA map.

For a complete list of which elements cascade within a map, see the column "Does it cascade to child `<topicref>` elements?" in the topic Reconciling topic and map metadata elements (53).

Note: It is possible that a specialization might define metadata that should replace rather than add to metadata in the referenced map, but DITA (by default) does not currently support this behavior.

Note: It is possible that a specialization might define metadata that should replace rather than add to metadata in the referenced map, but DITA (by default) does not currently support this behavior.

For example, consider the following code examples:

```
<map>
    <topicref href="a.ditamap" format="ditamap">
        <topicmeta>
            <shortdesc>This map contains information about Acme defects.</shortdesc>
        </topicmeta>
    </topicref>
    <topicref href="b.ditamap" format="ditamap">
        <topicmeta>
            <audience type="programmer"/>
        </topicmeta>
    </topicref>
    <mapref href="c.ditamap" format="ditamap"/>
    <mapref href="d.ditamap" format="ditamap"/>
    </map>
```

Figure 8: `test-2.ditamap`

```
<map>
    <topicmeta>
        <audience type="writer"/>
    </topicmeta>
    <topicref href="b-1.dita"/>
    <topicref href="b-2.dita"/>
</map>
```

Figure 9: `b.ditamap`

When `test-2.ditamap` is processed, the following behavior occurs:

- Because the `<shortdesc>` element does not cascade, it does not apply to the DITA topics that are referenced in `a.ditamap`.
- Because the `<audience>` element cascades, the `<audience>` element in the reference to `b.ditamap` combines with the `<audience>` element that is specified at the top level of `b.ditamap`. The result is that the `b-1.dita` topic and `b-2.dita` topic are processed as though hey each contained the following child `<topicmeta>` element:

  ```
  <topicmeta>
      <audience type="programmer"/>
      <audience type="writer"/>
  </topicmeta>
  ```

3.4.6.3 Cascading of roles from map to map

When specialized `<topicref>` elements (such as `<chapter>` or `<mapref>`) reference a map, they typically imply a semantic role for the referenced content.

The semantic role reflects the `@class` hierarchy of the referencing `<topicref>` element; it is equivalent to having the `@class` attribute from the referencing `<topicref>` cascade to the top-level `<topicref>` elements in the referenced map. Although this cascade behavior is not universal, there are general guidelines for when `@class` values should be replaced.

When a `<topicref>` element or a specialization of a `<topicref>` element references a DITA resource, it defines a role for that resource. In some cases this role is straightforward, such as when a `<topicref>` element references a DITA topic (giving it the already known role of "topic"), or when a `<mapref>` element references a DITA map (giving it the role of "DITA map").

Unless otherwise instructed, a specialized `<topicref>` element that references a map supplies a role for the referenced content. This means that, in effect, the `@class` attribute of the referencing element cascades to top-level topicref elements in the referenced map. In situations where this should not happen - such as all elements from the mapgroup domain - the non-default behavior should be clearly specified.

For example, when a `<chapter>` element from the bookmap specialization references a map, it supplies a role of "chapter" for each top-level `<topicref>` element in the referenced map. When the `<chapter>` element references a branch in another map, it supplies a role of "chapter" for that branch. The `@class` attribute for `<chapter>` ("- map/topicref bookmap/chapter ") cascades to the top-level `<topicref>` element in the nested map, although it does not cascade any further.

Alternatively, the `<mapref>` element in the mapgroup domain is a convenience element; the top-level `<topicref>` elements in the map referenced by a `<mapref>` element **MUST NOT** be processed as if

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they are `<mapref>` elements. The `@class` attribute from the `<mapref>` element ("+ map/topicref mapgroup-d/mapref ") does not cascade to the referenced map.

In some cases, preserving the role of the referencing element might result in out-of-context content. For example, a `<chapter>` element that references a bookmap might pull in `<part>` elements that contain nested `<chapter>` elements. Treating the `<part>` element as a `<chapter>` will result in a chapter that nests other chapters, which is not valid in bookmap and might not be understandable by processors. The result is implementation specific; processors **MAY** choose to treat this as an error, issue a warning, or simply assign new roles to the problematic elements.

Example of cascading roles between maps

Consider the scenario of a `<chapter>` element that references a DITA map. This scenario could take several forms:

Referenced map contains a single top-level <topicref> element

The entire branch functions as if it were included in the bookmap; the top-level `<topicref>` element is processed as if it were the `<chapter>` element.

Referenced map contains multiple top-level <topicref> elements

Each top-level `<topicref>` element is processed as if it were a `<chapter>` element (the referencing element).

Referenced map contains a single <appendix> element

The `<appendix>` element is processed as it were a `<chapter>` element.

Referenced map contains a single <part> element, with nested <chapter> elements.

The `<part>` element is processed as it were a chapter element. Nested `<chapter>` elements might not be understandable by processors; applications **MAY** recover as described above.

<chapter> element references a single <topicref> element rather than a map

The referenced `<topicref>` element is processed as if it were a `<chapter>` element.

3.4.7 Context hooks and window metadata for user assistance

Context hook information specified in the `<resourceid>` element in the DITA map or in a DITA topic enables processors to generate the header, map, alias and other types of support files that are required to integrate the user assistance with the application. Some user assistance topics might need to be displayed in a specific window or viewport, and this windowing metadata can be defined in the DITA map within the `<ux-window>` element.

Context hook and windowing information is ignored if the processor does not support this metadata.

User interfaces for software application often are linked to user assistance (such as help systems and tool tips) through *context hooks*. Context hooks are identifiers that associate a part of the user interface with the location of a help topic. Context hooks can be direct links to URIs, but more often they are indirect links (numeric context identifiers and context strings) that can processed into external resource files. These external resource and mapping files are then used directly by context-sensitive help systems and other downstream applications.

Context hooks can define either one-to-one or one-to-many relationships between user interface controls and target help content.

The metadata that is available in `<resourceid>` and `<ux-window>` provides flexibility for content developers:

- You can overload maps and topics with all the metadata needed to support multiple target help systems. This supports single-sourcing of help content and help metadata.
- You can choose whether to add `<resourceid>` metadata to `<topicref>` elements, `<prolog>` elements, or both. Context-dependent metadata might be best be kept with maps, while persistent, context-independent metadata might best stay with topics in `<prolog>` elements

Context hook information is defined within DITA topics and DITA maps through attributes of the `<resourceid>` element.

In some help systems, a topic might need to be displayed in a specifically sized or featured window. For example, a help topic might need to be displayed immediately adjacent to the user interface control that it supports in a window of a specific size that always remains on top, regardless of the focus within the operating system. Windowing metadata can be defined in the DITA map within the `<ux-window>` element.

The `<ux-window>` element provides the `@top`, `@left`, `@height`, `@width`, `@on-top`, `@features`, `@relative`, and `@full-screen` attributes.

Related reference

8.8.4.1.22 resourceid (271)
A resource ID provides an identifier for applications that must use their own identifier scheme, such as context-sensitive help systems and databases.

8.8.3.1.11 ux-window (249)
Use the `<ux-window>` element to provide specifications for a window or viewport in which a user assistance topic or Web page can be displayed. The window or viewport can be referenced by the `<resourceid>` element associated with a topic or `<topicref>` element.

4 DITA addressing

DITA provides two addressing mechanisms. DITA addresses either are direct URI-based addresses, or they are indirect key-based addresses. Within DITA documents, individual elements are addressed by unique identifiers specified on the `@id` attribute. DITA defines two fragment-identifier syntaxes; one is the full fragment-identifier syntax, and the other is an abbreviated fragment-identifier syntax that can be used when addressing non-topic elements from within the same topic.

4.1 ID attribute

The `@id` attribute assigns an identifier to DITA elements so that the elements can be referenced.

The `@id` attribute is available for most elements. An element must have a valid value for the `@id` attribute before it can be referenced using a fragment identifier. The requirements for the `@id` attribute differ depending on whether it is used on a topic element, a map element, or an element within a topic or map.

All values for the `@id` attribute must be XML name tokens.

The `@id` attributes for topic and map elements are declared as XML attribute type ID; therefore, they must be unique with respect to other XML IDs within the XML document that contains the topic or map element. The `@id` attribute for most other elements within topics and maps are not declared to be XML IDs; this means that XML parsers do not require that the values of those attributes be unique. However, the DITA specification requires that all IDs be unique within the context of a topic. For this reason, tools might provide an additional layer of validation to flag violations of this rule.

Within documents that contain multiple topics, the values of the `@id` attribute for all non-topic elements that have the same nearest-ancestor-topic element should be unique with respect to each other. The values of the `@id` attribute for non-topic elements can be the same as non-topic elements with different nearest-ancestor-topic elements. Therefore, within a single DITA document that contains more than one topic, the values of the `@id` attribute of the non-topic elements need only to be unique within each topic.

Within a map document, the values of the `@id` attributes for all elements **SHOULD** be unique. When two elements within a map have the same value for the `@id` attribute, processors **MUST** resolve references to that ID to the first element with the given ID value in document order.

Element	XML attribute type for `@id`	Must be unique within	Required?
`<map>`	ID	document	No
`<topic>`	ID	document	Yes
sub-map (elements nested within a map)	NMTOKEN	document	Usually no, with some exceptions
sub-topic (elements nested within a topic)	NMTOKEN	individual topic	Usually no, with some exceptions

Figure 10: Summary of requirements for the @id attribute

Note: For all elements other than footnote (`<fn>`), the presence of a value for the `@id` attribute has no impact on processing. For `<fn>`, the presence or absence of a valid `@id` attribute affects how the element is processed. This is important for tools that automatically assign `@id` attributes to all elements.

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Note: For all elements other than footnote (`<fn>`), the presence of a value for the `@id` attribute has no impact on processing. For `<fn>`, the presence or absence of a valid `@id` attribute affects how the element is processed. This is important for tools that automatically assign `@id` attributes to all elements.

4.2 DITA linking

DITA supports many different linking elements, but they all use the same set of attributes to describe relationships between content.

URI-based addressing

URI-based links are described by the following attributes.

@href

The `@href` attribute specifies the URI of the resource that is being addressed.

@format

The `@format` attribute identifies the format of the resource being addressed. For example, references to DITA topics are identified with `format="dita"`, whereas references to DITA maps use `format="ditamap"`. References to other types of content should use other values for this attribute. By default, references to non-XML content use the extension of the URI in the `@href` attribute as the effective format.

@scope

The `@scope` attribute describes the closeness of the relationship between the current document and the target resource. Resources in the same information unit are considered `"local"`; resources in the same system as the referencing content but not part of the same information unit are considered `"peer"`; and resources outside the system, such as Web pages, are considered `"external"`.

@type

The `@type` attribute is used on cross-references to describe the target of the reference. Most commonly, the `@type` attribute names the element type being referenced when `format="dita"`.

These four attributes act as a unit, describing whatever link is established by the element that carries them.

The `@format` and `@scope` attributes are assigned default values based on the URI that is specified in the `@href` attribute. Thus they rarely need to be explicitly specified in most cases. However, they can be useful in many non-traditional linking scenarios or environments.

Indirect key-based addressing

DITA also supports indirect links and cross-references in which a DITA map assigns unique names, or keys, to the resources being referenced by the publication. This is done using `<topicref>` elements that specify the `@keys` attribute. Using the `@keyref` attribute, individual links, cross-references, and images then reference resources by their keys instead of their URIs . Links defined using `@keyref` thus allow context-specific linking behavior. That is, the links in a topic or map might resolve to one set of resources in one context, and a completely different set of resources in another, without the need for any modifications to the link markup.

When links are defined using `@keyref`, values for the four linking attributes described above are typically all specified (or given default values) on the key defining element.

4.3 URI-based (direct) addressing

Content reference and link relationships can be established from DITA elements by using URI references. DITA uses URI references in `@href`, `@conref`, and other attributes for all direct addressing of resources.

URI references address *resources* and (in some cases) subcomponents of those resources. In this context, a resource is a DITA document (map, topic, or DITA base document) or a non-DITA resource (for example, an image, a Web page, or a PDF document).

URI references that are URLs must conform to the rules for URLs and URIs. Windows paths that contain a backslash (\) are not valid URLs.

URIs and fragment identifiers

For DITA resources, fragment identifiers can be used with the URI to address individual elements. The fragment identifier is the part of the URI that starts with a number sign (#), for example, `#topicid/elementid`. URI references also can include a query component that is introduced with a question mark (?). DITA processors **MAY** ignore queries on URI references to DITA resources. URI references that address components in the same document **MAY** consist of just the fragment identifier.

For addressing DITA elements within maps and topics or individual topics within documents containing multiple topics, URI references must include the appropriate DITA-defined fragment identifier. URI references can be relative or absolute. A relative URI reference can consist of just a fragment identifier. Such a reference is a reference to the document that contains the reference.

Addressing non-DITA targets using a URI

DITA can use URI references to directly address non-DITA resources. Any fragment identifier used must conform to the fragment identifier requirements that are defined for the target media type or provided by processors.

Addressing elements within maps using a URI

When addressing elements within maps, URI references can include a fragment identifier that includes the ID of the map element, for example, `filename.ditamap#mapId` or `#mapId`. The same-topic, URI-reference fragment identifier of a period (.) can not be used in URI references to elements within maps.

Addressing topics using a URI

When addressing a DITA topic element, URI references can include a fragment identifier that includes the ID of the topic element (`filename.dita#topicId` or `#topicId`). When addressing the DITA topic element that contains the URI reference, the URI reference might include the same topic fragment identifier of "." (`#.`).

Topics always can be addressed by a URI reference whose fragment identifier consists of the topic ID. For the purposes of linking, a reference to a topic-containing document addresses the first topic within that document in document order. For the purposes of rendering, a reference to a topic-containing document addresses the root element of the document.

Consider the following examples:

- Given a document whose root element is a topic, a URI reference (with no fragment identifier) that addresses that document implicitly references the topic element.
- Given a `<dita>` document that contains multiple topics, for the purposes of linking, a URI reference that addresses the `<dita>` document implicitly references the first child topic.

- Given a `<dita>` document that contains multiple topics, for the purposes of rendering, a URI reference that addresses the `<dita>` document implicitly references all the topics that are contained by the `<dita>` element. This means that all the topics that are contained by the`<dita>` element are rendered in the result.

Addressing non-topic elements using a URI

When addressing a non-topic element within a DITA topic, a URI reference must use a fragment identifier that contains the ID of the ancestor topic element of the non-topic element being referenced, a slash ("/"), and the ID of the non-topic element (`filename.dita#topicId/elementId` or `#topicId/elementId`). When addressing a non-topic element within the topic that contains the URI reference, the URI reference can use an abbreviated fragment-identifier syntax that replaces the topic ID with "." (`#./elementId`).

This addressing model makes it possible to reliably address elements that have values for the `@id` attribute that are unique within a single DITA topic, but which might not be unique within a larger XML document that contains multiple DITA topics.

Examples: URI reference syntax

The following table shows the URI syntax for common use cases.

Use case	Sample syntax
Reference a table in a topic at a network location	`"http://example.com/file.dita#topicID/tableID"`
Reference a section in a topic on a local file system	`"directory/file.dita#topicID/sectionID"`
Reference a figure contained in the same XML document	`"#topicID/figureID"`
Reference a figure contained in the same topic of an XML document	`"#./figureID"`
Reference an element within a map	`"http://example.com/map.ditamap#elementID"` (and a value of "ditamap" for the `@format` attribute)
Reference a map element within the same map document	`"#elementID"` (and a value of "ditamap" for the `@format` attribute)
Reference an external Web site	`"http://www.example.com"`, `"http://www.example.com#somefragment"` or any other valid URI
Reference an element within a local map	`"filename.ditamap#elementid"` (and a value of "ditamap" for the `@format` attribute)
Reference a local map	`"filename.ditamap"` (and a value of "ditamap" for the `@format` attribute)
Reference a local topic	Reference a local topic `"filename.dita"` or "`path/filename.dita`"
Reference a specific topic in a local document	`"filename.dita#topicid"` or `"path/filename.dita#topicid"`

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Use case	Sample syntax
Reference a specific topic in the same file	`"#topicid"`
Reference the same topic in the same XML document	`"#."`
Reference a peer map for cross-deliverable linking	`"../book-b/book-b.ditamap"` (and a value of "ditamap" for the `@format` attribute, a value of "peer" for the `@scope` attribute, and a value for the `@keyscope` attribute)

4.4 Indirect key-based addressing

DITA keys provide an alternative to direct addressing. The key reference mechanism provides a layer of indirection so that resources (for example, URIs, metadata, or variable text strings) can be defined at the DITA map level instead of locally in each topic.

For information about using keys to define and reference controlled values, see Subject scheme maps and their usage (34).

Note: The material in this section of the DITA specification is exceptionally complex; it is targeted at implementers who build processors and other rendering applications.

Note: The material in this section of the DITA specification is exceptionally complex; it is targeted at implementers who build processors and other rendering applications.

4.4.1 Core concepts for working with keys

The concepts described below are critical for a full understanding of keys and key processing.

The use of the phases "`<map>` element" or "`<topicref>` element" should be interpreted as "`<map>` element and any specialization of `<map>` element " or " `<topicref>` element or any specialization of `<topicref>` element."

Definitions related to keys

resource

For the purposes of keys and key resolution, one of the following:

- An object addressed by URI
- Metadata specified on a resource, such as a `@scope` or `@format` attribute
- Text or metadata located within a `<topicmeta>` element

key

A name for a resource. See Using keys for addressing (68) for more information.

key definition

A `<topicref>` element that binds one or more key names to zero or more resources.

key reference

An attribute that references a key, such as `@keyref` or `@conkeyref`.

key space

A list of key definitions that are used to resolve key references.

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effective key definition

The definition for a key within a key space that is used to resolve references to that key. A key might have multiple definitions within a key space, but only one of those definitions is effective.

key scope

A map or section of a map that defines its own key space and serves as the resolution context for its key references.

Key definitions

A key definition binds one or more keys to zero or more resources. Resources can be:

- Any URI-addressed resource that is referenced directly by the `@href` attribute or indirectly by the `@keyref` attribute on the key definition. References to the key are considered references to the URI-addressed resource.
- (If the key definition contains a child `<topicmeta>` element) The child elements of the `<topicmeta>` element. The content of those elements can be used to populate the content of elements that reference the key.

If a key definition does not contain a `<topicmeta>` element and does not refer to a resource by `@href` or `@keyref`, it is nonetheless a valid key definition. References to the key definition are considered resolvable, but no linking or content transclusion occurs.

Key scopes

All key definitions and key references exist within a key scope. If the `@keyscope` attribute is never specified within the map hierarchy, all keys exist within a single, default key scope.

Additional key scopes are created when the `@keyscope` attribute is used. The `@keyscope` attribute specifies a name or names for the scope. Within a map hierarchy, key scopes are bounded by the following:

- The root map.
- The root element of submaps when the root elements of the submaps specify the `@keyscope` attribute
- Any `<topicref>` elements that specify the `@keyscope` attribute

Key spaces

The key space associated with a key scope is used to resolve all key references that occur immediately within that scope. Key references in child scopes are resolved using the key spaces that are associated with those child scopes.

A key scope is associated with exactly one key space. That key space contains all key definitions that are located directly within the scope; it might also contain definitions that exist in other scopes. Specifically, the key space associated with a key scope is comprised of the following key definitions, in order of precedence:

1. All key definitions from the key space associated with the parent key scope, if any.
2. Key definitions within the scope-defining element, including those defined in directly-addressed, locally-scoped submaps, but excluding those defined in child scopes. (Keys defined in child scopes cannot be addressed without qualifiers.)

3. The key definitions from child scopes, with each key prepended by the child scope name followed by a period. If a child scope has multiple names, the keys in that scope are addressable from the parent scope using any of the scope names as a prefix.

Note: Because of rules 1 and 3, the key space that is associated with a child scope includes the scope-qualified copies of its own keys that are inherited from the key space of the parent scope, as well as those from other "sibling" scopes.

Note: Because of rules 1 and 3, the key space that is associated with a child scope includes the scope-qualified copies of its own keys that are inherited from the key space of the parent scope, as well as those from other "sibling" scopes.

Effective key definitions

A key space can contain many definitions for a given key, but only one definition is effective for the purpose of resolving key references.

When a key has a definition in the key space that is inherited from a parent scope, that definition is effective. Otherwise, a key definition is effective if it is first in a breadth-first traversal of the locally-scoped submaps beneath the scope-defining element. Put another way, a key definition is effective if it is the first definition for that key name in the shallowest map that contains that key definition. This allows higher-level map authors to override keys defined in referenced submaps.

Note: A key definition that specifies more than one key name in its `@keys` attribute might be the effective definition for some of its keys but not for others.

Note: A key definition that specifies more than one key name in its `@keys` attribute might be the effective definition for some of its keys but not for others.

Within a key scope, keys do not have to be defined before they are referenced. The key space is effective for the entire scope, so the order of key definitions and key references relative to one another is not significant. This has the following implications for processors:

- All key spaces for a root map must be determined before any key reference processing can be performed.
- Maps referenced solely by key reference have no bearing on key space contents.

For purposes of key definition precedence, the scope-qualified key definitions from a child scope are considered to occur at the location of the scope-defining element within the parent scope. See Example: How key scopes affect key precedence (88) for more information.

4.4.2 Key scopes

Key scopes enable map authors to specify different sets of key definitions for different map branches.

A key scope is defined by a `<map>` or `<topicref>` element that specifies the `@keyscope` attribute. The `@keyscope` attribute specifies the names of the scope, separated by spaces. The legal characters for a key scope name are the same as those for keys.

A key scope includes the following components:

- The scope-defining element
- The elements that are contained by the scope-defining element, minus the elements that are contained by child key scopes
- The elements that are referenced by the scope-defining element or its descendants, minus the elements that are contained by child key scopes

If the `@keyscope` attribute is specified on both a reference to a DITA map and the root element of the referenced map, only one scope is created; the submap does not create another level of scope hierarchy. The single key scope that results from this scenario has multiple names; its names are the union of the values of the `@keyscope` attribute on the map reference and the root element of the submap. This means that processors can resolve references to both the key scopes specified on the map reference and the key scopes specified on the root element of the submap.

The root element of a root map always defines a key scope, regardless of whether a `@keyscope` attribute is present. All key definitions and key references exist within a key scope, even if it is an unnamed, implicit key scope that is defined by the root element in the root map.

Each key scope has its own key space that is used to resolve the key references that occur within the scope. The key space that is associated with a key scope includes all of the key definitions within the key scope. This means that different key scopes can have different effective key definitions:

- A given key can be defined in one scope, but not another.
- A given key also can be defined differently in different key scopes.

Key references in each key scope are resolved using the effective key definition that is specified within its own key scope.

Example: Key scopes specified on both the map reference and the root element of the submap

Consider the following scenario:

```
<map>
  <mapref keyscope="A" href="installation.ditamap"/>
  <!-- ... -->
</map>
```

Figure 11: Root map

```
<map keyscope="B">
  <!-- ... -->
</map>
```

Figure 12: `installation.ditamap`

Only one key scope is created; it has key scope names of "A" and "B".

4.4.3 Using keys for addressing

For topic references, image references, and other link relationships, resources can be indirectly addressed by using the `@keyref` attribute. For content reference relationships, resources can be indirectly addressed by using the `@conkeyref` attribute.

Syntax

For references to topics, maps, and non-DITA resources, the value of the `@keyref` attribute is simply a key name (for example, `keyref="topic-key"`).

For references to non-topic elements within topics, the value of the `@keyref` attribute is a key name, a slash ("/"), and the ID of the target element (for example, `keyref="topic-key/some-element-id"`.)

Example

For example, consider this topic in the document `file.dita`:

```
<topic id="topicid">
 <title>Example referenced topic</title>
 <body>
  <section id="section-01">Some content.</section>
 </body>
</topic>
```

and this key definition:

```
<map>
  <topicref keys="myexample"
    href="file.dita"
  />
</map>
```

A cross reference of the form `keyref="myexample/section-01"` resolves to the `<section>` element in the topic. The key reference is equivalent to the URI reference `xref="file.dita#topicid/section-01"`.

4.4.4 Addressing keys across scopes

When referencing key definitions that are defined in a different key scope, key names might need to be qualified with key scope names.

A root map might contain any number of key scopes; relationships between key scopes are discussed using the following terms:

child scope

A key scope that occurs directly within another key scope. For example, in the figure below, key scopes "A-1" and "A-2" are child scopes of key scope "A".

parent scope

A key scope that occurs one level above another key scope. For example, in the figure below, key scope "A" is a parent scope of key scopes "A-1" and "A-2".

ancestor scope

A key scope that occurs any level above another key scope. For example, in the figure below, key scopes "A" and "Root" are both ancestor scopes of key scopes "A-1" and "A-2"

descendant scope

A key scope that occurs any level below another key scope. For example, in the figure below, key scopes "A", "A-1", and "A-2" are all descendant scopes of the implicit, root key scope

sibling scope

A key scope that shares a common parent with another key scope. For example, in the figure below, key scopes "A" and "B" are sibling scopes; they both are children of the implicit, root key scope.

key scope hierarchy

A key scope and all of its descendant scopes.

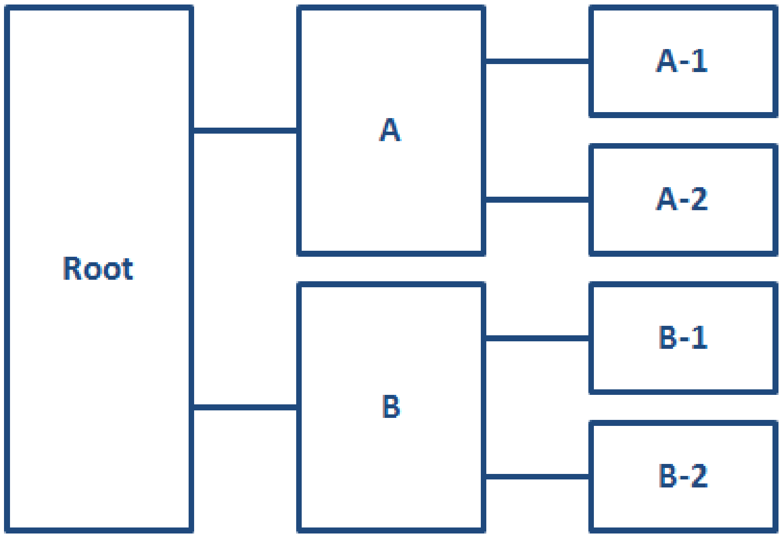

Figure 13: A key scope hierarchy

Keys that are defined in parent key scopes

The key space that is associated with a key scope also includes all key definitions from its parent key scope. If a key name is defined in both a key scope and its parent scope, the key definition in the parent scope takes precedence. This means that a key definition in a parent scope overrides all definitions for the same key name in all descendant scopes. This enables map authors to override the keys that are defined in submaps, regardless of whether the submaps define key scopes.

In certain complex cases, a scope-qualified key name (such as "scope.key") can override an unqualified key name from the parent scope. See Example: How key scopes affect key precedence (88).

Keys that are defined in child key scopes

The key space associated with a key scope does not include the *unqualified* key definitions from the child scopes. However, it does include scope-qualified keys from the child scopes. This enables sibling key scopes to have different key definitions for the same key name.

A *scope-qualified key name* is a key name, prepended by one or more key scope names and separated by periods. For example, to reference a key "keyName" defined in a child scope named "keyScope", specify `keyref="keyScope.keyName"`.

If a key scope has multiple names, its keys can be addressed from its parent scope using any of the scope names. For example, if a key scope is defined with `keyscope="a b c"`, and it contains a key name of "product", that key can be referenced from the parent scope by `keyref="a.product"`, `keyref="b.product"`, or `keyref="c.product"`

Because a child scope contributes its scope-qualified keys to its parent scope, and that parent scope contributes *its* scope-qualified keys to *its* parent scope, it is possible to address the keys in any descendant scope by using the scope-qualified key name. For example, consider a key scope named "ancestorScope" that has a child scope named "parentScope" which in turn has a child scope named "childScope". The scope "childScope" defines a key named "keyName". To reference the key "keyName" from scope "ancestorScope", specify the scope-qualified key name: `keyref="parentScope.childScope.keyName"`.

Keys that are defined in sibling key scopes

Because a parent key scope contains scope-qualified keys from all of its child scopes, and a child scope inherits all of the key definitions (including scope-qualified keys) from its parent scope, it is possible for a child scope to reference its own scope-qualified keys, as well as those defined by its sibling scopes.

For example, consider two sibling scopes, "scope1" and "scope2". Each scope defines the key "productName". References to "productName" in each scope resolve to the local definition. However, since each scope inherits the scope-qualified keys that are available in their parent scope, either scope can reference "scope1.productName" and "scope2.productName" to refer to the scope-specific definitions for that key.

4.4.5 Cross-deliverable addressing and linking

A map can use scoped keys to reference keys that are defined in a different root map. This cross-deliverable addressing can support the production of deliverables that contain working links to other deliverables.

When maps are referenced and the value of the `@scope` attribute is set to "peer", the implications are that the two maps are managed in tandem, and that the author of the referencing map might have access to the referenced map. Adding a key scope to the reference indicates that the peer map should be treated as a separate deliverable for the purposes of linking.

The keys that are defined by the peer map belong to any key scopes that are declared on the `<topicref>` element that references that map. Such keys can be referenced from content in the referencing map by using scope-qualified key names. However, processors handle references to keys that are defined in peer maps differently from how they handle references to keys that are defined in submaps.

DITA processors are not required to resolve key references to peer maps. However, if all resources are available in the same processing or management context, processors have the potential to resolve key references to peer maps. There might be performance, scale, and user interface challenges in implementing such systems, but the ability to resolve any given reference is ensured when the source files are physically accessible.

Note the inverse implication; if the peer map is not available, then it is impossible to resolve the key reference. Processors that resolve key references to peer maps should provide appropriate messages when a reference to a peer map cannot be resolved. Depending on how DITA resources are authored, managed, and processed, references to peer maps might not be resolvable at certain points in the content life cycle.

The peer map might specify `@keyscope` on its root element. In that case, the `@keyscope` on the peer map is ignored for the purpose of resolving scoped key references from the referencing map. This avoids the need for processors to have access to the peer map in order to determine whether a given key definition comes from the peer map.

Example: A root map that declares a peer map

Consider the DITA maps `map-a.ditamap` and `map-b.ditamap`. Map A designates Map B as a peer map by using the following markup:

```
<map>
  <title>Map A</title>
  <topicref
    scope="peer"
    format="ditamap"
    keyscope="map-b"
    href="../map-b/map-b.ditamap"
```

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```
    processing-role="resource-only"
  />
  <!-- ... -->
</map>
```

In this example, `map-b.ditamap` is not a submap of Map A; it is a peer map.

Example: Key resolution in a peer map that contains a @keyscope attribute on the root element

Consider the map reference in map Map A:

```
<mapref
  keyscope="scope-b"
  scope="peer"
  href="map-b.ditamap"
/>
```

where `map-b.ditamap` contains the following markup:

```
<map keyscope="product-x">
 <!-- ... -->
</map>
```

From the context of Map A, key references of the form "scope-b.somekey" are resolved to keys that are defined in the global scope of map B, but key references of the form "product-x.somekey" are not. The presence of a `@keyscope` attribute on the `<map>` element in Map B has no effect. A key reference to the scope "scope-b.somekey" is equivalent to the unscoped reference "somekey" when processed in the context of Map B as the root map. In both cases, the presence of `@keyscope` on the root element of Map B has no effect; in the first case it is explicitly ignored, and in the second case the key reference is within the scope "product-x" and so does not need to be scope qualified.

4.4.6 Processing key references

Key references can resolve as links, as text, or as both. Within a map, they also can be used to create or supplement information on a topic reference. This topic covers information that is common to all key processing, regardless of how the key is used.

Processing of undefined keys

If both `@keyref` and `@href` attributes are specified on an element, the `@href` value **MUST** be used as a fallback address when the key name is undefined. If both `@conkeyref` and `@conref` attributes are specified on an element, the `@conref` value **MUST** be used as a fallback address when the key name is undefined.

Determining effective attributes on the key-referencing element

The attributes that are common to the key-defining element and the key-referencing element, other than the `@keys`, `@processing-role`, and `@id` attributes, are combined as for content references, including the special processing for the `@xml:lang`, `@dir`, and `@translate` attributes. There is no special processing associated with either the `@locktitle` or the `@lockmeta` attributes when attributes are combined.

Keys and conditional processing

The effective key definitions for a key space might be affected by conditional processing (filtering). Processors **SHOULD** perform conditional processing before determining the effective key definitions. However, processors might determine effective key definitions before filtering. Consequently, different processors might produce different effective bindings for the same map when there are key definitions that might be filtered out based on their filtering attributes.

Note: In order to retain backwards compatibility with DITA 1.0 and 1.1, the specification does not mandate a processing order for different DITA features. This makes it technically possible to determine an effective key definition, resolve references to that key definition, and then filter out the definition. However, the preferred approach is to take conditional processing into account when resolving keys, so that key definitions which are excluded by processing are not used in resolving key references.

Note: In order to retain backwards compatibility with DITA 1.0 and 1.1, the specification does not mandate a processing order for different DITA features. This makes it technically possible to determine an effective key definition, resolve references to that key definition, and then filter out the definition. However, the preferred approach is to take conditional processing into account when resolving keys, so that key definitions which are excluded by processing are not used in resolving key references.

Reusing a topic in multiple key scopes

If a topic that contains key references is reused in multiple key scopes within a given root map such that its references resolve differently in each use context, processors **MUST** produce multiple copies of the source topic in resolved output for each distinct set of effective key definitions that are referenced by the topic. In such cases, authors can use the `@copy-to` attribute to specify different source URIs for each reference to a topic.

Error conditions

If a referencing element contains a key reference with an undefined key, it is processed as if there were no key reference, and the value of the `@href` attribute is used as the reference. If the `@href` attribute is not specified, the element is not treated as a navigation link. If it is an error for the element to be empty, an implementation **MAY** give an error message; it also **MAY** recover from this error condition by leaving the key reference element empty.

4.4.7 Processing key references for navigation links and images

Keys can be used to create or redirect links and cross references. Keys also can be used to address resources such as images or videos. This topic explains how to evaluate key references on links and cross references to determine a link target.

When a key definition is bound to a resource that is addressed by the `@href` or `@keyref` attributes, and does not specify "none" for the `@linking` attribute, all references to that key definition become links to the bound resource. When a key definition is not bound to a resource or specifies "none" for the `@linking` attribute, references to that key definition do not become links.

When a key definition has no `@href` value and no `@keyref` value, references to that key will not result in a link, even if they do contain an `@href` attribute of their own. If the key definition also does not contain a `<topicmeta>` subelement, empty elements that refer to the key (such as `<link keyref="a"/>` or `<xref keyref="a" href="fallback.dita"/>`) are ignored.

The `<object>` element has additional key-referencing attributes (`@archivekeyrefs`, `@classidkeyref`, `@codebasekeyref`, and `@datakeyref`). Key names in these attributes are resolved using the same processing that is described for the normal `@keyref` attribute.

4.4.8 Processing key references on <topicref> elements

While `<topicref>` elements are used to define keys, they also can reference keys that are defined elsewhere. This topic explains how to evaluate key references on `<topicref>` elements and its specializations.

For topic references that use the `@keyref` attribute, the effective value of the `<topicref>` element is determined in the following way:

Determining the effective resource

The effective resource bound to the `<topicref>` element is determined by resolving all intermediate key references. Each key reference is resolved either to a resource addressed directly by URI reference in an `@href` attribute, or to no resource. Processors **MAY** impose reasonable limits on the number of intermediate key references that they will resolve. Processors **SHOULD** support at least three levels of key references.

Note: This rule applies to all topic references, including those that define keys. The effective bound resource for a key definition that uses the `@keyref` attribute cannot be determined until the key space has been constructed.

Note: This rule applies to all topic references, including those that define keys. The effective bound resource for a key definition that uses the `@keyref` attribute cannot be determined until the key space has been constructed.

Combining metadata

Content from a key-defining element cascades to the key-referencing element following the rules for combining metadata between maps and other maps and between maps and topics. The `@lockmeta` attribute is honored when metadata content is combined.

The combined attributes and content cascade from one map to another or from a map to a topic, but this is controlled by existing rules for cascading, which are not affected by the use of key references.

If, in addition to the `@keys` attribute, a key definition specifies a `@keyref` attribute that can be resolved after the key resolution context for the key definition has been determined, the resources bound to the referenced key definition take precedence.

4.4.9 Processing key references to generate text or link text

Key references can be used to pull text from the key definition. This topic explains how to generate text from a key definition, regardless of whether the key reference also results in a link.

Note: The processing described in this topic is unrelated to the `@conkeyref` attribute. In that case `@conkeyref` is used to determine the target of a `@conref` attribute, after which the normal `@conref` rules apply.

Note: The processing described in this topic is unrelated to the `@conkeyref` attribute. In that case `@conkeyref` is used to determine the target of a `@conref` attribute, after which the normal `@conref` rules apply.

Empty elements that include a key reference with a defined key might get their effective content from the key definition. Empty elements are defined as elements that meet the following criteria:

- Have no text content, including white space

- Have no sub-elements
- Have no attributes that would be used as text content

When an empty element as defined above references a key definition that has a child `<topicmeta>` element, content from that `<topicmeta>` element is used to determine the effective content of the referencing element. Effective content from the key definition becomes the element content, with the following exceptions:

- For empty `<image>` elements, effective content is used as alternate text, equivalent to creating an `<alt>` sub-element to hold that content.
- For empty `<link>` elements, effective content is used as link text, equivalent to creating a `<linktext>` sub-element to hold that content.
- For empty `<link>` and `<xref>` elements, a key definition can be used to provide a short description in addition to the normal effective content. If the key definition includes `<shortdesc>` inside of `<topicmeta>`, that `<shortdesc>` should be used to provide effective content for a `<desc>` sub-element.
- The `<longdescref>` and `<longquoteref>` elements are empty elements with no effective content. Key definitions are not used to set effective text for these elements.
- The `<param>` element does not have any effective content, so key definitions do not result in any effective content for `<param>` elements.
- The `<indextermref>` element is not completely defined, so determining effective content for this element is also left undefined.

Effective text content is determined using the following set of rules:

1. For elements that also exist as a child of `<topicmeta>` in the key definition, effective content is taken from the first matching direct child of `<topicmeta>`. For example, given the following key definition, an empty `<author>` element with the attribute `keyref="justMe"` would result in the matching content "Just M. Name":

   ```
   <keydef keys="justMe" href="http://www.example.com/my-profile" format="html"
   scope="external">
     <topicmeta>
       <author>Just M. Name</author>
     </topicmeta>
   </keydef>
   ```

2. For elements that do not allow the `@href` attribute, content is taken from the first `<keyword>` element inside of `<keywords>` inside of the `<topicmeta>`. For example, given the following key definition, empty `<keyword>`, `<term>`, and `<dt>` elements with the attribute `keyref="nohref"` would all result in the matching content "first":

   ```
   <keydef keys="nohref">
     <topicmeta>
       <keywords><keyword>first</keyword><keyword>second</keyword><keyword>third</
   keyword></keywords>
     </topicmeta>
   </keydef>
   ```

3. For elements that do allow `@href`, elements from within `<topicmeta>` that are legal within the element using `@keyref` are considered matching text. For example, the `<xref>` element allows `@href`, and also allows `<keyword>` as a child. Using the code sample from the previous item, an empty `<xref>` with `keyref="nohref"` would use all three of these elements as text content; after processing, the result would be equivalent to:

   ```
   <xref keyref="test"><keyword>first</keyword><keyword>second</keyword><keyword>third</
   keyword></xref>
   ```

4. Otherwise, if `<linktext>` is specified inside of `<topicmeta>`, the contents of `<linktext>` are used as the effective content.

   Note: Because all elements that get effective content will eventually look for content in the `<linktext>` element, using `<linktext>` for effective content is a best practice for cases where all elements getting text from a key definition should result in the same value.

   Note: Because all elements that get effective content will eventually look for content in the `<linktext>` element, using `<linktext>` for effective content is a best practice for cases where all elements getting text from a key definition should result in the same value.
5. Otherwise, if the element with the key reference results in a link, normal link text determination rules apply as they would for `<xref>` (for example, using the `<navtitle>` or falling back to the URI of the link target).

When the effective content for a key reference element results in invalid elements, those elements **SHOULD** be generalized to produce a valid result. For example, `<linktext>` in the key definition might use a domain specialization of `<keyword>` that is not valid in the key reference context, in which case the specialized element should be generalized to `<keyword>`. If the generalized content is also not valid, a text equivalent should be used instead. For example, `<linktext>` might include `<ph>` or a specialized `<ph>` in the key definition, but neither of those are valid as the effective content for a `<keyword>`. In that case, the text content of the `<ph>` should be used.

4.4.10 Examples of keys

This section of the specification contains examples and scenarios. They illustrate a wide variety of ways that keys can be used.

4.4.10.1 Examples: Key definition

The `<topicref>` element, and any specialization of `<topicref>` that allows the `@keys` attribute, can be used to define keys.

In the following example, a `<topicref>` element is used to define a key; the `<topicref>` element also contributes to the navigation structure.

```
<map>
  <!--... -->
  <topicref keys="apple-definition" href="apple-gloss-en-US.dita" />
  <!--... -->
</map>
```

The presence of the `@keys` attribute does not affect how the `<topicref>` element is processed.

In the following example, a `<keydef>` element is used to define a key.

```
<map>
  <!--... -->
  <keydef keys="apple-definition" href="apple-gloss-en-US.dita"/>
  <!--... -->
</map>
```

Because the `<keydef>` element sets the default value of the `@processing-role` attribute to "resource-only", the key definition does not contribute to the map navigation structure; it only serves as a key definition for the key name "apple-definition".

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4.4.10.2 Examples: Key definitions for variable text

Key definitions can be used to store variable text, such as product names and user-interface labels. Depending on the key definition, the rendered output might have a link to a related resource.

In the following example, a "product-name" key is defined. The key definition contains a child `<keyword>` element nested within a `<keydef>`element.

```
<map>
  <keydef keys="product-name">
    <topicmeta>
     <keywords>
       <keyword>Thing-O-Matic</keyword>
     </keywords>
    </topicmeta>
  </keydef>
</map>
```

A topic can reference the "product-name" key by using the following markup:

```
<topic id="topicid">
  <p><keyword keyref="product-name"/> is a product designed to ...</p>
</topic>
```

When processed, the output contains the text "Thing-O-Matic is a product designed to ... ".

In the following example, the key definition contains both a reference to a resource and variable text.

```
<map>
  <keydef keys="product-name" href="thing-o-matic.dita">
    <topicmeta>
     <keywords>
       <keyword>Thing-O-Matic</keyword>
     </keywords>
    </topicmeta>
  </keydef>
</map>
```

When processed using the key reference from the first example, the output contains the "Thing-O-Matic is a product designed to ... " text. The phrase "Thing-O-Matic" also is a link to the `thing-o-matic.dita` topic.

4.4.10.3 Example: Scoped key definitions for variable text

Scoped key definitions can be used for variable text. This enables you to use the same DITA topic multiple times in a DITA map, and in each instance the variable text can resolve differently.

The Acme Tractor Company produces two models of tractor: X and Y. Their product manual contains sets of instructions for each model. While most maintenance procedures are different for each model, the instructions for changing the oil are identical for both model X and model Y. The company policies call for including the specific model number in each topic, so a generic topic that could be used for both models is not permitted.

1. The authoring team references the model information in the `changing-the-oil.dita` topic by using the following mark-up:

   ```
   <keyword keyref="model"/>
   ```

2. The information architect examines the root map for the manual, and decides how to define key scopes. Originally, the map looked like the following:

   ```
   <map>
     <!-- Model X: Maintenance procedures -->
   ```

```
  <topicref href="model-x-procedures.dita">
    <topicref href="model-x/replacing-a-tire.dita"/>
    <topicref href="model-x/adding-fluid.dita"/>
  </topicref>

<!-- Model Y: Maintenance procedures -->
  <topicref href="model-y-procedures.dita">
    <topicref href="model-y/replacing-a-tire.dita"/>
    <topicref href="model-y/adding-fluid.dita"/>
  </topicref>
</map>
```

3. The information architect wraps each set of procedures in a `<topicgroup>` element and sets the `@keyscope` attribute.

```
<map>
  <!-- Model X: Maintenance procedures -->
  <topicgroup keyscope="model-x">
    <topicref href="model-x-procedures.dita">
      <topicref href="model-x/replacing-a-tire.dita"/>
      <topicref href="model-x/adding-fluid.dita"/>
    </topicref>
  </topicgroup>

<!-- Model Y: Maintenance procedures -->
  <topicgroup keyscope="model-y">
    <topicref href="model-y-procedures.dita">
      <topicref href="model-y/replacing-a-tire.dita"/>
      <topicref href="model-y/adding-fluid.dita"/>
    </topicref>
  </topicgroup>
</map>
```

   This defines the key scopes for each set of procedures.

4. The information architect then adds key definitions to each set of procedures, as well as a reference to the `changing-the-oil.dita` topic.

```
<map>
  <!-- Model X: Maintenance procedures -->
  <topicgroup keyscope="model-x">
    <keydef keys="model">
      <topicmeta>
        <linktext>X</linktext>
      </topicmeta>
    </keydef>
    <topicref href="model-x-procedures.dita">
      <topicref href="model-x/replacing-a-tire.dita"/>
      <topicref href="model-x/adding-fluid.dita"/>
      <topicref href="common/changing-the-oil.dita"/>
    </topicref>
  </topicgroup>

<!-- Model Y: Maintenance procedures -->
  <topicgroup keyscope="model-y">
    <keydef keys="model">
      <topicmeta>
        <linktext>Y</linktext>
      </topicmeta>
    </keydef>
    <topicref href="model-y-procedures.dita">
      <topicref href="model-y/replacing-a-tire.dita"/>
      <topicref href="model-y/adding-fluid.dita"/>
      <topicref href="common/changing-the-oil.dita"/>
    </topicref>
  </topicgroup>
</map>
```

   When the DITA map is processed, the `changing-the-oil.dita` topic is rendered twice. The model variable is rendered differently in each instance, using the text as specified in the scoped key definition. Without key scopes, the first key definition would win, and "model "X" would be used in all topics.

4.4.10.4 Example: Duplicate key definitions within a single map

In this scenario, a DITA map contains duplicate key definitions. How a processor finds the effective key definition depends on document order and the effect of filtering applied to the key definitions.

In the following example, a map contains two definitions for the key "load-toner":

```
<map>
  <!--... -->
  <keydef keys="load-toner" href="model-1235-load-toner-proc.dita"/>
  <keydef keys="load-toner" href="model-4545-load-toner-proc.dita"
  />
  <!--... -->
</map>
```

In this example, only the first key definition (in document order) of the "load-toner" key is effective. All references to the key within the scope of the map resolve to the topic `model-1235-load-toner-proc.dita`.

In the following example, a map contains two definitions for the "file-chooser-dialog" key; each key definition specifies a different value for the `@platform` attribute.

```
<map>
  <!--... -->
  <keydef keys="file-chooser-dialog" href="file-chooser-osx.dita" platform="osx"/>
  <keydef keys="file-chooser-dialog" href="file-chooser-win7.dita" platform="windows7"/>
  <!--... -->
</map>
```

In this case, the effective key definition is determined not only by the order in which the definitions occur, but also by whether the active value of the platform condition is "osx" or "windows7". Both key definitions are *potentially* effective because they have distinct values for the conditional attribute. Note that if no active value is specified for the `@platform` attribute at processing time, then both of the key definitions are present and so the first one in document order is the effective definition.

If the DITAVAL settings are defined so that both "osx" and "windows" values for the `@platform` attribute are excluded, then neither definition is effective and the key is undefined. That case can be avoided by specifying an unconditional key definition after any conditional key definitions, for example:

```
<map>
  <!--... -->
  <keydef keys="file-chooser-dialog" href="file-chooser-osx.dita" platform="osx"/>
  <keydef keys="file-chooser-dialog" href="file-chooser-win7.dita" platform="windows7"/>
  <keydef keys="file-chooser-dialog" href="file-chooser-generic.dita"/>
  <!--... -->
</map>
```

If the above map is processed with both "osx" and "windows" values for the `@platform` attribute excluded, then the effective key definition for "file-chooser-dialog" is the `file-chooser-generic.dita` resource.

4.4.10.5 Example: Duplicate key definitions across multiple maps

In this scenario, the root map contains references to two submaps, each of which defines the same key. The effective key definition depends upon the document order of the direct URI references to the maps.

In the following example, a root map contains a key definition for the key "toner-specs" and references to two submaps.

```
<map>
  <keydef keys="toner-specs" href="toner-type-a-specs.dita"/>
  <mapref href="submap-01.ditamap"/>
  <mapref href="submap-02.ditamap"/>
</map>
```

The first submap, `submap-01.ditamap`, contains definitions for the keys "toner-specs" and "toner-handling":

```
<map>
  <keydef keys="toner-specs" href="toner-type-b-specs.dita"/>
  <keydef keys="toner-handling" href="toner-type-b-handling.dita"/>
</map>
```

The second submap, `submap-02.ditamap`, contains definitions for the keys "toner-specs", "toner-handling", and "toner-disposal":

```
<map>
  <keydef keys="toner-specs" href="toner-type-c-specs.dita"/>
  <keydef keys="toner-handling" href="toner-type-c-handling.dita"/>
  <keydef keys="toner-disposal" href="toner-type-c-disposal.dita"/>
</map>
```

For this example, the effective key definitions are listed in the following table.

Key	Bound resource
toner-specs	`toner-type-a-specs.dita`
toner-handling	`toner-type-b-handling.dita`
toner-disposal	`toner-type-c-disposal.dita`

The key definition for "toner-specs" in the root map is effective, because it is the first encountered in a breadth-first traversal of the root map. The key definition for "toner-handling" in `submap-01.ditamap` is effective, because submap-01 is included before submap-02 and so comes first in a breadth-first traversal of the submaps. The key definition for "toner-disposal" is effective because it is the only definition of the key.

4.4.10.6 Example: Key definition with key reference

When a key definition also specifies a key reference, the key reference must also be resolved in order to determine the effective resources bound to that key definition.

In the following example, a `<topicref>` element references the key "widget". The definition for "widget" in turn references the key "mainProduct".

```
<map>
  <topicref keyref="widget" id="example"/>
  <keydef keys="widget" href="widgetInfo.dita" scope="local" format="dita" rev="v1r2"
          keyref="mainProduct">
    <topicmeta><navtitle>Information about Widget</navtitle></topicmeta>
  </keydef>
  <keydef keys="mainProduct" href="http://example.com/productPage" scope="external"
format="html"
```

```
           product="prodCode" audience="sysadmin">
     <topicmeta><navtitle>Generic product page</navtitle></topicmeta>
   </keydef>
</map>
```

For this example, the key reference to "widget" pulls resources from that key definition, which in turn pulls resources from "mainProduct". The metadata resources from "mainProduct" are combined with the resources already specified on the "widget" key definition, resulting in the addition of `@product` and `@audience` values. Along with the navigation title, the `@href`, `@scope`, and `@format` attributes on the "widget" key definition override those on "mainProduct". Thus after key references are resolved, the original reference from `<topicref>` is equivalent to:

```
<topicref id="example"
          href="widgetInfo.dita" scope="local" format="dita" rev="v1r2"
          product="prodCode" audience="sysadmin">
   <topicmeta><navtitle>Information about Widget</navtitle></topicmeta>
</topicref>
```

4.4.10.7 Example: References to scoped keys

You can address scoped keys from outside the key scope in which the keys are defined.

```
<map xml:lang="en">
  <title>Examples of scoped key references</title>

  <!-- Key scope #1 -->
  <topicgroup keyscope="scope-1">
    <keydef keys="key-1" href="topic-1.dita"/>
    <topicref keyref="key-1"/>
    <topicref keyref="scope-1.key-1"/>
    <topicref keyref="scope-2.key-1"/>
  </topicgroup>

  <!-- Key scope #2 -->
  <topicgroup keyscope="scope-2">
    <keydef keys="key-1" href="topic-2.dita"/>
    <topicref keyref="key-1"/>
    <topicref keyref="scope-1.key-1"/>
    <topicref keyref="scope-2.key-1" />
  </topicgroup>

  <topicref keyref="key-1" />
  <topicref keyref="scope-1.key-1" />
  <topicref keyref="scope-2.key-1" />

</map>
```

For this example, the effective key definitions are listed in the following tables.

Table 2: Effective key definitions for scope-1

Key reference	Resource
key-1	`topic-1.dita`
scope-1.key-1	`topic-1.dita`
scope-2.key-1	`topic-2.dita`

Table 3: Effective key definitions for scope-2

Key reference	Resource
key-1	`topic-2.dita`

Key reference	Resource
scope-1.key-1	`topic-1.dita`
scope-2.key-1	`topic-2.dita`

Table 4: Effective key definitions for the key scope associated with the root map

Key reference	Resource
key-1	Undefined
scope-1.key-1	`topic-1.dita`
scope-2.key-1	`topic-2.dita`

4.4.10.8 Example: Key definitions in nested key scopes

In this scenario, the root map contains nested key scopes, each of which contain duplicate key definitions. The effective key definition depends on key-scope precedence rules.

Consider the following DITA map:

```
<map>
  <title>Root map</title>
  <!-- Root scope -->
  <keydef keys="a" href="topic-1.dita"/>

  <!-- Key scope A -->
  <topicgroup keyscope="A">
    <keydef keys="b" href="topic-2.dita"/>

    <!-- Key scope A-1 -->
    <topicgroup keyscope="A-1">
      <keydef keys="c" href="topic-3.dita"/>
    </topicgroup>

    <!-- Key scope A-2 -->
    <topicgroup keyscope="A-2">
      <keydef keys="d" href="topic-4.dita"/>
    </topicgroup>
  </topicgroup>

  <!-- Key scope B -->
  <topicgroup keyscope="B">
    <keydef keys="a" href="topic-5.dita"/>
    <keydef keys="e" href="topic-6.dita"/>

    <!-- Key scope B-1 -->
    <topicgroup keyscope="B-1">
      <keydef keys="f" href="topic-7.dita"/>
    </topicgroup>

    <!-- Key scope B-2 -->
    <topicgroup keyscope="B-2">
      <keydef keys="g" href="topic-8.dita"/>
    </topicgroup>
  </topicgroup>
</map>
```

The key scopes in this map form a tree structure.

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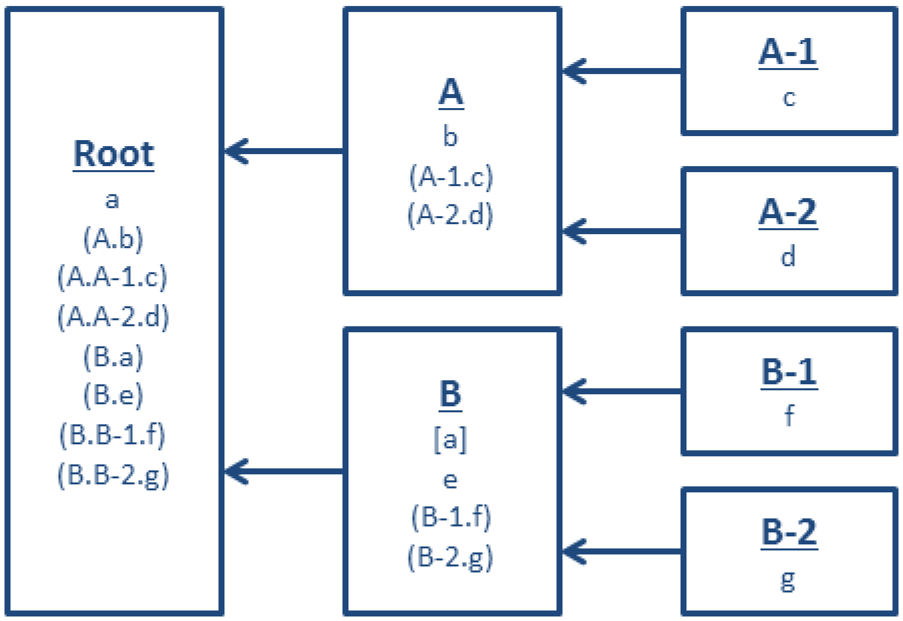

Figure 14: Graphical representation of the key scopes

Each box in the diagram represents a key scope; the name of the key scope is indicated in bold with upper-case letters. Below the name of the key scope, the key definitions that are present in the scope are listed. Different typographic conventions are used to indicate where the key definition occurs:

No styling
: The key definition occurs in the immediate key scope and is not overridden by a key definition in a parent scope. For example, key "a" in the root map.

Parentheses
: The key definition occurs in a child scope. For example, keys "A-1.c" and "A-2.d" in key scope A.

Brackets
: The key definition occurs in the immediate key scope, but it is overridden by a key definition in an ancestor scope. For example, key "a" in key scope B.

Arrows point from child to parent scopes.

Assume that each key scope contains numerous key references. The following tables demonstrate how key references resolve in key scopes A-2 and B. The first column shows the value used in key references; the second column shows the resource to which the key resolves.

Table 5: Key scope A-2

Key reference	Resource to which the key resolves
a	"a", defined in the root map: `topic-1.dita`
d	"d", as defined in the immediate key scope: `topic-4.dita`
A-2.d	"d", as defined in the immediate key scope: `topic-4.dita`

Key reference	Resource to which the key resolves
c	Undefined
A-1.c	"A-1.c", as defined in key scope A-1. This key name is available because it exists in the parent scope, key scope A. The key name resolves to `topic-3.dita`
A.A-1.c	"A-1.c", as defined in key scope A-1. This key name is available because it exists in the root key scope. The key name resolves to `topic-3.dita`

Table 6: Key scope B

Key reference	Resource to which the key resolves
e	"e", defined in the immediate key scope: `topic-6.dita`
a	"a", as defined in the *root key scope*. (While a key definition for "a" exists in the immediate key scope, it is overridden by the key definition that occurs in the parent key scope.) The key name resolves to `topic-1.dita`
B.a	"a", as defined in the *immediate key scope*. Because the key reference uses the scope-qualified names, it resolves to the key "a" in scope B. The key name resolves to `topic-5.dita`
g	Undefined. The key "g" is defined only in key scope B-2, so no unqualified key named "g" is defined in scope B.
B-2.g	"g", as defined in key scope B-2: `topic-8.dita`.

4.4.10.9 Example: Link redirection

This scenario outlines how different authors can redirect links to a common topic by using key definitions. This could apply to `<xref>`, `<link>`, or any elements (such as `<keyword>` or `<term>`) that become navigation links.

A company wants to use a common DITA topic for information about recycling: `recycling.dita`. However, the topic contains a cross-reference to a topic that needs to be unique for each product line; each such topic contains product-specific URLs.

1. The editing team creates a `recycling.dita` topic that includes a cross-reference to the product-specific topic. The cross reference is implemented using a key reference:

   ```
   <xref keyref="product-recycling-info" href="generic-recycling-info.dita"/>
   ```

   The value of the `@href` attribute provides a fallback in the event that a product team forgets to include a key definition for "product-recycling-info".

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2. Each product documentation group creates a unique key definition for "product-recycling-info". Each group authors the key definition in a DITA map, for example:

```
<map>
  <!-- ... -->
  <keydef keys="product-recycling-info" href="acme-server-recycling.dita"/>
  <!-- ... -->
</map>
```

   Each team can use the `recycling.dita` topic, and the cross reference in the topic resolves differently for each team.
3. A year later, there is an acquisition. The newly-acquired team wants to reuse Acme's common material, but it needs to direct its users to an external Web site that lists the URLs, rather than a topic in the product documentation. Their key definition looks like the following:

```
<topicref  keys="product-recycling-info"
                  href="http://acme.example.com/server/recycling"
                  scope="external" format="html"/>
```

   When newly-acquired team uses the `recycling.dita` topic, it resolves to the external Web site; however for all other teams, the cross reference in the topic continues to resolves to their product-specific topic.
4. A new product team is formed, and the team forgets to include a key definition for "product-recycling-info" in one of their root maps. Because the cross reference in the `recycling.dita` topic contains a value for the `@href` attribute, the link falls back to `generic-recycling-info.dita`, thus avoiding a broken cross reference in the output.

4.4.10.10 Example: Link modification or removal

This scenario outlines how different authors can effectively remove or modify a `<link>` element in a shared topic.

A company wants to use a shared topic for information about customer support. For most products, the shared topic should include a link to a topic about extended warranties. But a small number of products do not offer extended warranties.

1. Team one creates the shared topic: `customer-support.dita`. The topic contains the following mark-up:

```
 <related-links>
  <link keyref="extended-warranties" href="common/extended-warranties.dita"/>
 </related-links>
```

2. The teams that need the link to the topic about extended warranties can reference the `customer-support.dita` topic in their DITA maps. When processed, the related link in the topic resolves to the `common/extended-warranties.dita` topic.
3. The teams that do not want the related link to the topic about extended warranties can include a key definition in their DITA map that does not include an `@href` attribute, for example:

```
<map>
  <!-- ... -->
  <keydef keys="extended-warranties"/>
  <!-- ... -->
</map>
```

   When processed, the related link in the topic is not rendered.

4. Yet another team wants to simply have a paragraph about extended warranties printed. They define the key definition for "extended-warranties" as follows:

```
<map>
  <!-- ... -->
  <keydef keys="extended-warranties"/>
    <topicmeta>
      <linktext>This product does not offer extended warranties.</linktext>
    </topicmeta>
  <!-- ... -->
</map>
```

   When this team renders their content, there is no hyperlink in the output, just the text "This product does not offer extended warranties" statement.

4.4.10.11 Example: Links from <term> or <keyword> elements

The @keyref attribute enables authors to specify that references to keywords or terms in a DITA topic can be rendered as a link to an associated resource.

In this scenario, a company with well-developed glossary wants to ensure that instances of a term that is defined in the glossary always include a link to the glossary topic.

1. An information architect adds values for the @keys attribute to all the of the <topicref> elements that are in the DITA map for the glossary, for example:

```
<map>
  <title>Company-wide glossary</title>
  <topicref keys="term-1" href="term-1.dita"/>
  <topicref keys="term-2" href="term-2.dita"/>
  <topicref keys="term-3" href="term-3.dita"/>
  <topicref keys="term-4" href="term-4.dita"/>
</map>
```

2. When authors refer to a term in a topic, they use the following mark-up:

```
<term keyref="term-1"/>
```

   When the <term> element is rendered, the content is provided by the <title> element of the glossary topic. The <term> element also is rendered as a link to the glossary topic.

4.4.10.12 Example: conref redirection

The @conkeyref attribute enables authors to share DITA topics that reuse content. It also enables map authors to specify different key definitions for common keys.

In this scenario, Acme produces content for a product that is also resold through a business partner. When the DITA content is published for the partner, several items must be different, including the following:

- Product names
- Standard notes that contain admonitions

Simply using the @conref attribute would not be possible for teams that use a component content management system where every DITA topic is addressed by a globally-unique identifier (GUID).

1. Authors reference the reusable content in their topics by using the @conkeyref attribute, for example:

```
<task id="reusable-product-content">
  <title><keyword conkeyref="reuse/product-name"/> prerequisites</title>
  <taskbody>
    <prereq><note conkeyref="reuse/warning-1"/></prereq>
```

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```
    <!-- ... -->
  </taskbody>
</task>
```

2. Authors create two different topics; one topic contains elements appropriate for Acme, and the other topic contains elements appropriate for the partner. Note that each reuse topic must use the same element types (or compatible specializations) and values for the `@id` attribute. For example, the following reuse file is appropriate for use by Acme:

   ```
   <topic id="acme-reuse">
     <title>Reuse topic for Acme</title>
     <body>
       <note id="warning-1">Admonitions for Acme</note>
       <p><keyword id="product-name">Acme product name</keyword></p>
       <!-- ... -->
     </body>
   </topic>
   ```

   The following reuse file is appropriate for use by the OEM partner:

   ```
   <topic id="oem-reuse">
     <title>Reuse topic for OEM partner</title>
     <body>
       <note id="warning-1">Admonitions for partner</note>
       <p><keyword id="product-name">OEM product name</keyword></p>
       <!-- ... -->
     </body>
   </topic>
   ```

3. The two versions of the DITA maps each contain different key definitions for the key name "reuse". (This associates a key with the topic that contains the appropriate reusable elements.) For example:

   ```
   <map>
     <!-- ... -->
     <keydef keys="reuse" href="acme-reuse.dita"/>
     <!-- ... -->
   </map>
   ```

   Figure 15: DITA map for Acme

   ```
   <map>
     <!-- ... -->
     <keydef keys="reuse" href="oem-reuse.dita"/>
     <!-- ... -->
   </map>
   ```

   Figure 16: DITA map for OEM partner

When each of the DITA maps is published, the elements that are referenced by `@conkeyref` will use the reuse topic that is referenced by the `<keydef>` element in the map. The product names and warnings will be different in the output.

4.4.10.13 Example: Key scopes and omnibus publications

Key scopes enable you to create omnibus publications that include multiple submaps that define the same key names for common items, such as product names or common topic clusters.

In this scenario, a training organization wants to produce a deliverable that includes all of their training course materials. Each course manual uses common keys for standard parts of the course materials, including "prerequisites," "overview", "assessment", and "summary.

An information architect creates a root map that contains the following markup:

```
<map xml:lang="en">
  <title>Training courses</title>
  <mapref href="course-1.ditamap"/>
  <mapref href="course-2.ditamap"/>
  <mapref href="course-3.ditamap"/>
  <topicref href="omnibus-summary.dita"/>
</map>
```

Each of the submaps contain `<topicref>` elements that refer to resources using the `@keyref` attribute. Each submap uses common keys for standard parts of the course materials, including "prerequisites," "overview", "assessment", and "summary", and their key definitions bind the key names to course-specific resources. For example:

```
<map xml:lang="en">
  <title>Training course #1</title>
  <mapref href="course-1/key-definitions.ditamap"/>
  <topicref keyref="prerequisites"/>
  <topicref keyref="overview"/>
  <topicref keyref="assessment"/>
  <topicref keyref="summary"/>
</map>
```

Without using key scopes, the effective key definitions for the common keys resolve to those found in `course-1.ditamap`. This is not the desired outcome. By adding key scopes to the submaps, however, the information architect can ensure that the key references in the submaps resolve to the course-specific key definitions.

```
<map xml:lang="en">
  <title>Training courses</title>
  <mapref href="course-1.ditamap" keyscope="course-1"/>
  <mapref href="course-2.ditamap" keyscope="course-2"/>
  <mapref href="course-3.ditamap" keyscope="course-3"/>
  <topicref href="omnibus-summary.dita"/>
</map>
```

The information architect does **not** set `keys="summary"` on the `<topicref>` element in the root map. Doing so would mean that all key references to "summary" in the submaps would resolve to `omnibus-summary.dita`, rather than the course-specific summary topics. This is because key definitions located in parent scopes override those located in child scopes.

4.4.10.14 Example: How key scopes affect key precedence

For purposes of key definition precedence, the scope-qualified key definitions from a child scope are considered to occur at the location of the scope-defining element within the parent scope.

Within a single key scope, key precedence is determined by which key definition comes first in the map, or by the depth of the submap that defines the key. This was true for all key definitions prior to DITA 1.3, because all key definitions were implicitly in the same key scope. Scope-qualified key names differ in that precedence is determined by the location where the key scope is defined.

This distinction is particularly important when key names or key scope names contain periods. While avoiding periods within these names will avoid this sort of issue, such names are legal so processors will need to handle them properly.

The following root map contains one submap and one key definition. The submap defines a key named "sample".

```
<map>
  <!-- The following mapref defines the key scope "scopeName" -->
  <mapref href="submap.ditamap" keyscope="scopeName"/>
  <!-- The following keydef defines the key "scopeName.sample" -->
  <keydef keys="scopeName.sample" href="losing-key.dita"/>

  <!-- Other content, key definitions, etc. -->
</map>
```

Figure 17: Root map

```
<map>
  <keydef keys="sample" href="winning-key.dita"/>
  <!-- Other content, key definitions, etc. -->
</map>
```

Figure 18: Submap

When determining precedence, all keys from the key scope "scopeName" occur at the location of the scope-defining element -- in this case, the `<mapref>` element in the root map. Because the `<mapref>` comes first in the root map, the scope-qualified key name "scopeName.sample" that is pulled from `submap.ditamap` occurs before the definition of "scopeName.sample" in the root map. This means that in the context of the root map, the effective definition of "scopeName.sample" is the scope-qualified key definition that references `winning-key.dita`.

The following illustration shows a root map and several submaps. Each submap defines a new key scope, and each map defines a key. In order to aid understanding, this sample does not use valid DITA markup; instead, it shows the content of submaps inline where they are referenced.

```
<map>   <!-- Start of the root map -->

  <mapref href="submapA.ditamap" keyscope="scopeA">
    <!-- Contents of submapA.ditamap begin here -->
    <mapref href="submapB.ditamap" keyscope="scopeB">
      <!-- Contents of submapB.ditamap: define key MYKEY -->
      <keydef keys="MYKEY" href="example-ONE.dita"/>
    </mapref>
    <keydef keys="scopeB.MYKEY" href="example-TWO.dita"/>
    <!-- END contents of submapA.ditamap -->
  </mapref>

  <mapref href="submapC.ditamap" keyscope="scopeA.scopeB">
    <!-- Contents of submapC.ditamap begin here -->
    <keydef keys="MYKEY" href="example-THREE.dita"/>
  </mapref>

  <keydef keys="scopeA.scopeB.MYKEY" href="example-FOUR.dita"/>
</map>
```

Figure 19: Complex map with multiple submaps and scopes

The sample map shows four key definitions. From the context of the root scope, all have key names of "scopeA.scopeB.MYKEY".

1. `submapB.ditamap` defines the key "MYKEY". The key scope "scopeB" is defined on the `<mapref>` to `submapB.ditamap`, so from the context of `submapA.ditamap`, the scope-qualified key name is "scopeB.MYKEY". The key scope "scopeA" is defined on the `<mapref>` to `submapA.ditamap`, so from the context of the root map, the scope-qualified key name is "scopeA.scopeB.MYKEY".
2. `submapA.ditamap` defines the key "scopeB.MYKEY". The key scope "scopeA" is defined on the `<mapref>` to `submapA.ditamap`, so from the context of the root map, the scope-qualified key name is "scopeA.scopeB.MYKEY".

3. `submapC.ditamap` defines the key "MYKEY". The key scope "scopeA.scopeB" is defined on the `<mapref>` to `submapC.ditamap`, so from the context of the root map, the scope-qualified key name is "scopeA.scopeB.MYKEY".
4. Finally, the root map defines the key "scopeA.scopeB.MYKEY".

Because scope-qualified key definitions are considered to occur at the location of the scope-defining element, the effective key definition is the one from `submapB.ditamap` (the definition that references `example-ONE.dita`).

4.4.10.15 Example: Keys and collaboration

Keys enable authors to collaborate and work with evolving content with a minimum of time spent reworking topic references.

In this scenario, authors collaborate on a publication that includes content for a product that is in the early stages of development. The company documentation is highly-structured and uses the same organization for all publications: "Introduction," "Example," and "Reference."

1. Author one creates a submap for the new product information. She knows the structure that the final content will have, but she does not want to create empty topics for information that is not yet available. She decides to initially author what content is available in a single topic. When more content is available, she'll create additional topics. Her DITA map looks like the following:

   ```
   <map>
     <title>New product content</title>
     <topicref keys="1-overview 1-intro 1-example 1-reference" href="1-overview.dita"/>
   </map>
   ```
2. Author two knows that he needs to add a `<topicref>` to the "Example" topic that will eventually be authored by author one. He references the not-yet-authored topic by key reference:

   ```
   <topicref keyref="1-example"/>
   ```

   His topic reference initially resolves to the `1-overview.dita` topic.
3. Author one finally gets the information that she was waiting on. She creates additional topics and modifies her DITA map as follows:

   ```
   <map>
     <title>New product content</title>
     <topicref keys="1-overview" href="1-overview.dita">
       <topicref keys="1-intro" href="1-intro.dita"/>
       <topicref keys="1-example" href="1-example.dita"/>
       <topicref keys="1-reference" href="1-reference.dita"/>
     </topicref>
   </map>
   ```

   Without needing to make any changes to the content, author two's topic reference now resolves to the `1-example.dita` topic.

5 DITA processing

DITA processing is affected by a number of factors, including attributes that indicate the set of vocabulary and constraint modules on which a DITA document depends; navigation; linking; content reuse (using direct or indirect addressing); conditional processing; branch filtering; chunking; and more. In addition, translation of DITA content is expedited through the use of the `@dir`, `@translate`, and `@xml:lang` attributes, and the `<index-sort-as>` element.

5.1 Navigation

DITA includes markup that processors can use to generate reader navigation to or across DITA topics. Such navigation behaviors include table of contents (TOCs) and indexes.

5.1.1 Table of contents

Processors can generate a table of contents (TOC) based on the hierarchy of the elements in a DITA map. By default, each `<topicref>` element in a map represents a node in the TOC. These topic references define a navigation tree.

When a map contains a topic reference to a map (often called a map reference), processors should integrate the navigation tree of the referenced map with the navigation tree of the referencing map at the point of reference. In this way, a deliverable can be compiled from multiple DITA maps.

Note: If a `<topicref>` element that references a map contains child `<topicref>` elements, the processing behavior regarding the child `<topicref>` elements is undefined.

Note: If a `<topicref>` element that references a map contains child `<topicref>` elements, the processing behavior regarding the child `<topicref>` elements is undefined.

The effective navigation title is used for the value of the TOC node. A TOC node is generated for every `<topicref>` element that references a topic or specifies a navigation title, except in the following cases:

- The `@processing-role` attribute that is specified on the `<topicref>` element or an ancestor element is set to "resource-only".
- Conditional processing is used to filter out the node or an ancestor node.
- There is no information from which a TOC entry can be constructed; there is no referenced resource or navigation title.
- The node is a `<topicgroup>` element, even if it specifies a navigation title.

To suppress a `<topicref>` element from appearing in the TOC, set the `@toc` attribute to "no". The value of the `@toc` attribute cascades to child `<topicref>` elements, so if `@toc` is set to "no" on a particular `<topicref>`, all children of the `<topicref>` element are also excluded from the TOC. If a child `<topicref>` overrides the cascading operation by specifying `toc="yes"`, then the node that specifies `toc="yes"` appears in the TOC (minus the intermediate nodes that set `@toc` to "no").

5.1.2 Indexes

An index can be generated from index entries that occur in topic bodies, topic prologs, or DITA maps.

The specialized indexing domain also provides elements to enable additional indexing function, such as "See" and "See also".

For more information, see Indexing-group domain elements (297).

5.2 Content reference (conref)

The DITA conref attributes provide mechanisms for reusing content. DITA content references support reuse scenarios that are difficult or impossible to implement using other XML-based inclusion mechanisms like XInclude and entities. Additionally, DITA content references have rules that help ensure that the results of content inclusion remain valid after resolution

Related concepts

6.6.5.4 Weak and strong constraints (145)
Constraints can be classified into two categories: Weak and strong. This classification determines whether processors enforce strict compatibility during `@conref` or `@conkeyref` resolution.

5.2.1 Conref overview

The DITA `@conref`, `@conkeyref`, `@conrefend`, and `@conaction` attributes provide mechanisms for reusing content within DITA topics or maps. These mechanisms can be used both to pull and push content.

This topic uses the definitions of referenced element (0) and referencing element (0) as defined in DITA terminology and notation (13).

Pulling content to the referencing element

When the `@conref` or `@conkeyref` attribute is used alone, the referencing element acts as a placeholder for the referenced element, and the content of the referenced element is rendered in place of the referencing element.

The combination of the `@conrefend` attribute with either `@conref` or `@conkeyref` specifies a range of elements that is rendered in place of the referencing element. Although the start and end elements must be of the same type as the referencing element (or specialized from that element type), the elements inside the range can be any type.

Pushing content from the referencing element

The `@conaction` attribute reverses the direction of reuse from pull to push. With a push, the referencing element is rendered before, after, or in place of the referenced element. The location (before, after, or in place of) is determined by the value of the `@conaction` attribute. Because the `@conaction` and `@conrefend` attributes cannot both be used within the same referencing element, it is not possible to push a range of elements.

A fragment of DITA content, such as an XML document that contains only a single paragraph without a topic ancestor, does not contain enough information for the conref processor to be able to determine the validity of a reference to it. Consequently, the value of a conref must specify one of the following items:

- A referenced element within a DITA map
- A referenced element within a DITA topic
- An entire DITA map
- An entire DITA topic

Related reference

8.8.8.13.6 The conaction attribute (373)
The `@conaction` attribute allows users to push content from one topic into another. It causes the `@conref` attribute to work in reverse, so that the content is pushed from the current topic into another, rather than pulled from another topic into the current one. Allowable values for `@conaction` are: pushafter, pushbefore, pushreplace, mark, and -dita-use-conref-target.

8.8.8.13.8 The conkeyref attribute (381)

The `@conkeyref` attribute provides an indirect content reference to topic elements, map elements, or elements within maps or topics. When the DITA content is processed, the key references are resolved using key definitions from DITA maps.

8.8.8.13.5 The conref attribute (371)
The `@conref` attribute is used to reference content that can be reused. It allows reuse of DITA elements, including topic or map level elements.

8.8.8.13.7 The conrefend attribute (377)
The `@conrefend` attribute is used when referencing a range of elements with the conref mechanism. The `@conref` or `@conkeyref` attribute references the first element in the range, while `@conrefend` references the last element in the range.

5.2.2 Processing conrefs

When processing content references, DITA processors compare the restrictions of each context to ensure that the conrefed content is valid in its new context.

Except where allowed by weak constraints, a conref processor **MUST NOT** permit resolution of a reuse relationship that could be rendered invalid under the rules of either the reused or reusing content.

Note: The DITA `@conref` attribute is a transclusion mechanism similar to XInclude and to HyTime value references. DITA differs from these mechanisms, however, in that conref validity does not apply simply to the current content at the time of replacement, but to the possible content given the restrictions of both the referencing document type and the referenced document type.

Note: The DITA `@conref` attribute is a transclusion mechanism similar to XInclude and to HyTime value references. DITA differs from these mechanisms, however, in that conref validity does not apply simply to the current content at the time of replacement, but to the possible content given the restrictions of both the referencing document type and the referenced document type.

When pulling content with the conref mechanism, if the referenced element is the same type as the referencing element, and the set of domains declared on the `@domains` attribute in the referenced topic or map instance is the same as or a subset of the domains declared in the referencing document, the element set allowed in the referenced element is guaranteed to be the same as, or a subset of, the element set allowed in the referencing element.

When pushing content with the conref mechanism, the domain checking algorithm is reversed. In this case, if the set of domains declared on the `@domains` attribute in the referencing topic or map instance is the same as or a subset of the domains declared in the referenced document, the element set allowed in the pushed content is guaranteed to be the same as, or a subset of, the element set allowed in the new location.

In both cases, processors resolving conrefs **SHOULD** tolerate specializations of valid elements and generalize elements in the pushed or pulled content fragment as needed for the resolving context.

Related concepts

6.6.3.7 domains attribute rules and syntax (134)
The `@domains` attribute enables processors to determine whether two elements or two documents use compatible domains. The attribute is declared on the root element for each topic or map type. Each structural, domain, and constraint module defines its ancestry as a parenthesized sequence of space-separated module names; the effective value of the `@domains` attribute is composed of these parenthesized sequences.

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5.2.3 Processing attributes when resolving conrefs

When resolving conrefs, processors need to combine the attributes that are specified on the referencing and referenced element.

The attribute specifications on the resolved element are drawn from both the referencing element and the referenced element, according to the following priority:

1. All attributes as specified on the referencing element, except for attributes set to "-dita-use-conref-target".
2. All attributes as specified on the referenced element except the `@id` attribute.
3. The `@xml:lang` attribute has special treatment as described in The xml:lang attribute (122).

The token -dita-use-conref-target is defined by the specification to enable easier use of `@conref` on elements with required attributes. The only time the resolved element would include an attribute whose specified value is "-dita-use-conref-target" is when the referenced element had that attribute specified with the "-dita-use-conref-target" value and the referencing element either had no specification for that attribute or had it also specified with the "-dita-use-conref-target" value. If the final resolved element (after the complete resolution of any conref chain, as explained below) has an attribute with the "-dita-use-conref-target" value, that element **MUST** be treated as equivalent to having that attribute unspecified.

A given attribute value on the resolved element comes in its entirety from either the referencing element or the referenced element; the attribute values of the referencing and referenced elements for a given attribute are never additive, even if the property (such as `@audience`) takes a list of values.

If the referenced element has a `@conref` attribute specified, the above rules should be applied recursively with the resolved element from one referencing/referenced combination becoming one of the two elements participating in the next referencing/referenced combination. The result should preserve without generalization all elements that are valid in the originating context, even if they are not valid in an intermediate context.

For example, if topic A and topic C allow highlighting, and topic B does not, then a content reference chain of topic A-to-topic B-to-topic C should preserve any highlighting elements in the referenced content. The result, however it is achieved, must be equivalent to the result of resolving the conref pairs recursively starting from the original referencing element in topic A.

Related reference

8.8.8.13.5.1 Using the -dita-use-conref-target value (372)
The value -dita-use-conref-target is available on enumerated attributes and can also be specified on other attributes. When an element uses `@conref` to pull in content, for any of its attributes assigned a value of "-dita-use-conref-target", the resulting value for those attributes is also pulled in from the referenced element.

5.2.4 Processing xrefs and conrefs within a conref

When referenced content contains a content reference or cross reference, the effective target of the reference depends on the form of address that is used in the referenced content. It also might depend on the map context, especially when key scopes are present.

Direct URI reference (but not a same-topic fragment identifier)

When the address is a direct URI reference of any form other than a same-topic fragment identifier, processors **MUST** resolve it relative to the source document that contains the original URI reference.

Same-topic fragment identifier

When the address is a same-topic fragment identifier, processors **MUST** resolve it relative to the location of the content reference (referencing context).

Key reference

When the address is a key reference, processors **MUST** resolve it relative to the location of the content reference (referencing context).

When resolving key references or same-topic fragment identifiers, the phrase *location of the content reference* means the final resolved context. For example, in a case where content references are chained (topic A pulls from topic B, which in turn pulls a reference from topic C), the reference is resolved relative to the topic that is rendered. When topic B is rendered, the reference is resolved relative to the content reference in topic B; when topic A is rendered, the reference is resolved relative to topic A. If content is pushed from topic A to topic B to topic C, then the same-topic fragment identifier is resolved in the context of topic C.

The implication is that a content reference or cross reference can resolve to different targets in different use contexts. This is because a URI reference that contains a same-topic fragment identifier is resolved in the context of the topic that contains the content reference, and a key reference is resolved in the context of the key scope that is in effect for each use of the topic that contains the content reference.

Note: In the case of same-topic fragment identifiers, it is the responsibility of the author of the content reference to ensure that any element IDs that are specified in same-topic fragment identifiers in the referenced content will also be available in the referencing topic at resolution time.

Note: In the case of same-topic fragment identifiers, it is the responsibility of the author of the content reference to ensure that any element IDs that are specified in same-topic fragment identifiers in the referenced content will also be available in the referencing topic at resolution time.

Example: Resolving conrefs to elements that contain cross references

Consider the following paragraphs in `paras-01.dita` that are intended to be used by reference from other topics:

```
<topic id="paras-01"><title>Reusable paragraphs</title>
    <body>
        <p id="p1">See <xref href="#paras-01/p5"/>.</p>
        <p id="p2">See <xref href="topic-02.dita#topic02/fig-01"/>.</p>
        <p id="p3">See <xref href="#./p5"/>.</p>
        <p id="p4">See <xref keyref="task-remove-cover"/>.</p>
        <p id="p5">Paragraph 5 in paras-01.</p>
    </body>
</topic>
```

The paragraphs are used by content reference from other topics, including the `using-topic-01.dita` topic:

```
<topic id="using-topic-01"><title>Using topic one</title>
    <body>
        <p id="A" conref="paras-01.dita#paras-01/p1"/>
        <p id="B" conref="paras-01.dita#paras-01/p2"/>
        <p id="C" conref="paras-01.dita#paras-01/p3"/>
        <p id="D" conref="paras-01.dita#paras-01/p4"/>
        <p id="p5">Paragraph 5 in using-topic-01</p>
    </body>
</topic>
```

Following resolution of the content references and processing of the `<xref>` elements in the referenced paragraphs, the rendered cross references in `using-topic-01.dita` are shown in the following table.

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Paragraph	**Value of `@id` attribute on conrefed paragraph**	**`<xref>` within conrefed paragraph**	**Resolution**
A	p1	`<xref href="#paras-01/p5"/>`	The cross reference in paragraph p1 is a direct URI reference that does not contain a same-topic fragment identifier. It can be resolved only to paragraph p5 in `paras-01.dita`, which contains the content "Paragraph 5 in paras-01".
B	p2	`<xref href="topic-02.dita#topic02/fig-01"/>`	The cross reference in paragraph p2 is a direct URI reference. It can be resolved only to the element with `id="fig-01"` in `topic-02.dita`.
C	p3	`<xref href="#./p5"/>`	The cross reference in paragraph p3 is a direct URI reference that contains a same-topic fragment identifier. Because the URI reference contains a same-topic fragment identifier, the reference is resolved in the context of the referencing topic (`using-topic-01.dita`). If `using-topic-01.dita` did not contain an element with `id="p5"`, then the conref to paragraph p3 would result in a link resolution failure.
D	p4	`<xref keyref="task-remove-cover"/>`	The cross reference in paragraph p4 is a key reference. It is resolved to whatever resource is bound to the key name "task-remove-cover" in the applicable map context.

Example: Resolving conrefs to elements that contain key-based cross references

Consider the following map, which uses the topics from the previous example:

```
<map>
  <topicgroup keyscope="product-1">
    <topicref keys="task-remove-cover" href="prod-1-task-remove-cover.dita"/>
    <topicref href="using-topic-01.dita"/>
  </topicgroup>
  <topicgroup keyscope="product-2">
    <topicref keys="task-remove-cover" href="prod-2-task-remove-cover.dita"/>
    <topicref href="using-topic-01.dita"/>
  </topicgroup>
</map>
```

The map establishes two key scopes: "product-1" and "product-2". Within the map branches, the key name "task-remove-cover" is bound to a different topic. The topic `using-topic-01.dita`, which includes a conref to a paragraph that includes a cross reference to the key name "task-remove-cover", is also referenced in each branch. When each branch is rendered, the target of the cross reference is different.

In the first branch with the key scope set to "product-1", the cross reference from paragraph p4 is resolved to `prod-1-task-remove-cover.dita`. In the second branch with the key scope set to "product-2", the cross reference from paragraph p4 is resolved to `prod-2-task-remove-cover.dita`.

5.3 Conditional processing (profiling)

Conditional processing, also known as profiling, is the filtering or flagging of information based on processing-time criteria.

DITA defines attributes that can be used to enable filtering and flagging individual elements. `@props` and any attribute specialized from `@props` (including those integrated by default in OASIS shells: `@audience`, `@deliveryTarget`, `@platform`, `@product`, `@otherprops`) allow conditions to be assigned to elements so that the elements can be included, excluded, or flagged during processing. The `@rev` flagging attribute allows values to be assigned to elements so that special formatting can be applied to those elements during processing. A conditional-processing profile specifies which elements to include, exclude, or flag. DITA defines a document type called DITAVAL for creating conditional-processing profiles.

Processors **SHOULD** be able to perform filtering and flagging using the attributes listed above. The `@props` attribute can be specialized to create new attributes, and processors **SHOULD** be able to perform conditional processing on specializations of `@props`.

Although metadata elements exist with similar names, such as the `<audience>` element, processors are not required to perform conditional processing using metadata elements.

Related concepts

3.3.4.2.1 Conditional processing attributes (46)
The metadata attributes specify properties of the content that can be used to determine how the content should be processed. Specialized metadata attributes can be defined to enable specific business-processing needs, such as semantic processing and data mining.

Related reference

8.8.8.1.2 Metadata attribute group (357)
The metadata attribute group includes common metadata attributes, several of which support conditional processing (filtering and flagging) or the creation of new attribute domain specializations.

8.8.7.2 DITAVAL elements (347)
A conditional processing profile (DITAVAL file) is used to identify which values are to be used for conditional processing during a particular output, build, or some other purpose. The profile should have an extension of `.ditaval`.

5.3.1 Conditional processing values and groups

Conditional processing attributes classify elements with metadata. The metadata is specified using space-delimited string values or grouped values.

For example, the string values within `@product` in `<p product="basic deluxe">` indicate that the paragraph applies to the “basic” product and to the “deluxe” product.

Groups can be used to organize classification metadata into subcategories. This is intended to support situations where a predefined metadata attribute applies to multiple specialized subcategories. The grouping syntax exactly matches the syntax used for generalized attributes, making it valid inside `@props` and any attribute specialized from `@props` (including those integrated by default in OASIS shells: `@audience`, `@deliveryTarget`, `@platform`, `@product`, `@otherprops`).

For example, the `@product` attribute can be used to classify an element based on both related databases and related application servers. Using groups for these subcategories allows each category to be processed independently; when filter conditions exclude all applicable databases within a group, the element can be safely excluded, regardless of any other `@product` conditions.

Groups can be used within `@props` and any attribute specialized from `@props` (including those integrated by default in OASIS shells: `@audience`, `@deliveryTarget`, `@platform`, `@product`, `@otherprops`). The following rules apply:

- Groups consist of a name immediately followed by a parenthetical group of zero or more space-delimited string values. For example, `"groupName(valueOne valueTwo)"`.
- Groups cannot be nested.
- If two groups with the same name are found in a single attribute, they should be treated as if all values are specified in the same group. The following values for the `@otherprops` attribute are equivalent:

  ```
  otherprops="groupA(a b) groupA(c) groupZ(APPNAME)"
  otherprops="groupA(a b c) groupZ(APPNAME)"
  ```
- If both grouped values and ungrouped values are found in a single attribute, the ungrouped values belong to an implicit group; the name of that group matches the name of the attribute. Therefore, the following values for the `@product` attribute are equivalent:

  ```
  product="a database(dbA dbB) b appserver(mySERVER) c"
  product="product(a b c) database(dbA dbB) appserver(mySERVER)"
  ```

Setting a conditional processing attribute to an empty value, such as `product=""`, is equivalent to omitting that attribute from the element. An empty group within an attribute is equivalent to omitting that group from the attribute. For example, `<ph product="database() A">` is equivalent to `<ph product="A">`. Combining both rules into one example, `<ph product="operatingSystem()">` is equivalent to `<ph>`.

If two groups with the same name exist on different attributes, a rule specified for that group will evaluate the same way on each attribute. For example, if the group "sampleGroup" is specified within both `@platform` and `@otherprops`, a DITAVAL rule for `sampleGroup="value"` will evaluate the same in each attribute. If there is a need to distinguish between similarly named groups on different attributes, the best practice is to use more specific group names such as platformGroupname and productGroupname. Alternatively, DITAVAL rules can be specified based on the attribute name rather than the group name.

If the same group name is used in different attributes, a complex scenario could be created where different defaults are specified for different attributes, with no rule set for a group or individual value. In this case a value might end up evaluating differently in the different attributes. For example, a DITAVAL can set a default of "exclude" for `@platform` and a default of "flag" for `@product`. If no rules are specified for group `oddgroup()`, or for the value `oddgroup="edgecase"`, the attribute `platform="oddgroup(edgecase)"` will evaluate to "exclude" while `product="oddgroup(edgecase)"` will resolve to "flag". See DITAVAL elements (347) for information on how to change default behaviors in DITAVAL profile.

Related reference

8.8.8.1.2 Metadata attribute group (357)
The metadata attribute group includes common metadata attributes, several of which support conditional processing (filtering and flagging) or the creation of new attribute domain specializations.

8.8.7.2 DITAVAL elements (347)

A conditional processing profile (DITAVAL file) is used to identify which values are to be used for conditional processing during a particular output, build, or some other purpose. The profile should have an extension of `.ditaval`.

5.3.2 Filtering

At processing time, a conditional processing profile can be used to specify profiling attribute values that determine whether an element with those values is included or excluded.

By default, values in conditional processing attributes that are not defined in a DITAVAL profile evaluate to "include". For example, if the value audience="novice" is used on a paragraph, but this value is not defined in a DITAVAL profile, the attribute evaluates to "include".

However, the DITAVAL profile can change this default to "exclude", so that any value not explicitly defined in the DITAVAL profile will evaluate to "exclude". The DITAVAL profile also can be used to change the default for a single attribute; for example, it can declare that values in the `@platform` attribute default to "exclude", while those in the `@product` attribute default to include. See DITAVAL elements (347) for information on how to set up a DITAVAL profile and how to change default behaviors.

When deciding whether to include or exclude a particular element, a processor should evaluate each attribute independently:

1. For each attribute:
   - If the attribute is empty, or contains only empty groups, it is equivalent to omitting the attribute from the element. If evaluated for the purposes of filtering, the attribute is treated as "include", because an omitted attribute cannot evaluate to "exclude".
   - If the attribute value does not contain any groups, then if any token in the attribute value evaluates to "include", the element evaluates to "include"; otherwise it evaluates to "exclude". In other words, the attribute evaluates to "exclude" only when **all** the values in that attribute evaluate to "exclude".
   - If the attribute value does include groups, evaluate as follows, treating ungrouped tokens together as a group:
     a. For each group (including the group of ungrouped tokens), if any token inside the group evaluates to "include", the group evaluates to "include"; otherwise it evaluates to "exclude". In other words, a group evaluates to "exclude" only when every token in that group evaluates to "exclude".
     b. If any group within an attribute evaluates to "exclude", that attribute evaluates to "exclude"; otherwise it evaluates to "include".
2. If **any single attribute** evaluates to exclude, the element is excluded.

For example, if a paragraph applies to three products and the publisher has chosen to exclude all of them, the processor should exclude the paragraph. This is true even if the paragraph applies to an audience or platform that is not excluded. But if the paragraph applies to an additional product that has not been excluded, then its content is still relevant for the intended output and should be preserved.

Similarly, with groups, a step might apply to one application server and two database applications:

```
<steps>
  <step><cmd>Common step</cmd></step>
  <step product="appserver(mySERVER) database(ABC dbOtherName)">
    <cmd>Do something special for databases ABC or OtherName when installing on mySERVER</cmd>
  </step>
  <!-- additional steps -->
</steps>
```

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If a publisher decides to exclude the application server mySERVER, then the appserver() group evaluates to exclude. This can be done by setting `product="mySERVER"` to exclude *or* by setting `appserver="mySERVER"` to exclude. This means the step should be excluded, regardless of how the values "ABC" or "dbOtherName" evaluate. If a rule is specified for both `product="mySERVER"` and `appserver="mySERVER"`, the rule for the more specific group name "appserver" takes precedence.

Similarly, if both "ABC" and "dbOtherName" evaluate to exclude, then the database() group evaluates to exclude and the element should be excluded regardless of how the "mySERVER" value is set.

In more advanced usage, a DITAVAL can be used to specify a rule for a group name. For example, an author could create a DITAVAL rule that sets `product="database"` to "exclude". This is equivalent to setting a default of "exclude" for any individual value in a database() group; it also excludes the more common usage of "database" as a single value within the `@product` attribute. Thus when "myDB" appears in a database() group within the `@product` attribute, the full precedence for determining whether to include or exclude the value is as follows:

1. Check for a DITAVAL rule for `database="myDB"`
2. Check for a DITAVAL rule for `product="myDB"`
3. Check for a DITAVAL rule for `product="database"` (default for the database group)
4. Check for a DITAVAL rule for "product" (default for the `@product` attribute)
5. Check for a default rule for all conditions (default of include or exclude for all attributes)
6. Otherwise, evaluate to "include"

Related reference

8.8.8.1.2 Metadata attribute group (357)
The metadata attribute group includes common metadata attributes, several of which support conditional processing (filtering and flagging) or the creation of new attribute domain specializations.

DITAVAL markup with extended filtering example (354)
The `<val>` element is the root element of a DITAVAL file.

5.3.3 Flagging

Flagging is the application of text, images, or styling during rendering. This can highlight the fact that content applies to a specific audience or operating system, for example; it also can draw a reader's attention to content that has been marked as being revised.

At processing time, a conditional processing profile can be used to specify profiling attribute values that determine whether an element with those values is flagged.

When deciding whether to flag a particular element, a processor should evaluate each value. Wherever an attribute value that has been set as flagged appears (for example, `audience="administrator"`), the processor should add the flag. When multiple flags apply to a single element, multiple flags should be rendered, typically in the order that they are encountered.

When the same element evaluates as both flagged and included, the element should be flagged and included. When the same element evaluates as both flagged and filtered (for example, flagged because of a value for the `@audience` attribute and filtered because of a value for the `@product` attribute value), the element should be filtered.

Related reference

DITAVAL markup with extended flagging example (354)
The `<val>` element is the root element of a DITAVAL file.

DITAVAL markup for flagging revisions (350)

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Identifies a value in the `@rev` attribute that should be flagged in some manner. Unlike the conditional processing attributes, which can be used for both filtering and flagging, the `@rev` attribute only can be used for flagging.

5.3.4 Conditional processing to generate multiple deliverable types

By default, the content of most elements is included in all output media. Within maps and topics, elements can specify the delivery targets to which they apply.

Within maps, topic references can use the `@deliveryTarget` attribute to indicate the delivery targets to which they apply.

Within topics, most elements can use the `@deliveryTarget` attribute to indicate the delivery targets to which they apply.

If a referenced topic should be excluded from all output formats, set the `@processing-role` attribute to "resource-only" instead of using the `@deliveryTarget`. Content within that topic can still be referenced for display in other locations.

@deliveryTarget attribute

@deliveryTarget

The intended delivery target of the content, for example "html", "pdf", or "epub".

The `@deliveryTarget` attribute is specialized from the `@props` attribute. It is defined in the deliveryTargetAttDomain, which is integrated into all OASIS-provided document-type shells. If this domain is not integrated into a given document-type shell, the `@deliveryTarget` attribute will not be available.

The `@deliveryTarget` attribute is processed the same way as any other conditional processing attribute. For example, the element `<topicref deliveryTarget="html5 epub" href="example.dita"/>` uses two values for `@deliveryTarget`. A conditional processing profile can then set rules for `@deliveryTarget` that determine whether the topic `example.dita` is included or excluded when the map is rendered as HTML5 or EPUB.

5.3.5 Examples of conditional processing

This section provides examples that illustrate the ways that conditional processing attributes can be set and used.

Related reference

DITAVAL markup with additional filtering and flagging examples (354)
The `<val>` element is the root element of a DITAVAL file.

5.3.5.1 Example: Setting conditional processing values and groups

Conditional processing attributes can be used to classify content using either individual values or using groups.

Example: Simple product values

In the following example, the first configuration option applies only to the "extendedprod" product, while the second option applies to both "extendedprod" and to "baseprod". The entire `<p>` element containing the list applies to an audience of "administrator".

```
<p audience="administrator">Set the configuration options:
  <ul>
    <li product="extendedprod">Set foo to bar</li>
    <li product="basicprod extendedprod">Set your blink rate</li>
    <li>Do some other stuff</li>
    <li>Do a special thing for Linux</li>
  </ul>
</p>
```

Example: Grouped values on an attribute

The following example indicates that a step applies to one application server and two databases. Specifically, this step only applies when it is taken on the server "mySERVER"; likewise, it only applies when used with the databases "ABC" or "dbOtherName".

```
<steps>
  <step><cmd>Common step</cmd></step>
  <step product="appserver(mySERVER) database(ABC dbOtherName)">
    <cmd>Do something special for databases ABC or OtherName when installing on mySERVER</
cmd>
  </step>
  <!-- additional steps -->
</steps>
```

5.3.5.2 Example: Filtering and flagging topic content

A publisher might want to flag information that applies to administrators, and to exclude information that applies to the extended product.

Consider the following DITA source fragment and conditional processing profile:

```
<p audience="administrator">Set the configuration options:
  <ul>
    <li product="extendedprod">Set foo to bar</li>
    <li product="basicprod extendedprod">Set your blink rate</li>
    <li>Do some other stuff</li>
    <li>Do a special thing for Linux</li>
  </ul>
</p>
```

Figure 20: DITA source fragment

```
<val>
  <prop att="audience" val="administrator" action="flag">
    <startflag><alt-text>ADMIN</alt-text></startflag>
  </prop>
  <prop att="product" val="extendedprod" action="exclude"/>
</val>
```

Figure 21: DITAVAL profile

When the content is rendered, the paragraph is flagged, and the first list item is excluded (since it applies to extendedprod). The second list item is still included; even though it does apply to extendedprod, it also applies to basicprod, which was not excluded.

The result should look something like the following:

ADMIN Set the configuration options:

- Set your blink rate
- Do some other stuff
- Do a special thing for Linux

5.4 Branch filtering

The branch filtering mechanism enables map authors to set filtering conditions for specific branches of a map. This makes it possible for multiple conditional-processing profiles to be applied within a single publication.

Without the branch filtering mechanism, the conditions specified in a DITAVAL document are applied globally. With branch filtering, the `<ditavalref>` element specifies a DITAVAL document that can be applied to a subset of content; the location of the `<ditavalref>` element determines the content to which filtering conditions are applied. The filtering conditions then are used to filter the map branch itself (map elements used to create the branch), as well as the local maps or topics that are referenced by that branch.

The `<ditavalref>` element also provides the ability to process a single branch of content multiple times, applying unique conditions to each instance of the branch.

5.4.1 Overview of branch filtering

Maps or map branches can be filtered by adding a `<ditavalref>` element that specifies the DITAVAL document to use for that map or map branch.

The `<ditavalref>` element is designed to manage conditional processing for the following use cases.

1. A map branch needs to be filtered using conditions that do not apply to the rest of the publication. For example, a root map might contain content that is written for both novice and expert users. However, the authors want to add a section that targets only novice users. Using branch filtering, a map branch can be filtered so that it only includes content germane to a novice audience, while the content of the rest of the map remains appropriate for multiple audiences.
2. A map branch needs to be presented differently for different audiences. For example, a set of software documentation might contain installation instructions that differ between operating systems. In that case, the map branch with the installation instructions needs to be filtered multiple times with distinct sets of conditions, while the rest of the map remains common to all operating systems.

Filtering rules often are specified globally, outside of the content. When global conditions set a property value to "exclude", that setting overrides any other settings for the same property that are specified at a branch level. Global conditions that set a conditional property to "include" or "flag" do not override branch-level conditions that set the same property to "exclude".

Using `<ditavalref>` elements, it is possible to specify one set of conditions for a branch and another set of conditions for a subset of the branch. As with global conditions, properties set to "exclude" for a map branch override any other settings for the same property specified for a subset of the branch. Branch conditions that set a conditional property to "include" or "flag" do not override conditions on a subset of the branch that explicitly set the same property to "exclude".

In addition to filtering, applications **MAY** support flagging at the branch level based on conditions that are specified in referenced DITAVAL documents.

5.4.2 Branch filtering: Single condition set for a branch

Using a single `<ditavalref>` element as a child of a map or map branch indicates that the map or map branch must be conditionally processed using the rules specified in the referenced DITAVAL document.

The following rules outline how the filtering conditions that are specified in DITAVAL document are applied:

<ditavalref> element as a direct child of a map

The filtering conditions are applied to the entire map.

<ditavalref> element within a map branch

The filtering conditions are used to process the entire branch, including the parent element that contains the `<ditavalref>` element.

<ditavalref> element within a <topicref> reference to a local map

The filtering conditions are applied to the submap.

<ditavalref> element within a <topicref> reference to peer map

The reference conditions are **not** applied to the peer map.

5.4.3 Branch filtering: Multiple condition sets for a branch

Using multiple `<ditavalref>` elements as the children of a map or map branch indicates that the map or map branch must be conditionally processed using the rules that are specified in the referenced DITAVAL documents.

When multiple `<ditavalref>` elements occur as children of the same element, the rules in the referenced DITAVAL documents are processed independently. This effectively requires a processor to maintain one copy of the branch for each `<ditavalref>`, so that each copy can be filtered using different conditions.

Note: In most cases, it is possible to create a valid, fully-resolved view of a map with branches copied to reflect the different `<ditavalref>` conditions. However, this might not be the case when multiple `<ditavalref>` elements occur as direct children of a root map. In this case, it is possible that the map could be filtered in a manner that results in two or more distinct versions of the `<title>` or metadata. How this is handled is processor dependent. For example, when a root map has three `<ditavalref>` elements as children of `<map>`, a conversion to EPUB could produce an EPUB with three versions of the content, or it could produce three distinct EPUB documents.

Note: In most cases, it is possible to create a valid, fully-resolved view of a map with branches copied to reflect the different `<ditavalref>` conditions. However, this might not be the case when multiple `<ditavalref>` elements occur as direct children of a root map. In this case, it is possible that the map could be filtered in a manner that results in two or more distinct versions of the `<title>` or metadata. How this is handled is processor dependent. For example, when a root map has three `<ditavalref>` elements as children of `<map>`, a conversion to EPUB could produce an EPUB with three versions of the content, or it could produce three distinct EPUB documents.

When a processor maintains multiple copies of a branch for different condition sets, it has to manage situations where a single resource with a single key name results in two distinct resources. Key names must be modified in order to allow references to a specific filtered copy of the resource; without renaming, key references could only be used to refer to a single filtered copy of the resource, chosen by the processor. See Branch filtering: Impact on resource and key names (104) for details on how to manage resource names and key names.

5.4.4 Branch filtering: Impact on resource and key names

When map branches are cloned by a processor in order to support multiple condition sets, processors must manage conflicting resource and key names. The ditavalref domain includes metadata elements that authors can use to specify how resource and key names are renamed.

Note: While the processing controls that are described here are intended primarily for use with map branches that specify multiple condition sets, they also can be used with map branches that include only a single `<ditavalref>` element.

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Note: While the processing controls that are described here are intended primarily for use with map branches that specify multiple condition sets, they also can be used with map branches that include only a single `<ditavalref>` element.

When a map branch uses multiple condition sets, processors create multiple effective copies of the branch to support the different conditions. This results in potential conflicts for resource names, key names, and key scopes. Metadata elements inside of the `<ditavalref>` element are available to provide control over these values, so that keys, key scopes, and URIs can be individually referenced within a branch.

For example, the following map branch specifies two DITAVAL documents:

```
<topicref href="productFeatures.dita" keys="features" keyscope="prodFeatures">
  <ditavalref href="novice.ditaval"/>
  <ditavalref href="admin.ditaval"/>
  <topicref href="newFeature.dita" keys="newThing"/>
</topicref>
```

In this case, the processor has two effective copies of `productFeatures.dita` and `newFeature.dita`. One copy of each topic is filtered using the conditions specified in `novice.ditaval`, and the other copy is filtered using the conditions specified in `admin.ditaval`. If an author has referenced a topic using `keyref="features"` or `keyref="prodFeatures.features"`, there is no way for a processor to distinguish which filtered copy is the intended target.

Metadata elements in the DITAVAL reference domain

Metadata within the `<ditavalref>` element makes it possible to control changes to resource names and key scope names, so that each distinct filtered copy can be referenced in a predictable manner.

<dvrResourcePrefix>

Enables a map author to specify a prefix that is added to the start of resource names for each resource in the branch.

<dvrResourceSuffix>

Enables a map author to specify a suffix that is added to the end of resource names (before any extension) for each resource in the branch.

<dvrKeyscopePrefix>

Enables a map author to specify a prefix that is added to the start of key scope names for each key scope in the branch. If no key scope is specified for the branch, this can be used to establish a new key scope, optionally combined with a value specified in `<dvrKeyscopeSuffix>`.

<dvrKeyscopeSuffix>

Enables a map author to specify a suffix that is added to the end of key scope names for each key scope in the branch.

For example, the previous code sample can be modified as follows to create predictable resource names and key scopes for the copy of the branch that is filtered using the conditions that are specified in `admin.ditaval`.

```
<topicref href="productFeatures.dita" keys="features" keyscope="prodFeatures">
  <ditavalref href="novice.ditaval"/>
  <ditavalref href="admin.ditaval">
    <ditavalmeta>
      <dvrResourcePrefix>admin-</dvrResourcePrefix>
      <dvrKeyscopePrefix>adminscope-</dvrKeyscopePrefix>
    </ditavalmeta>
  </ditavalref>
  <topicref href="newFeature.dita" keys="newThing"/>
</topicref>
```

The novice branch does not use any renaming, which allows it to be treated as the default copy of the branch. As a result, when the topics are filtered using the conditions that are specified in `novice.ditaval`, the resource names and key names are unmodified, so that references to the original resource name and key name will resolve to topics in the novice copy of the branch. This has the following effect on topics that are filtered using the conditions specified in `admin.ditaval`:

- The prefix `admin-` is added to the beginning of each resource name in the admin branch.
  - The resource `productFeatures.dita` becomes `admin-productFeatures.dita`
  - The resource `newFeature.dita` becomes `admin-newFeature.dita`
- The prefix `adminscope-` is added to the existing key scope "prodFeatures".
  - The attribute value `keyref="adminscope-prodFeatures.features"` refers explicitly to the admin copy of `productFeatures.dita`
  - The attribute `keyref="adminscope-prodFeatures.newThing"` refers explicitly to the admin copy of `newFeature.dita`

Note: In general, the best way to reference a topic that will be modified based on branch filtering is to use a key rather than a URI. Key scopes and key names (including those modified based on the elements above) must be calculated by processors before other processing. This means that in the example above, a key reference to `adminscope-prodFeatures.features` will always refer explicitly to the instance of `productFeatures.dita` filtered against the conditions in `admin.ditaval`, regardless of whether a processor has performed the filtering yet. References that use the URI `productFeatures.dita` or `admin-productFeatures.dita` could resolve differently (or fail to resolve), as discussed in Branch filtering: Implications of processing order (107).

Note: In general, the best way to reference a topic that will be modified based on branch filtering is to use a key rather than a URI. Key scopes and key names (including those modified based on the elements above) must be calculated by processors before other processing. This means that in the example above, a key reference to `adminscope-prodFeatures.features` will always refer explicitly to the instance of `productFeatures.dita` filtered against the conditions in `admin.ditaval`, regardless of whether a processor has performed the filtering yet. References that use the URI `productFeatures.dita` or `admin-productFeatures.dita` could resolve differently (or fail to resolve), as discussed in Branch filtering: Implications of processing order (107).

Renaming based on multiple <ditavalref> elements

It is possible for a branch with `<ditavalref>` already in effect to specify an additional `<ditavalref>`, where each `<ditavalref>` includes renaming metadata. When renaming, metadata on the `<ditavalref>` nested more deeply within the branch appears closer to the original resource or key name. For example:

```
<topicref href="branchParent.dita">
  <ditavalref href="parent.ditaval">
    <ditavalmeta>
      <dvrResourcePrefix>parentPrefix-</dvrResourcePrefix>
    </ditavalmeta>
  </ditavalref>
  <!-- additional topics or layers of nesting -->
  <topicref href="branchChild.dita">
    <ditavalref href="child.ditaval">
      <ditavalmeta>
        <dvrResourcePrefix>childPrefix-</dvrResourcePrefix>
      </ditavalmeta>
    </ditavalref>
  </topicref>
</topicref>
```

In this situation, the resource `branchChild.dita` is given a prefix based on both the reference to `parent.ditaval` and the reference to `child.ditaval`. The value "childPrefix-" is specified in the `<ditavalref>` that is nested more deeply within the branch, so it appears closer to the original resource name. The resource `branchChild.dita` would result in `parentPrefix-childPrefix-branchChild.dita`. Suffixes (if specified) would be added in a similar manner, resulting in a name like `branchChild-childSuffix-parentSuffix.dita`. Note that the hyphens are part of the specified prefix; they are not added automatically.

Handling resource name conflicts

It is an error if `<ditavalref>`-driven branch cloning results in multiple copies of a topic that have the same resolved name. Processors **SHOULD** report an error in such cases. Processors **MAY** recover by using an alternate naming scheme for the conflicting topics.

In rare cases, a single topic might appear in different branches that set different conditions, yet still produce the same result. For example, a topic might appear in both the admin and novice copies of a branch but not contain content that is tailored to either audience; in that case, the filtered copies would match. A processor **MAY** consider this form of equivalence when determining if two references to the same resource should be reported as an error.

5.4.5 Branch filtering: Implications of processing order

Because the branch filtering process can result in new or renamed keys, key scopes, or URIs, the full effects of the branch filtering process **MUST** be calculated by processors before they construct the effective map and key scope structure.

Note: The `@keyref` attribute and related attributes are explicitly disallowed on `<ditavalref>`. This prevents any confusion resulting from a `@keyref` that resolves to additional key- or resource-renaming metadata.

Note: The `@keyref` attribute and related attributes are explicitly disallowed on `<ditavalref>`. This prevents any confusion resulting from a `@keyref` that resolves to additional key- or resource-renaming metadata.

In general, the DITA specification refrains from mandating a processing order; thus publication results can vary slightly depending on the order in which processes are run. With branch filtering, processors are not required to apply filter conditions specified outside of the map and filter conditions specified with `<ditavalref>` at the same time in a publishing process.

For example, a processor might use the following processing order:

1. Apply externally-specified filter conditions to maps
2. Apply filtering based on `<ditavalref>` elements

Because externally-specified "exclude" conditions always take precedence over branch-specific conditions, content excluded based on external conditions will always be removed, regardless of the order in which processors evaluate conditions.

Processors should consider the following points when determining a processing order:

- If links are generated based on the map hierarchy, those links should be created using the renamed keys and URIs that result from evaluating the `<ditavalref>` filter conditions, to ensure that the links are consistent within the modified branches. For example, sequential links based on a map hierarchy should remain within the appropriate modified branch.

- If conrefs are resolved in topics before the `<ditavalref>` filtering conditions are evaluated, content that applies to multiple audiences can be brought in and (later in the process) selectively filtered by branch. For example, if a set of installation steps is pulled in with conref (from outside the branch), it might contain information that is later filtered by platform based on `<ditavalref>`. This results in copies of the steps that are specific to each operating system. If conref is processed after the `<ditavalref>`, content might be pulled in that has not been appropriately filtered for the new context.
- The same scenario applies to conref values that push content into the branch.
  - Pushing content into a branch before resolving the `<ditavalref>` conditions allows content for multiple conditions to be pushed and then filtered by branch based on the `<ditavalref>` conditions.
  - If the branch using `<ditavalref>` pushes content elsewhere, resolving `<ditavalref>` first could result in multiple copies of the content to be pushed (one for each branch), resulting in multiple potentially conflicting copies pushed to the new destination.

5.4.6 Examples of branch filtering

The branch filtering examples illustrate the processing expectations for various scenarios that involve `<ditavalref>` elements. Processing examples use either before and after sample markup or expanded syntax that shows the equivalent markup without the `<ditavalref>` elements.

5.4.6.1 Example: Single <ditavalref> on a branch

A single `<ditavalref>` element can be used to supply filtering conditions for a branch.

Consider the following DITA map and the DITAVAL file that is referenced from the `<ditavalref>` element:

```
<map>
  <topicref href="intro.dita"/>
  <topicref href="install.dita">
    <ditavalref href="novice.ditaval"/>
    <topicref href="do-stuff.dita"/>
    <topicref href="advanced-stuff.dita" audience="admin"/>
    <!-- more topics -->
  </topicref>
  <!-- Several chapters worth of other material -->
</map>
```

Figure 22: `input.ditamap`:

```
<val>
  <prop att="audience" val="novice" action="include"/>
  <prop att="audience" val="admin" action="exclude"/>
</val>
```

Figure 23: Contents of `novice.ditaval`

When this content is published, the following processing occurs:

- The first topic (`intro.dita`) does not use any of the conditions that are specified in `novice.ditaval`. It is published normally, potentially using other DITAVAL conditions that are specified externally.
- The second topic (`install.dita`) is filtered using any external conditions as well as the conditions that are specified in `novice.ditaval`.

- The third topic (`do-stuff.dita`) is filtered using any external conditions as well as the conditions that are specified in `novice.ditaval`.
- The fourth topic (`advanced-stuff.dita`) is removed from the map entirely, because it is filtered out with the conditions that are specified for the branch.

In this example, no resources are renamed based on the `<ditavalref>` processing.

Note: In cases where the original resource names map directly to names or anchors in a deliverable, the absence of renaming ensures that external links to those topics are stable regardless of whether a DITAVAL document is used.

Note: In cases where the original resource names map directly to names or anchors in a deliverable, the absence of renaming ensures that external links to those topics are stable regardless of whether a DITAVAL document is used.

5.4.6.2 Example: Multiple <ditavalref> elements on a branch

Multiple `<ditavalref>` elements can be used on a single map branch to create multiple distinct copies of the branch.

Consider the following DITA map that contains a branch with three peer `<ditavalref>` elements. Because topics in the branch are filtered in three different ways, processors are effectively required to handle three copies of the entire branch. Sub-elements within the `<ditavalref>` elements are used to control how new resource names are constructed for two copies of the branch; one copy (based on the conditions in `win.ditaval`) is left with the original file names.

```
<map>
  <topicref href="intro.dita"/>
  <!-- Begining of installing branch -->
  <topicref href="install.dita">
    <ditavalref href="win.ditaval"/>
    <ditavalref href="mac.ditaval">
      <ditavalmeta>
        <dvrResourceSuffix>-apple</dvrResourceSuffix>
      </ditavalmeta>
    </ditavalref>
    <ditavalref href="linux.ditaval">
      <ditavalmeta>
        <dvrResourceSuffix>-linux</dvrResourceSuffix>
      </ditavalmeta>
    </ditavalref>
    <topicref href="do-stuff.dita">
    <!-- more topics and nested branches -->
      <topicref href="mac-specific-stuff.dita" platform="mac"/>
    </topicref>
    <!-- End of installing branch -->
    <topicref href="cleanup.dita"/>
  </topicref>
</map>
```

Figure 24: `input.ditamap`

```
<val>
  <prop att="platform" val="win" action="include"/>
  <prop att="platform" action="exclude"/>
</val>
```

Figure 25: Contents of `win.ditaval`

```
<val>
  <prop att="platform" val="mac" action="include"/>
  <prop att="platform" action="exclude"/>
</val>
```

Figure 26: Contents of `mac.ditaval`

```
<val>
  <prop att="platform" val="linux" action="include"/>
  <prop att="platform" action="exclude"/>
</val>
```

Figure 27: Contents of `linux.ditaval`

When a processor evaluates this markup, it results in three copies of the installing branch. The following processing takes place:

- The first topic (`intro.dita`) is published normally, potentially using any other DITAVAL conditions that are specified externally.
- The installing branch appears three times, once for each DITAVAL document. The branches are created as follows:
  - The first branch uses the first DITAVAL document (`win.ditaval`). Resources use their original names as specified in the map. The `mac-specific-stuff.dita` topic is removed. The resulting branch, with indenting to show the hierarchy, matches the original without the mac topic:

    ```
    install.dita
       do-stuff.dita
         ...more topics and nested branches...
       cleanup.dita
    ```
  - The second branch uses the second DITAVAL document (`mac.ditaval`). Resources are renamed based on the `<dvrResourceSuffix>` element. The `mac-specific-stuff.dita` topic is included. The resulting branch, with indenting to show the hierarchy, is as follows:

    ```
    install-apple.dita
       do-stuff-apple.dita
          mac-specific-stuff-apple.dita
          ...more topics and nested branches...
       cleanup-apple.dita
    ```
  - The third branch uses the last DITAVAL document (`linux.ditaval`). Resources are renamed based on the `<dvrResourceSuffix>` element. The `mac-specific-stuff.dita` topic is removed. The resulting branch, with indenting to show the hierarchy, is as follows:

    ```
    install-linux.dita
       do-stuff-linux.dita
         ...more topics and nested branches...
       cleanup-linux.dita
    ```

The example used three DITAVAL documents to avoid triple maintenance of the installing branch in a map; the following map is functionally equivalent, but it requires parallel maintenance of each branch.

```
<map>
  <topicref href="intro.dita"/>
  <!-- Windows installing branch -->
  <topicref href="install.dita">
    <ditavalref href="win.ditaval"/>
    <topicref href="do-stuff.dita">
      <!-- more topics and nested branches -->
    </topicref>
    <topicref href="cleanup.dita"/>
  </topicref>
```

```
  <!-- Mac installing branch -->
  <topicref href="install.dita">
    <ditavalref href="mac.ditaval">
      <ditavalmeta><dvrResourceSuffix>-apple</dvrResourceSuffix></ditavalmeta>
    </ditavalref>
    <topicref href="do-stuff.dita">
      <topicref href="mac-specific-stuff.dita" platform="mac"/>
      <!-- more topics and nested branches -->
    </topicref>
    <topicref href="cleanup.dita"/>
  </topicref>
  <!-- Linux installing branch -->
  <topicref href="install.dita">
    <ditavalref href="linux.ditaval">
      <ditavalmeta><dvrResourceSuffix>-linux</dvrResourceSuffix></ditavalmeta>
    </ditavalref>
    <topicref href="do-stuff.dita">
      <!-- more topics and nested branches -->
    </topicref>
    <topicref href="cleanup.dita"/>
  </topicref>
  <!-- Several chapters worth of other material -->
</map>
```

Figure 28: `input.ditamap`

5.4.6.3 Example: Single <ditavalref> as a child of <map>

Using a `<ditavalref>` element as a direct child of the `<map>` element is equivalent to setting global filtering conditions for the map.

The following map is equivalent to processing all the contents of the map with the conditions in the `novice.ditaval` document. If additional conditions are provided externally (for example, as a parameter to the publishing process), those conditions take precedence.

```
<map>
  <title>Sample map</title>
  <ditavalref href="novice.ditaval"/>
  <!-- lots of content -->
</map>
```

5.4.6.4 Example: Single <ditavalref> in a reference to a map

Using a `<ditavalref>` element in a reference to a map is equivalent to setting filtering conditions for the referenced map.

In the following example, `other.ditamap` is referenced by a root map. The `<ditavalref>` element indicates that all of the content in `other.ditamap` should be filtered using the conditions specified in the `some.ditaval` document.

```
<topicref href="parent.dita">
  <topicref href="other.ditamap" format="ditamap">
    <ditavalref href="some.ditaval"/>
  </topicref>
</topicref>
```

Figure 29: Map fragment

```
<map>
  <topicref href="nestedTopic1.dita">
    <topicref href="nestedTopic2.dita"/>
  </topicref>
  <topicref href="nestedTopic3.dita"/>
</map>
```

Figure 30: Contents of `other.ditamap`

This markup is functionally equivalent to applying the conditions in `some.ditaval` to the topics that are referenced in the nested map. For the purposes of filtering, it could be rewritten in the following way. The extra `<topicgroup>` container is used here to ensure filtering is not applied to `parent.dita`, as it would not be in the original example:

```
<topicref href="parent.dita">
  <topicgroup>
    <ditavalref href="some.ditaval"/>
    <topicref href="nestedTopic1.dita">
      <topicref href="nestedTopic2.dita"/>
    </topicref>
    <topicref href="nestedTopic3.dita"/>
  </topicgroup>
</topicref>
```

For the purposes of filtering, this map also could be rewritten as follows.

```
<topicref href="parent.dita">
  <topicref href="nestedTopic1.dita">
    <ditavalref href="some.ditaval"/>
    <topicref href="nestedTopic2.dita"/>
  </topicref>
  <topicref href="nestedTopic3.dita">
    <ditavalref href="some.ditaval"/>
  </topicref>
</topicref>
```

Filtering based on the `<ditavalref>` element applies to the containing element and its children, so in each case, the files `nestedTopic1.dita`, `nestedTopic2.dita`, and `nestedTopic3.dita` are filtered against the conditions specified in `some.ditaval`. In each version, `parent.dita` is not a parent for the `<ditavalref>`, so it is not filtered.

5.4.6.5 Example: Multiple <ditavalref> elements as children of <map> in a root map

Using multiple instances of the `<ditavalref>` element as direct children of the `<map>` element in a root map is equivalent to setting multiple sets of global filtering conditions for the root map.

Note: Unlike most other examples of branch filtering, this example cannot be rewritten using a single valid map with alternate markup that avoids having multiple `<ditavalref>` elements as children of the same grouping element.

Note: Unlike most other examples of branch filtering, this example cannot be rewritten using a single valid map with alternate markup that avoids having multiple `<ditavalref>` elements as children of the same grouping element.

Processing the following root map is equivalent to processing all the contents of the map with the conditions in the `mac.ditaval` file and again with the `linux.ditaval` file. If additional conditions are provided externally (for example, as a parameter to the publishing process), those global conditions take precedence.

```
<map>
  <title>Setting up my product
on <keyword platform="mac">Mac</keyword><keyword platform="linux">Linux</keyword></title>
  <topicmeta>
    <othermeta platform="mac"   name="ProductID" content="1234M"/>
    <othermeta platform="linux" name="ProductID" content="1234L"/>
  </topicmeta>
  <ditavalref href="mac.ditaval"/>
  <ditavalref href="linux.ditaval"/>
  <!-- lots of content, including relationship tables -->
</map>
```

Figure 31: `input.ditamap`

```
<val>
  <prop att="platform" val="mac"   action="include"/>
  <prop att="platform" val="linux" action="exclude"/>
</val>
```

Figure 32: Contents of `mac.ditaval`

```
<val>
  <prop att="platform" val="mac"   action="exclude"/>
  <prop att="platform" val="linux" action="include"/>
</val>
```

Figure 33: Contents of `linux.ditaval`

Because the title and metadata each contain filterable content, processing using the conditions that are referenced by the `<ditavalref>` element results in two variants of the title and common metadata. While this cannot be expressed using valid DITA markup, it is conceptually similar to something like the following.

```
<!-- The following wrapperElement is not a real DITA element.
     It is used here purely as an example to illustrate one possible
     way of picturing the conditions. -->
<wrapperElement>
  <map>
    <title>Setting up my product on <keyword platform="mac">Mac</keyword></title>
    <topicmeta>
      <othermeta platform="mac"   name="ProductID" content="1234M"/>
    </topicmeta>
    <ditavalref href="mac.ditaval"/>
    <!-- lots of content, including relationship tables -->
  </map>
  <map>
    <title>Setting up my product on <keyword platform="linux">Linux</keyword></title>
    <topicmeta>
      <othermeta platform="linux" name="ProductID" content="1234L"/>
    </topicmeta>
    <ditavalref href="linux.ditaval"/>
    <!-- lots of content, including relationship tables -->
  </map>
</wrapperElement>
```

How this map is rendered is implementation dependent. If this root map is rendered as a PDF, possible renditions might include the following:

- Two PDFs, with one using the conditions from `mac.ditaval` and another using the conditions from `linux.ditaval`
- One PDF, with a title page that includes each filtered variant of the title and product ID, followed by Mac-specific and Linux-specific renderings of the content as chapters in the PDF
- One PDF, with the first set of filter conditions used to set book level titles and metadata, followed by content filtered with those conditions, followed by content filtered with conditions from the remaining `<ditavalref>` element.

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5.4.6.6 Example: Multiple <ditavalref> elements in a reference to a map

Using multiple instances of the `<ditavalref>` element in a reference to a map is equivalent to referencing that map multiple times, with each reference nesting one of the `<ditavalref>` elements.

In the following example, `other.ditamap` is referenced by a root map. The `<ditavalref>` elements provide conflicting sets of filter conditions.

```
<topicref href="parent.dita">
  <topicref href="other.ditamap" format="ditamap">
    <ditavalref href="audienceA.ditaval"/>
    <ditavalref href="audienceB.ditaval"/>
    <ditavalref href="audienceC.ditaval"/>
  </topicref>
</topicref>
```

Figure 34: Map fragment

This markup is functionally equivalent to referencing `other.ditamap` three times, with each reference including a single `<ditavalref>` elements. The fragment could be rewritten as:

```
<topicref href="parent.dita">
  <topicref href="other.ditamap" format="ditamap">
    <ditavalref href="audienceA.ditaval"/>
  </topicref>
  <topicref href="other.ditamap" format="ditamap">
    <ditavalref href="audienceB.ditaval"/>
  </topicref>
  <topicref href="other.ditamap" format="ditamap">
    <ditavalref href="audienceC.ditaval"/>
  </topicref>
</topicref>
```

Figure 35: Map fragment

5.4.6.7 Example: <ditavalref> within a branch that already uses <ditavalref>

When a branch is filtered because a `<ditavalref>` element is present, another `<ditavalref>` deeper within that branch can supply additional conditions for a subset of the branch.

In the following map fragment, a set of operating system conditions applies to installation instructions. Within that common branch, a subset of content applies to different audiences.

```
<topicref href="install.dita">
  <ditavalref href="linux.ditaval"/>
  <ditavalref href="mac.ditaval">
    <ditavalmeta>
      <dvrResourceSuffix>-mac</dvrResourceSuffix>
    </ditavalmeta>
  </ditavalref>
  <ditavalref href="win.ditaval">
    <ditavalmeta>
      <dvrResourceSuffix>-win</dvrResourceSuffix>
    </ditavalmeta>
  </ditavalref>
  <topicref href="perform-install.dita">
    <!-- other topics-->
  </topicref>
  <!-- Begin configuration sub-branch -->
  <topicref href="configure.dita">
    <ditavalref href="novice.ditaval">
      <ditavalmeta>
        <dvrResourceSuffix>-novice</dvrResourceSuffix>
      </ditavalmeta>
    </ditavalref>
    <ditavalref href="advanced.ditaval">
      <ditavalmeta>
        <dvrResourceSuffix>-admin</dvrResourceSuffix>
      </ditavalmeta>
    </ditavalref>
    <!-- Other config topics -->
  </topicref>
  <!-- End configuration sub-branch -->
</topicref>
```

In this case, the effective map contains three copies of the complete branch. The branches are filtered by operating system. Because topics in the branch are filtered in different ways, processors are effectively required to handle three copies of the entire branch. The map author uses the `<dvrResourceSuffix>` elements to control naming for each copy. The Linux branch does not specify a `<dvrResourceSuffix>` element, because it is the default copy of the branch; this allows documents such as `install.dita` to retain their original names.

Within each operating system instance, the configuration sub-branch is repeated; it is filtered once for novice users and then again for advanced users. As a result, there are actually six instances of the configuration sub-branch. Additional `<dvrResourceSuffix>` elements are used to control naming for each instance.

1. The first instance is filtered using the conditions in `linux.ditaval` and `novice.ditaval`. For this instance, the resource `configure.dita` is treated as the resource `configure-novice.dita`. There is no renaming based on `linux.ditaval`, and the `<ditavalref>` the references `novice.ditaval` adds the `suffix -novice`.
2. The second instance is filtered using the conditions in `linux.ditaval` and `advanced.ditaval`. For this instance, the resource `configure.dita` is treated as the resource `configure-admin.dita`. There is no renaming based on `linux.ditaval`, and the `<ditavalref>` that references `advanced.ditaval` adds the suffix `-admin`.
3. The third instance is filtered using the conditions in `mac.ditaval` and `novice.ditaval`. For this instance, the resource `configure.dita` is treated as the resource `configure-novice-mac.dita`. The `<ditavalref>` that references `novice.ditaval` adds the suffix `-novice`, resulting in `configure-novice.dita`, and then the `<ditavalref>` that references `mac.ditaval` adds the additional suffix `-mac`.
4. The fourth instance is filtered using the conditions in `mac.ditaval` and `advanced.ditaval`. For this instance, the resource `configure.dita` is treated as the resource `configure-admin-mac.dita`. The `<ditavalref>` that references `admin.ditaval` adds the suffix `-admin`, resulting in `configure-admin.dita`, and then the `<ditavalref>` that references `mac.ditaval` adds the additional suffix `-mac`.
5. The fifth instance is filtered using the conditions in `win.ditaval` and `novice.ditaval`. For this instance, the resource `configure.dita` is treated as the resource `configure-novice-win.dita`. The `<ditavalref>` that references `novice.ditaval` adds the suffix `-novice`, resulting in `configure-novice.dita`, and then the `<ditavalref>` that references `win.ditaval` adds the additional suffix `-win`.
6. The sixth instance is filtered using the conditions in `win.ditaval` and `advanced.ditaval`. For this instance, the resource `configure.dita` is treated as the resource `configure-admin-win.dita`. The `<ditavalref>` that references `admin.ditaval` adds the suffix `-admin`, resulting in `configure-admin.dita`, and then the `<ditavalref>` that references `win.ditaval` adds the additional suffix `-win`.

5.4.6.8 Example: <ditavalref> error conditions

It is an error condition when multiple, non-equivalent copies of the same file are created with the same resource name.

The following map fragment contains several error conditions that result in name clashes:

```
<topicref href="a.dita" keys="a">
  <ditavalref href="one.ditaval"/>
  <ditavalref href="two.ditaval"/>
  <topicref href="b.dita" keys="b"/>
</topicref>
<topicref href="a.dita"/>
<topicref href="c.dita" keys="c">
  <ditavalref href="one.ditaval">
    <ditavalmeta>
      <dvrResourceSuffix>-token</dvrResourceSuffix>
    </ditavalmeta>
  </ditavalref>
  <ditavalref href="two.ditaval">
    <ditavalmeta>
      <dvrResourceSuffix>-token</dvrResourceSuffix>
    </ditavalmeta>
  </ditavalref>
</topicref>
```

In this sample, the effective map that results from evaluating the filter conditions has several clashes. In some cases the same document must be processed with conflicting conditions, using the same URI. In addition, because no key scope is added or modified, keys in the branch are duplicated in such a way that only one version is available for use. When the branches are evaluated to create distinct copies, the filtered branches result in the following equivalent map:

```
<topicref href="a.dita" keys="a"> <!-- a.dita to be filtered by one.ditaval -->
  <topicref href="b.dita" keys="b"/>  <!-- b.dita to be filtered by one.ditaval -->
</topicref>
<topicref href="a.dita" keys="a"> <!-- a.dita to be filtered by two.ditaval; key "a"
ignored -->
  <topicref href="b.dita" keys="b"/>  <!-- b.dita to be filtered by two.ditaval; key "b"
ignored -->
</topicref>
<topicref href="a.dita"/>
<topicref href="c-token.dita" keys="c">
  <!-- c-token.ditaval to be filtered by one.ditaval -->
</topicref>
<topicref href="c-token.dita" keys="c">
  <!-- c-token.ditaval to be filtered by two.ditaval, key "c" ignored -->
</topicref>
```

The equivalent map highlights several problems with the original source:

- The key names "a" and "b" are present in a branch that will be duplicated. No key scope is introduced for either version of the branch, meaning that the keys will be duplicated. Because there can only be one effective key definition for "a" or "b", it only is possible to reference one version of the topic using keys.
- The key name "c" is present on another branch that will be duplicated, resulting in the same problem.
- The file `c.dita` is filtered with two sets of conditions, each of which explicitly maps the filtered resource to `c-token.dita`. This is an error condition that should be reported by processors.
- In situations where resource names map directly to output file names, such as an HTML5 rendering that creates files based on the original resource name, the following name conflicts also occur. In this case a processor would need to report an error, use an alternate naming scheme, or both:

    1. `a.dita` generates `a.html` using three alternate set of conditions. One version uses `one.ditaval`, one version uses `two.ditaval`, and the third version uses no filtering.

2. `b.dita` generates `b.html` using two alternate set of conditions. One version uses `one.ditaval`, and the other version uses `two.ditaval`.

5.5 Chunking

Content can be chunked (divided or merged into new output documents) in different ways for the purposes of delivering content and navigation. For example, content best authored as a set of separate topics might need to be delivered as a single Web page. A map author can use the `@chunk` attribute to split up multi-topic documents into component topics or to combine multiple topics into a single document as part of output processing.

The `@chunk` attribute is commonly used for the following use cases.

Reuse of a nested topic

A content provider creates a set of topics as a single document. Another user wants to incorporate only one of the nested topics from the document. The new user can reference the nested topic from a DITA map, using the `@chunk` attribute to specify that the topic should be produced in its own document.

Identification of a set of topics as a unit

A curriculum developer wants to compose a lesson for a SCORM LMS (Learning Management System) from a set of topics without constraining reuse of those topics. The LMS can save and restore the learner's progress through the lesson if the lesson is identified as a referenceable unit. The curriculum developer defines the collection of topics with a DITA map, using the `@chunk` attribute to identify the learning module as a unit before generating the SCORM manifest.

5.5.1 Using the @chunk attribute

The specification defines tokens for the `@chunk` attribute that cover the most common chunking scenarios. These tokens can be used to override whatever default chunking behavior is set by a processor. Chunking is necessarily format specific, with chunked output required for some and not supported for other rendered formats. Chunking is also implementation specific with some implementations supporting some, but not all, chunking methods, or adding new methods to the standard ones described in this specification.

The value of the `@chunk` attribute consists of one or more space delimited tokens. Tokens are defined in three categories: for selecting topics, for setting chunking policies, and for defining how the chunk values impact rendering. It is an error to use two tokens from the same category on a single `<topicref>` element.

Selecting topics

When addressing a document that contains multiple topics, these values determine which topics are selected. These values are ignored when the element on which they are specified does not reference a topic. The defined values are:

- **`select-topic`**: Selects an individual topic without any ancestors, descendents, or peers from within the same document.
- **`select-document`**: Selects all topics in the target document.
- **`select-branch`**: Selects the target topic together with its descendent topics.

Policies for splitting or combining documents

The chunking policy tokens determine how source topics are chunked to produce different output chunks, for output formats where that makes sense. When specified on a `<map>` element, the policy becomes the default policy for all topic references. When specified on a topic reference, the policy applies only to that `<topicref>` and not to any descendant `<topicref>` elements.

- **`by-topic`**: A separate output chunk is produced for each of the selected topics. In particular, topics that are part of multi-topic documents are processed as though they are the root topics within a separate XML document.
- **`by-document`**: A single output chunk is produced for the referenced topic or topics, as though the selected topics were all children of the same document.

Rendering the selection

The following tokens affect how the chunk values impact rendering of the map or topics.

- **`to-content`**: The selection should be rendered as a new chunk of content.
  - When specified on a `<topicref>`, this means that the topics selected by this `<topicref>` and its children will be rendered as a single chunk of content.
  - When specified on the `<map>` element, this indicates that the contents of all topics referenced by the map are to be rendered as a single document.
  - When specified on a `<topicref>` that contains a title but no target, this indicates that processors **MUST** generate a title-only topic in the rendered result, along with any topics referenced by child `<topicref>` elements of this `<topicref>`. The rendition address of the generated topic is determined as defined for the `@copy-to` attribute. If the `@copy-to` attribute is not specified and the `<topicref>` has no `@id` attribute, the address of the generated topic is not required to be predictable or consistent across rendition instances.

  For cross references to `<topicref>` elements, if the value of the `@chunk` attribute is "to-content" or is unspecified, the cross reference is treated as a reference to the target topic. If the reference is to a `<topicref>` with no target, it is treated as a reference to the generated title-only topic.
- **`to-navigation` (DEPRECATED)**: The "to-navigation" token is deprecated in DITA 1.3. In earlier releases, the "to-navigation" token indicates that a new chunk of navigation should be used to render the current selection (such as an individual Table of Contents or related links). When specified on the `<map>` element, this token indicates that the map should be presented as a single navigation chunk. If a cross reference is made to a `<topicref>` that has a title but no target, and the `@chunk` value of that `<topicref>` is set to "to-navigation", the resulting cross reference is treated as a reference to the rendered navigation document (such as an entry in the table of contents).

Some tokens or combinations of tokens might not be appropriate for all output types. When unsupported or conflicting tokens are encountered during output processing, processors **SHOULD** produce warning or error messages. Recovery from such conflicts or other errors is implementation dependent.

There is no default value for the `@chunk` attribute on most elements and the `@chunk` attribute does not cascade from container elements, meaning that the `@chunk` value on one `<topicref>` is not passed to its children. A default by-xxx policy for an entire map can be established by setting the `@chunk` attribute on the `<map>` element, which will apply to any `<topicref>` that does not specify its own by-xxx policy.

When no `@chunk` attribute values are specified or defaulted, chunking behavior is implementation dependent. When variations of this sort are not desired, a default for a specific map can be established by including a `@chunk` attribute value on the `<map>` element.

When chunk processing results in new documents, the resource name or identifier for the new document (if relevant) is determined as follows:

1. If an entire map is used to generate a single chunk (by placing to-content on the `<map>` element), the resource name **SHOULD** be taken from the resource name of the map.
2. If the `@copy-to` attribute is specified, the resource name **MUST** taken from the `@copy-to` attribute.
3. If the `@copy-to` attribute is not specified and one or more keys are specified on the `<topicref>`, the resource name **SHOULD** be constructed using one of the keys.
4. If `@copy-to` and `@keys` are not specified and the by-topic policy is in effect, the resource name **SHOULD** be taken from the `@id` attribute of the topic.
5. If `@copy-to` and `@keys` are not specified and the by-document policy is in effect, the resource name **SHOULD** be taken from the resource name of the referenced document.

When following these steps results in resource name clashes, processors **MAY** recover by generating alternate resource identifiers. For example, when two chunked topics use the same `@id` attribute, a processor could recover by combining the original resource name with the `@id` value instead of using only the `@id` value.

Implementation-specific tokens and future considerations

Implementers **MAY** define their own custom, implementation-specific tokens. To avoid name conflicts between implementations or with future additions to the standard, implementation-specific tokens **SHOULD** consist of a prefix that gives the name or an abbreviation for the implementation followed by a colon followed by the token or method name.

For example: “acme:level2” could be a token for the Acme DITA Toolkit that requests the “level2” chunking method.

5.5.2 Chunking examples

The following examples cover many common chunking scenarios, such as splitting one document into many rendered objects or merging many documents into one rendered object.

In the examples below, an extension of ".xxxx" is used in place of the actual extensions that will vary by output format. For example, when the output format is HTML, the extension might actually be ".html", but this is not required.

The examples below assume the existence of the following files:

- `parent1.dita`, `parent2.dita`, etc., each containing a single topic with id P1, P2, etc.
- `child1.dita`, `child2.dita`, etc., each containing a single topic with id C1, C2, etc.
- `grandchild1.dita`, `grandchild2.dita`, etc., each containing a single topic with id GC1, GC2, etc.
- `nested1.dita`, `nested2.dita`, etc., each containing two topics: parent topics with id N1, N2, etc., and child topics with ids N1a, N2a, etc.
- `ditabase.dita`, with the following contents:

```
<dita xml:lang="en-us">
  <topic id="X">
    <title>Topic X</title><body><p>content</p></body>
  </topic>
  <topic id="Y">
    <title>Topic Y</title><body><p>content</p></body>
    <topic id="Y1">
      <title>Topic Y1</title><body><p>content</p></body>
      <topic id="Y1a">
       <title>Topic Y1a</title><body><p>content</p></body>
      </topic>
    </topic>
    <topic id="Y2">
```

```
      <title>Topic Y2</title><body><p>content</p></body>
    </topic>
  </topic>
  <topic id="Z">
    <title>Topic Z</title><body><p>content</p></body>
    <topic id="Z1">
      <title>Topic Z1</title><body><p>content</p></body>
    </topic>
  </topic>
</dita>
```

1. The following map causes the entire map to generate a single output chunk.

```
<map chunk="to-content">
   <topicref href="parent1.dita">
      <topicref href="child1.dita"/>
      <topicref href="child2.dita"/>
   </topicref>
</map>
```

2. The following map will generate a separate chunk for every topic in every document referenced by the map. In this case, it will result in the topics `P1.xxxx`, `N1.xxxx`, and `N1a.xxxx`.

```
<map chunk="by-topic">
   <topicref href="parent1.dita">
      <topicref href="nested1.dita"/>
   </topicref>
</map>
```

3. The following map will generate two chunks: `parent1.xxxx` will contain only topic P1, while `child1.xxxx` will contain topic C1, with topics GC1 and GC2 nested within C1.

```
<map>
   <topicref href="parent1.dita">
      <topicref href="child1.dita" chunk="to-content">
        <topicref href="grandchild1.dita"/>
        <topicref href="grandchild2.dita"/>
      </topicref>
   </topicref>
</map>
```

4. The following map breaks down portions of `ditabase.dita` into three chunks. The first chunk `Y.xxxx` will contain only the single topic Y. The second chunk `Y1.xxxx` will contain the topic Y1 along with its child Y1a. The final chunk `Y2.xxxx` will contain only the topic Y2. For navigation purposes, the chunks for Y1 and Y2 are still nested within the chunk for Y.

```
<map>
  <topicref href="ditabase.dita#Y" copy-to="Y.dita"
            chunk="to-content select-topic">
    <topicref href="ditabase.dita#Y1" copy-to="Y1.dita"
              chunk="to-content select-branch"/>
    <topicref href="ditabase.dita#Y2" copy-to="Y2.dita"
              chunk="to-content select-topic"/>
  </topicref>
</map>
```

5. The following map will produce a single output chunk named `parent1.xxxx`, containing topic P1, with topic Y1 nested within P1, but without topic Y1a.

```
<map chunk="by-document">
   <topicref href="parent1.dita" chunk="to-content">
      <topicref href="ditabase.dita#Y1"
         chunk="select-topic"/>
   </topicref>
</map>
```

6. The following map will produce a single output chunk, `parent1.xxxx`, containing topic P1, topic Y1 nested within P1, and topic Y1a nested within Y1.

```
<map chunk="by-document">
   <topicref href="parent1.dita" chunk="to-content">
      <topicref href="ditabase.dita#Y1"
         chunk="select-branch"/>
   </topicref>
</map>
```

7. The following map will produce a single output chunk, `P1.xxxx`. The topic P1 will be the root topic, and topics X, Y, and Z (together with their descendents) will be nested within topic P1.

```
<map chunk="by-topic">
   <topicref href="parent1.dita" chunk="to-content">
      <topicref href="ditabase.dita#Y1"
         chunk="select-document"/>
   </topicref>
</map>
```

8. The following map will produce a single output chunk named `parentchunk.xxxx` containing topic P1 at the root. Topic N1 will be nested within P1, and N1a will be nested within N1.

```
<map chunk="by-document">
   <topicref href="parent1.dita" chunk="to-content" copy-to="parentchunk.dita">
      <topicref href="nested1.dita" chunk="select-branch"/>
   </topicref>
</map>
```

9. The following map will produce two output chunks. The first chunk named `parentchunk.xxxx` will contain the topics P1, C1, C3, and GC3. The "to-content" token on the reference to `child2.dita` causes that branch to begin a new chunk named `child2chunk.xxxx`, which will contain topics C2 and GC2.

```
<map chunk="by-document">
   <topicref href="parent1.dita"
      chunk="to-content" copy-to="parentchunk.dita">
      <topicref href="child1.dita" chunk="select-branch"/>
      <topicref href="child2.dita"
         chunk="to-content select-branch"
         copy-to="child2chunk.dita">
         <topicref href="grandchild2.dita"/>
      </topicref>
      <topicref href="child3.dita">
         <topicref href="grandchild3.dita"
            chunk="select-branch"/>
      </topicref>
   </topicref>
 </map>
```

10. The following map produces a single chunk named `nestedchunk.xxxx`, which contains topic N1 with no topics nested within.

```
<map>
   <topicref href="nested1.dita#N1"
             copy-to="nestedchunk.dita"
             chunk="to-content select-topic"/>
</map>
```

5.6 Translation and localization

DITA has features that facilitate preparing content for translation and working with multilingual content, including the `@xml:lang` attribute, the `@dir` attribute, and the `@translate` attribute. In addition, the `<sort-as>` and `<index-sort-as>` elements provide support for sorting in languages in which the correct sorting of an element requires text that is different from the base content of the element.

5.6.1 The @xml:lang attribute

The `@xml:lang` attribute specifies the language and (optional) locale of the element content. The `@xml:lang` attribute applies to all attributes and content of the element where it is specified, unless it is overridden with `@xml:lang` on another element within that content.

The `@xml:lang` attribute **SHOULD** be explicitly set on the root element of each map and topic.

Setting the `@xml:lang` attribute in the DITA source ensures that processors handle content in a language- and locale-appropriate way. If the `@xml:lang` attribute is not set, processors assume a default value which might not be appropriate for the DITA content. When the `@xml:lang` attribute is specified for a document, DITA processors **MUST** use the specified value to determine the language of the document.

Setting the `@xml:lang` attribute in the source language document facilitates the translation process; it enables translation tools (or translators) to simply change the value of the existing `@xml:lang` attribute to the value of the target language. Some translation tools support changing the value of an existing `@xml:lang` attribute, but they do not support adding new markup to the document that is being translated. Therefore, if source language content does not set the `@xml:lang` attribute, it might be difficult or impossible for the translator to add the `@xml:lang` attribute to the translated document.

If the root element of a map or a top-level topic has no value for the`@xml:lang` attribute , a processor **SHOULD** assume a default value. The default value of the processor can be either fixed, configurable, or derived from the content itself, such as the `@xml:lang` attribute on the root map.

The `@xml:lang` attribute is described in the XML Recommendation. Note that the recommended style for the `@xml:lang` attribute is lowercase language and (optional) uppercase, separated by a hyphen, for example, "en-US" or "sp-SP" or "fr". According to RFC 5646, *Tags for Identifying Languages,* language codes are case insensitive.

Recommended use in topics

For a DITA topic that contains a single language, set the `@xml:lang` attribute on the highest-level element that contains content.

When a DITA topic contains more than one language, set the `@xml:lang` attribute on the highest-level element to specify the *primary language and locale* that applies to the topic. If part of a topic is written in a different language, authors should ensure that the part is enclosed in an element with the `@xml:lang` attribute set appropriately. This method of overriding the default document language applies to both block and inline elements that use the alternate language. Processors **SHOULD** style each element in a way that is appropriate for its language as identified by the `@xml:lang` attribute.

Recommended use in maps

The `@xml:lang` attribute can be specified on the `<map>` element. The `@xml:lang` attribute cascades within the map in the same way that it cascades within a topic. However, since the `@xml:lang` attribute is an inherent property of the XML document, the value of the `@xml:lang` attribute does not cascade from one map to another or from a map to a topic; the value of the `@xml:lang` attribute that is specified in a map does not override `@xml:lang` values that are specified in other maps or in topics.

The primary language for the map **SHOULD** be set on the `<map>` element. The specified language remains in effect for all child `<topicref>` elements, unless a child specifies a different value for the `@xml:lang` attribute.

When no `@xml:lang` value is supplied locally or on an ancestor, a processor-determined default value is assumed.

Recommended use with the @conref or @conkeyref attribute

When a `@conref` or `@conkeyref` attribute is used to include content from one element into another, the processor **MUST** use the effective value of the `@xml:lang` attribute from the referenced element, that is, the element that contains the content. If the referenced element does not have an explicit value for the `@xml:lang` attribute, the processor **SHOULD** default to using the same value that is used for topics that do not set the `@xml:lang` attribute.

This behavior is shown in the following example, where the value of the `@xml:lang` attribute of the included note is obtained from its parent `<section>` element that sets the `@xml:lang` attribute to "fr". When the `installingAcme.dita` topic is processed, the `<note>` element with the `@id` attribute set to "mynote" has an effective value for the `@xml:lang` attribute of "fr".

```
<?xml version="1.0"?>
<!DOCTYPE task PUBLIC "-//OASIS//DTD DITA Task//EN" "task.dtd">
<task xml:lang="en" id="install_acme">
 <title>Installing Acme</title>
 <shortdesc>Step-by-step details about how to install Acme.</shortdesc>
 <taskbody>
   <prereq>
   <p>Special notes when installing Acme in France:</p>
   <note id="mynote" conref="warningsAcme.dita#topic_warnings/frenchwarnings"/>
  </prereq>
 </taskbody>
</task>
```

Figure 36: `installingAcme.dita`

```
<?xml version="1.0"?>
<!DOCTYPE topic PUBLIC "-//OASIS//DTD DITA Topic//EN" "topic.dtd">
<topic id="topic_warnings">
 <title>Warnings</title>
 <body>
  <section id="qqwwee" xml:lang="fr">
   <title>French warnings</title>
   <p>These are our French warnings.</p>
   <note id="frenchwarnings">Note in French!</note>
  </section>
  <section xml:lang="en">
   <title>English warnings</title>
   <p>These are our English warnings.</p>
   <note id="englishwarnings">Note in English!</note>
  </section>
 </body>
</topic>
```

Figure 37: `warningsAcme.dita`

5.6.2 The @dir attribute

The `@dir` attribute provides instructions to processors about how *bi-directional text* should be rendered.

Bi-directional text is text that contains text in both text directionalities, right-to-left (RTL) and left-to-right (LTR). For example, languages such as Arabic, Hebrew, Farsi, Urdu, and Yiddish have text written from right-to-left; however, numerics and embedded sections of Western language text are written from left to right. Some multilingual documents also contain a mixture of text segments in two directions.

DITA contains the following attributes that have an effect on bi-directional text processing:

@xml:lang

Identifies the language and locale, and so can be used to identify text that requires bi-directional rendering.

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@dir

Identifies or overrides the text directionality. It can be set to "ltr", "rtl", "lro", or "rlo"

In general, properly-written mixed text does not need any special markers; the Unicode bidirectional algorithm positions the punctuation correctly for a given language. The processor is responsible for displaying the text properly. However, some rendering systems might need directions for displaying bidirectional text, such as Arabic, properly. For example, Apache FOP might not render Arabic properly unless the left-to-right and right-to-left indicators are used.

The use of the `@dir` attribute and the Unicode algorithm is explained in the article Specifying the direction of text and tables: the `dir` attribute (http://www.w3.org/TR/html4/struct/dirlang.html#h-8.2) . This article contains several examples of how to use the `@dir` attribute set to either "ltr" or "rtl". There is no example of setting the `@dir` attribute to either "lro" or "rlo", although it can be inferred from the example that uses the `<bdo>` element, a now-deprecated W3C mechanism for overriding the entire Unicode bidirectional algorithm.

Recommended usage

The `@dir` attribute, together with the `@xml:lang` attribute, is essential for rendering table columns and definition lists in the proper order.

In general text, the Unicode Bidirectional algorithm, as specified by the `@xml:lang` attribute together with the `@dir` attribute, provides for various levels of bidirectionality:

- Directionality is either explicitly specified via the `@xml:lang` attribute in combination with the `@dir` attribute on the highest level element (topic or derived peer for topics, map for ditamaps) or assumed by the processing application. If used, the `@dir` attribute **SHOULD** be specified on the highest level element in the topic or document element of the map.
- When embedding a right-to-left text run inside a left-to-right text run (or vice-versa), the default direction might provide incorrect results based on the rendering mechanism, especially if the embedded text run includes punctuation that is located at one end of the embedded text run. Unicode defines spaces and punctuation as having neutral directionality and defines directionality for these neutral characters when they appear between characters having a strong directionality (most characters that are not spaces or punctuation). While the default direction is often sufficient to determine the correct directionality of the language, sometimes it renders the characters incorrectly (for example, a question mark at the end of a Hebrew question might appear at the beginning of the question instead of at the end or a parenthesis might render incorrectly). To control this behavior, the `@dir` attribute is set to "ltr" or "rtl" as needed, to ensure that the desired direction is applied to the characters that have neutral bidirectionality. The "ltr" and "rtl" values override only the neutral characters (for example, spaces and punctuation), not all Unicode characters.

  Note: Problems with Unicode rendering can be caused by the rendering mechanism. The problems are not due to the XML markup itself.

  Note: Problems with Unicode rendering can be caused by the rendering mechanism. The problems are not due to the XML markup itself.
- Sometimes you might want to override the default directionality for strongly bidirectional characters. Overrides are done using the "lro" and "rlo" values, which overrides the Unicode Bidirectional algorithm. This override forces a direction on the contents of the element. These override attributes give the author a brute force way of setting the directionality independent of the Unicode Bidirectional algorithm. The gentler "ltr" and "rtl" values have a less radical effect, only affecting punctuation and other so-called neutral characters.

For most authoring needs, the "ltr" and "rtl" values are sufficient. Use the override values only when you cannot achieve the desired effect using the the "ltr" and "rtl" values.

Processing expectations

Applications that process DITA documents, whether at the authoring, translation, publishing, or any other stage, **SHOULD** fully support the Unicode bidirectional algorithm to correctly implement the script and directionality for each language that is used in the document.

Applications **SHOULD** ensure that the root element in every topic document and the root element in the root map has values for the `@dir` and `@xml:lang` attributes.

Related information

What you need to know about the BIDI algorithm and inline markup (http://www.w3.org/International/articles/inline-bidi-markup/)
XHTML Bi-directional Text Attribute Module (http://www.w3.org/TR/2004/WD-xhtml2-20040722/mod-bidi.html)
Specifying the direction of text and tables: the dir attribute (http://www.w3.org/TR/html4/struct/dirlang.html#adef-dir)
HTML 4.0 Common Attributes (http://www.htmlhelp.com/reference/html40/attrs.html)

5.7 Processing documents with different values of the @domains attribute

When DITA elements are copied from one document to another, processors need to determine the validity of the copied elements. This copying might occur as the result of a content reference (conref) or key reference (keyref), or it might occur in the context of an author editing a DITA document.

A processor can examine the value of the `@domains` attribute and compare the set of modules listed to the set of modules for which it provides direct support. It then can take appropriate action if it does not provide support for a given module, for example, issuing a warning before applying fallback processing.

Documents might have incompatible constraints applied; see Weak and strong constraints (145) for more information about constraint compatibility checking.

When copying content from one DITA document to another, processors **SHOULD** determine if the data being copied (the copy source) requires modules that are not required by the document into which the data is to be copied (the copy target). Such a copy operation is always safe if the copy source requires a subset of the modules that are required by the copy target. Such a copy is unsafe if the copy source requires modules that are not required by the copy target.

When a copy operation is unsafe, processors **MAY** compare the copy source to the copy target to determine if the copy source satisfies the constraints of the copy target. If the copy source meets the copy target constraints, the copy operation can proceed. Processors **SHOULD** issue a warning that the copy was allowed but the constraints are not compatible. If the copy source does not meet the constraints of the copy target, processors **MAY** apply generalization until the generalized result either satisfies the copy target constraints or no further generalization can be performed. If the copy operation can be performed following generalization, the processor **SHOULD** issue a warning that the constraints are not compatible and generalization had to be performed in order to complete the copy operation.

Related concepts

6.6.3.7 domains attribute rules and syntax (134)
The `@domains` attribute enables processors to determine whether two elements or two documents use compatible domains. The attribute is declared on the root element for each topic or map type. Each structural, domain, and constraint module defines its ancestry as a parenthesized sequence of space-

separated module names; the effective value of the `@domains` attribute is composed of these parenthesized sequences.

3.3.4.2.3 Architectural attributes (48)
The architectural attributes specify the version of DITA that the content supports; they also identify the DITA domains, structural types, and specializations that are in use by the content.

5.8 Sorting

Processors can be configured to sort elements. Typical processing includes sorting glossary entries, lists of parameters or reference entries in custom navigation structures, and tables based on the contents of cells in specific columns or rows.

Each element to be sorted must have some inherent text on which it will be sorted. This text is the *base sort phrase* for the element. For elements that have titles, the base sort phrase usually is the content of the `<title>` element. For elements that do not have titles, the base sort phrase might be literal content in the DITA source, or it might be generated or constructed based on the semantics of the element involved; for example, it could be constructed from various attribute or metadata values. Processors that perform sorting **SHOULD** explicitly document how the base sort phrase is determined for a given element.

The `<sort-as>` element can be used to specify an effective sort phrase when the base sort phrase is not appropriate for sorting. For index terms, the `<index-sort-as>` element can be used to specify the effective sort phrase for an index entry.

The details of sorting and grouping are implementation specific. Processors might provide different mechanisms for defining or configuring collation and grouping details. Even where the `<sort-as>` element is specified, two processors might produce different sorted and grouped results because they might use different collation and grouping rules. For example, one processor might be configured to sort English terms before non-English terms, while another might be configured to sort them after. The grouping and sorting of content is subject to local editorial rules.

When a `<sort-as>` element is specified, processors that sort the containing element **MUST** construct the effective sort phrase by prepending the content of the `<sort-as>` element to the base sort phrase. This ensures that two items with the same `<sort-as>` element but different base sort phrases will sort in the appropriate order.

For example, if a processor uses the content of the `<title>` element as the base sort phrase, and the title of a topic is "24 Hour Support Hotline" and the value of the `<sort-as>` element is "twenty-four hour", then the effective sort phrase would be "twenty-four hour24 Hour Support Hotline".

Related reference

8.8.5.6.5 sort-as (320)
For elements that are sorted, the `<sort-as>` element provides text that is combined with the base sort phrase to construct the effective sort phrase. The text can be specified in the content of the `<sort-as>` element or in the `@value` attribute on the `<sort-as>` element. The `<sort-as>` element is useful for elements where the base sort phrase is inadequate or non-existent, for example, a glossary entry for a Japanese Kanji phrase.

8.8.5.4.4 index-sort-as (304)
The `<index-sort-as>` element specifies a sort phrase under which an index entry would be sorted.

6 Configuration, specialization, generalization, and constraints

The extension facilities of DITA allow existing vocabulary and constraint modules to be combined to create specific DITA document types. Vocabulary modules also can be specialized to meet requirements that are not satisfied by existing markup.

6.1 Overview of DITA extension facilities

DITA provides three extension facilities: configuration, constraint, and specialization. In addition, generalization augments specialization.

Configuration

Configuration enables the definition of DITA document types that include only the vocabulary modules that are required for a given set of documents. There is no need to modify the vocabulary modules. Configurations are implemented as document type shells.

Specialization

Specialization enables the creation of new element types in a way that preserves the ability to interchange those new element types with conforming DITA applications. Specializations are implemented as vocabulary modules, which are integrated into document-type shells.

Specializations are implemented as sets of vocabulary modules, each of which declares the markup and entities that are unique to a specialization. The separation of the vocabulary and its declarations into modules makes it easy to extend existing modules, because new modules can be added without affecting existing document types. It also makes it easy to assemble elements from different sources into a single document-type shell and to reuse specific parts of the specialization hierarchy in more than one document-type shell.

Generalization

Generalization is the process of reversing a specialization. It converts specialized elements or attributes into the original types from which they were derived.

Constraint

Constraint enables the restriction of content models and attribute lists for individual elements. There is no need to modify the vocabulary modules. Constraints are implemented as constraint modules, which are integrated into document-type shells.

6.2 Configuration

Configuration enables the definition of DITA document types that include only the vocabulary modules that are required for a given set of documents. There is no need to modify the vocabulary modules. Configurations are implemented as document-type shells.

6.2.1 Overview of document-type shells

A document type shell is an XML grammar file that specifies the elements and attributes that are allowed in a DITA document. The document type shell integrates structural modules, domain modules, and constraint modules. In addition, a document type shell specifies whether and how topics can nest.

A DITA document must either have an associated document-type definition or all required attributes must be made explicit in the document instances. Most DITA documents have an associated document-type shell. DITA documents that reference a document-type shell can be validated using standard XML processors. Such validation enables processors to read the XML grammar files and determine default values for the `@domains` and `@class` attributes.

The following figure illustrates the relationship between a DTD-based DITA document, its document-type shell, and the various vocabulary modules that it uses. A similar structure applies to DITA documents that use other XML grammars.

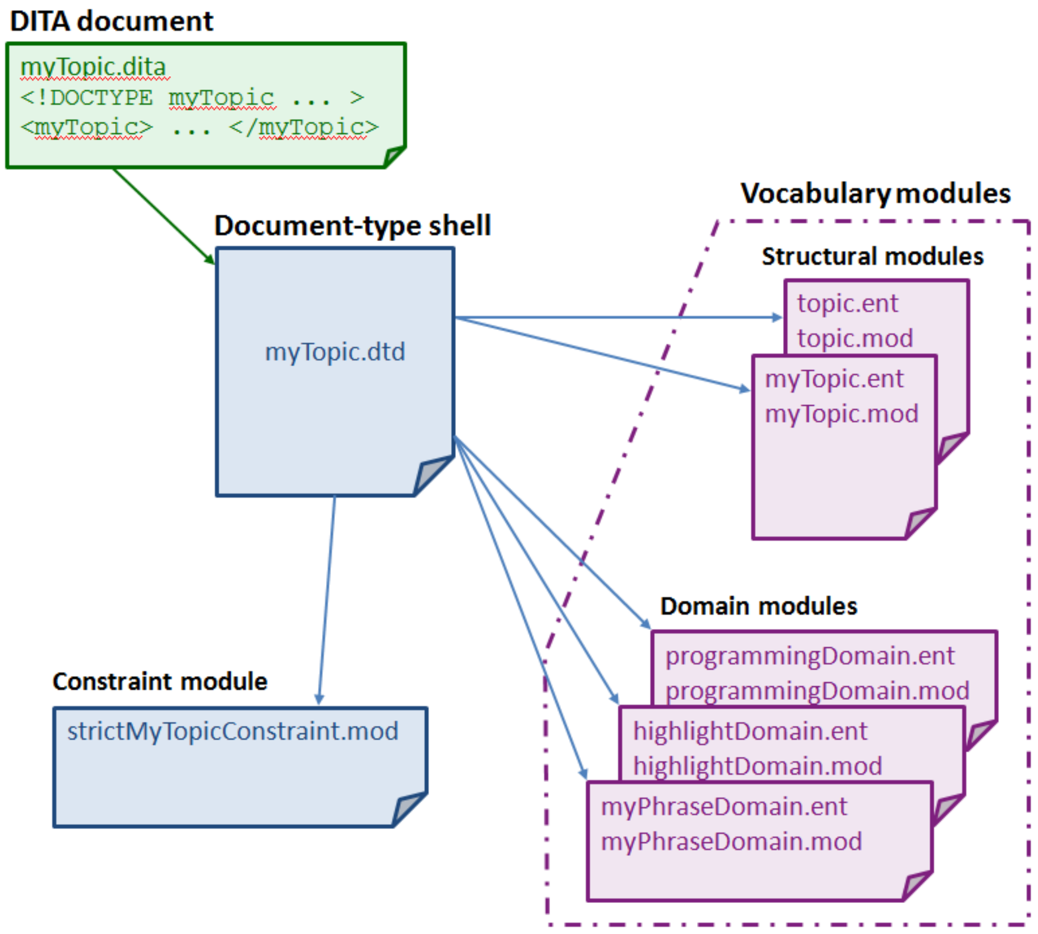

Figure 38: Document type shell

The DITA specification contains a starter set of document-type shells. These document type shells are commented and can be used as templates for creating custom document-type shells. While the OASIS-provided document-type shells can be used without any modification, creating custom document-type shells is a best practice. If the document-type shells need to be modified in the future, for example, to include a specialization or integrate a constraint, the existing DITA documents will not need to be modified to reference a new document-type shell.

6.2.2 Rules for document-type shells

This topic collects the rules that concern DITA document-type shells.

- While the DITA specification only defines coding requirements for DTD, RELAX NG, and XML Schema documents, conforming DITA documents **MAY** use other document-type constraint languages, such as Schematron.

- With two exceptions, a document-type shell **MUST NOT** directly define element or attribute types; it only includes and configures vocabulary and constraint modules. The exceptions to this rule are the following:
  - The ditabase document-type shell directly defines the `<dita>` element.
  - RNG- and XML Schema-based shells directly specify values for the `@domains` attribute; these values reflect the details of the domains and structural types that are integrated by the document-type shell.
- Document type shells that are not provided by OASIS **MUST** have a unique public identifier, if public identifiers are used.
- Document type shells that are not provided by OASIS **MUST NOT** indicate OASIS as the owner; the public identifier or URN for such document-type shells **SHOULD** reflect the owner or creator of the document-type shell.

  For example, if example.com creates a copy of the document type shell for topic, an appropriate public identifier would be "-//example.com//DTD DITA Topic//EN", where "example.com" is the owner identifier component of the public identifier. An appropriate URN would be "urn:example.com:names:dita:rng:topic.rng".

6.2.3 Equivalence of document-type shells

Two distinct DITA document types that are taken from different tools or environments might be functionally equivalent.

A DITA document type is defined by the following:

- The set of modules that are declared in the `@domains` attribute on the root element of the document
- The values of the `@class` attributes of all the elements in the document
- Rules for topic nesting

Two document-type shells define the same DITA document type if they integrate identical vocabulary modules, constraint modules, and rules for topic nesting. For example, a document type shell that is an unmodified copy of the OASIS-provided document-type shell for topic defines the same DITA document type as the original document-type shell. However, the new document-type shell has the following differences:

- It is a distinct file that is stored in a different location.
- It has a distinct system identifier.
- If it has a public identifier, the public identifier is unique.

Note: The public or system identifier that is associated with a given document-type shell is not, by itself, necessarily distinguishing. This is because two different people or groups might use the same modules and constraints to assemble equivalent document type shells, while giving them different names or public identifiers.

Note: The public or system identifier that is associated with a given document-type shell is not, by itself, necessarily distinguishing. This is because two different people or groups might use the same modules and constraints to assemble equivalent document type shells, while giving them different names or public identifiers.

6.2.4 Conformance of document-type shells

DITA documents typically are governed by a conforming DITA document-type shell. However, the conformance of a DITA document is a function of the document instance, not its governing grammar. Conforming DITA documents are not required to use a conforming document-type shell.

Conforming DITA documents are not required to have any governing document type declaration or schema. There might be compelling or practical reasons to use non-conforming document-type shells. For example, a document might use a document-type shell that does not conform to the DITA requirements for shells in order to meet the needs of a specific application or tool. Such a non-conforming document-type shell still might enable the creation of conforming DITA content.

6.3 Specialization

The specialization feature of DITA allows for the creation of new element types and attributes that are explicitly and formally derived from existing types. This facilitates interchange of conforming DITA content and ensures a minimum level of common processing for all DITA content. It also allows specialization-aware processors to add specialization-specific processing to existing base processing.

6.3.1 Overview of specialization

Specialization allows information architects to define new kinds of information (new structural types or new domains of information), while reusing as much of existing design and code as possible, and minimizing or eliminating the costs of interchange, migration, and maintenance.

Specialization modules enable information architects to create new element types and attributes. These new element types and attributes are derived from existing element types and attributes.

In traditional XML applications, all semantics for a given element instance are bound to the element type, such as `<para>` for a paragraph or `<title>` for a title. The XML specification provides no built-in mechanism for relating two element types to say "element type B is a subtype of element type A".

In contrast, the DITA specialization mechanism provides a standard mechanism for defining that an element type or attribute is derived from an ancestor type. This means that a specialized type inherits the semantics and default processing behavior from its ancestor type. Additional processing behavior optionally can be associated with the specialized descendant type.

For example, the `<section>` element type is part of the DITA base or core. It represents an organizational division in a topic. Within the task information type (itself a specialization of `<topic>`), the `<section>` element type is further specialized to other element types (such as `<prereq>` and `<context>`) that provide more precise semantics about the type of organizational division that they represent. The specialized element types inherit both semantic meaning and default processing from the ancestor elements.

There are two types of DITA specializations:

Structural specialization

Structural specializations are developed from either topic or map types. Structural specializations enable information architect to add new document types to DITA. The structures defined in the new document types either directly use or inherit from elements found in other document types. For example; concept, task, and reference are specialized from topic, whereas bookmap is specialized from map.

Domain specialization

Domain specializations are developed from elements defined with topic or map, or from the `@props` or `@base` attributes. They define markup for a specific information domain or subject area. Domain specializations can be added to document-type shells.

Each type of specialization module represents an “is a” hierarchy, in object-oriented terms, with each structural type or domain being a subclass of its parent. For example, a specialization of task is still a task, and a specialization of the user interface domain is still part of the user interface domain. A given domain can be used with any map or topic type. In addition, specific structural types might require the use of specific domains.

Use specialization when you need a new structural type or domain. Specialization is appropriate in the following circumstances:

- You need to create markup to represent new semantics (meaningful categories of information). This might enable you to have increased consistency or descriptiveness in your content model.
- You have specific needs for output processing and formatting that cannot be addressed using the current content model.

Do not use specialization to simply eliminate element types from specific content models. Use constraint modules to restrict content models and attribute lists without changing semantics.

6.3.2 Modularization

Modularization is at the core of DITA design and implementation. It enables reuse and extension of the DITA specialization hierarchy.

The DITA XML grammar files are a set of module files that declare the markup and entities that are required for each specialization. The document-type shell then integrates the modules that are needed for a particular authoring and publishing context.

Because all the pieces are modular, the task of developing a new information type or domain is easy. An information architect can start with existing base types (topic or map) -- or with an existing specialization if it comes close to matching their business requirements -- and only develop an extension that adds the extra semantics or functionality that is required. A specialization reuses elements from ancestor modules, but it only needs to declare the elements and attributes that are unique to the specialization. This saves considerable time and effort; it also reduces error, enforces consistency, and makes interoperability possible.

Because all the pieces are modular, it is easy to reuse different modules in different contexts. For example, a company that produces machines can use the task requirements and hazard statements domains, while a company that produces software can use the software, user interface, and programming domains. A company that produces health information for consumers can avoid using any of the standard domains, and instead develop a new domain that contains the elements necessary for capturing and tracking the comments made by medical professionals who review their information for accuracy and completeness.

Because all the pieces are modular, new modules can be created and put into use without affecting existing document-type shells. For example, a marketing division of a company can develop a new specialization for message campaigns and have their content authors begin using that specialization, without affecting any of the other information types that they have in place.

6.3.3 Vocabulary modules

A DITA element type or attribute is declared in exactly one vocabulary module.

The following terminology is used to refer to DITA vocabulary modules:

structural module

A vocabulary module that defines a top-level map or topic type. Structural modules also can define specializations of, or reuse elements from, domain or other structural modules. When this happens, the structural module becomes dependent.

element domain module

A vocabulary module that defines one or more specialized element types that can be integrated with maps or topics.

attribute domain module

A vocabulary module that defines exactly one specialization of either the `@base` or `@props` attribute.

For structural types, the module name is typically the same as the root element. For example, "task" is the name of the structural vocabulary module whose root element is `<task>`.

For element domain modules, the module name is typically a name that reflects the subject domain to which the domain applies, such as "highlight" or "software". Domain modules often have an associated short name, such as "hi-d" for the highlighting domain or "sw-d" for the software domain.

The name (or short name) of an element domain module is used to identify the module in `@class` and `@domains` attribute values. While module names need not be globally unique, module names must be unique within the scope of a given specialization hierarchy. The short name must be a valid XML name token.

Structural modules based on topic **MAY** define additional topic types that are then allowed to occur as subordinate topics within the top-level topic. However, such subordinate topic types **MAY NOT** be used as the root elements of conforming DITA documents. For example, a top-level topic type might require the use of subordinate topic types that would only ever be meaningful in the context of their containing type and thus would never be candidates for standalone authoring or aggregation using maps. In that case, the subordinate topic type can be declared in the module for the top-level topic type that uses it. However, in most cases, potential subordinate topics should be defined in their own vocabulary modules.

Domain elements intended for use in topics **MUST** ultimately be specialized from elements that are defined in the topic module. Domain elements intended for use in maps **MUST** ultimately be specialized from elements defined by or used in the map module. Maps share some element types with topics but no map-specific elements can be used within topics.

6.3.4 Specialization rules for element types

There are certain rules that apply to element type specializations.

A specialized element type has the following characteristics:

- A properly-formed `@class` attribute that specifies the specialization hierarchy of the element
- A content model that is the same or less inclusive than that of the element from which it was specialized
- A set of attributes that are the same or a subset of those of the element from which it was specialized
- Values or value ranges of attributes that are the same or a subset of those of the element from which it was specialized

DITA elements are never in a namespace. Only the `@DITAArchVersion` attribute is in a DITA-defined namespace. All other attributes, except for those defined by the XML standard, are in no namespace.

This limitation is imposed by the details of the `@class` attribute syntax, which makes it impractical to have namespace-qualified names for either vocabulary modules or individual element types or attributes. Elements included as descendants of the DITA `<foreign>` element type can be in any namespace.

Note: Domain modules that are intended for wide use should define element type names that are unlikely to conflict with names used in other domains, for example, by using a domain-specific prefix on all names.

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Note: Domain modules that are intended for wide use should define element type names that are unlikely to conflict with names used in other domains, for example, by using a domain-specific prefix on all names.

6.3.5 Specialization rules for attributes

There are certain rules that apply to attribute specializations.

A specialized attribute has the following characteristics:

- It is specialized from `@props` or `@base`.
- It is declared as a global attribute. Attribute specializations cannot be limited to specific element types.
- It does not have values or value ranges that are more extensive than those of the attribute from which it was specialized.
- Its values must be alphanumeric space-delimited values. In generalized form, the values must conform to the rules for attribute generalization.

6.3.6 @class attribute rules and syntax

The specialization hierarchy of each DITA element is declared as the value of the `@class` attribute. The `@class` attribute provides a mapping from the current name of the element to its more general equivalents, but it also can provide a mapping from the current name to more specialized equivalents. All specialization-aware processing can be defined in terms of `@class` attribute values.

The `@class` attribute tells a processor what general classes of elements the current element belongs to. DITA scopes elements by module type (for example topic type, domain type, or map type) instead of document type, which lets document type developers combine multiple module types in a single document without complicating transformation logic.

The sequence of values in the `@class` attribute is important because it tells processors which value is the most general and which is most specific. This sequence is what enables both specialization aware processing and generalization.

Syntax

Values for the `@class` attribute have the following syntax requirements:

- An initial "-" or "+" character followed by one or more spaces. Use "-" for element types that are defined in structural vocabulary modules, and use "+" for element types that are defined in domain modules.
- A sequence of one or more tokens of the form `"`*`modulename/typename`*`",` with each token separated by one or more spaces, where *modulename* is the short name of the vocabulary module and *typename* is the element type name. Tokens are ordered left to right from most general to most specialized.

  These tokens provide a mapping for every structural type or domain in the ancestry of the specialized element. The specialization hierarchy for a given element type must reflect any intermediate modules between the base type and the specialization type, even those in which no element renaming occurs.
- At least one trailing space character (" "). The trailing space ensures that string matches on the tokens can always include a leading and trailing space in order to reliably match full tokens.

Rules

When the `@class` attribute is declared in an XML grammar, it **MUST** be declared with a default value. In order to support generalization round-tripping (generalizing specialized content into a generic form and then returning it to the specialized form) the default value **MUST NOT** be fixed. This allows a generalization process to overwrite the default values that are defined by a general document type with specialized values taken from the document being generalized.

A vocabulary module **MUST NOT** change the `@class` attribute for elements that it does not specialize, but simply reuses by reference from more generic levels. For example, if `<task>`, `<bctask>`, and `<guitask>` use the `<p>` element without specializing it, they **MUST NOT** declare mappings for it.

Authors **SHOULD NOT** modify the `@class` attribute.

Example: DTD declaration for @class attribute for the <step> element

The following code sample lists the DTD declaration for the `@class` attribute for the `<step>` element:

```
<!ATTLIST step         class  CDATA "- topic/li task/step ">
```

This indicates that the `<step>` element is specialized from the `<li>` element in a generic topic. It also indicates explicitly that the `<step>` element is available in a task topic; this enables round-trip migration between upper level and lower level types without the loss of information.

Example: Element with @class attribute made explicit

The following code sample shows the value of the `@class` attribute for the `<wintitle>` element:

```
<wintitle class="+ topic/keyword ui-d/wintitle ">A specialized keyword</wintitle>
```

The `@class` attribute and its value is generally not surfaced in authored DITA topics, although it might be made explicit as part of a processing operation.

Example: @class attribute with intermediate value

The following code sample shows the value of a `@class` attribute for an element in the guitask module, which is specialized from `<task>`. The element is specialized from `<keyword>` in the base topic vocabulary, rather than from an element in the task module:

```
<windowname class="- topic/keyword task/keyword guitask/windowname ">...</windowname>
```

The intermediate values are necessary so that generalizing and specializing transformations can map the values simply and accurately. For example, if `task/keyword` was missing as a value, and a user decided to generalize this guitask up to a task topic, then the transformation would have to guess whether to map to keyword (appropriate if task is more general than guitask, which it is) or leave it as windowname (appropriate if task were more specialized, which it isn't). By always providing mappings for more general values, processors can then apply the simple rule that missing mappings must by default be to more specialized values than the one we are generalizing to, which means the last value in the list is appropriate. For example, when generalizing `<guitask>` to `<task>`, if a `<p>` element has no target value for `<task>`, we can safely assume that `<p>` does not specialize from `<task>` and should not be generalized.

6.3.7 @domains attribute rules and syntax

The `@domains` attribute enables processors to determine whether two elements or two documents use compatible domains. The attribute is declared on the root element for each topic or map type. Each structural, domain, and constraint module defines its ancestry as a parenthesized sequence of space-separated module names; the effective value of the `@domains` attribute is composed of these parenthesized sequences.

Document type shells collect the values that are provided by each module to construct the effective value of the `@domains` attribute. Processors can examine the collected values when content from one document is used in another, in order to determine whether the content is compatible.

For example, when an author pastes content from one topic into another topic within an XML editor, the application can use the `@domains` attribute to determine if the two topics use compatible domains. If not, copied content from the first topic might need to be generalized before it can be placed in the other topic.

The `@domains` attribute serves the same function when an element uses the `@conref` attribute to reference a more specialized version of the element. For example, a `<note>` element in a concept topic conrefs a `<hazardstatement>` element in a reference document. If the hazard statement domain is not available in the concept topic, the `<hazardstatement>` element is generalized to a `<note>` element when the content reference is resolved.

Syntax and rules

Each domain and constraint module **MUST** provide a value for use by the `@domains` attribute. Each structural vocabulary module **SHOULD** provide a value for use by the `@domains` attribute, and it **MUST** do so when it has a dependency on elements from any module that is not part of its specialization ancestry.

Values provided for the `@domains` attribute values are specified from root module (map or topic) to the provided module.

structural modules

The value of the `@domains` attribute includes each module in the specialization ancestry:

```
'(', topic-or-map, (' ', module)+, ')'
```

For example, consider the `<glossentry>` specialization, in which the topic type is specialized to the concept type, and the concept type is specialized to glossentry. The structural module contribution to the value of the `@domains` attribute for the glossentry structural module is `(topic concept glossentry)`.

structural modules with dependencies

Structural modules can directly reference or specialize elements from modules that are outside of their specialization ancestry. They also can define specialized elements that reference specialized attributes. In these cases the structural module has a dependency on the non-ancestor module, and the structural module contribution to the value of the `@domains` attribute **MUST** include the names of each dependent, non-ancestor module.

Dependencies are included in the value of the `@domains` attribute following the name of the structural module with the dependency on the non-ancestor module. Domain or attribute modules are appended to the name of the structural module with the dependency on the non-ancestor module, or to previous dependencies, separated by "+". Dependencies on structural specialization modules are appended to the name of the structural module with the dependency on the non-ancestor module, or to previous dependencies, separated by "++". The syntax is the same as for other structural modules, except that added modules can include these dependencies:

```
'(', topic-or-map, (' ', module-plus-optional-dependency-list)+, ')'
```

When the structural module is included in a document-type shell, all dependency modules also are included along with their own `@domains` values.

For example, the cppAPIRef structural module is specialized from reference, which is specialized from topic. The cppAPIRef module has a dependency on the cpp-d element domain and on the compilerTypeAtt-d attribute domain. The dependencies are listed after the name of `cppApiref`:

```
(topic reference cppApiRef+cpp-d+compilerTypeAtt-d)
```

Similarly, a codeChecklist structural module is specialized from reference, which is specialized from topic. The codeChecklist module has a dependency on the pr-d domain and on the task structural specialization. Again, the dependencies are listed after the name of `codeChecklist`. The pr-d domain and the task module each contribute their own values, so taken together these modules contribute the following values:

```
(topic reference codeChecklist+pr-d++task) (topic pr-d) (topic task)
```

element domains

The value includes the structural type ancestry and, if applicable, the domain module ancestry from which the domain is specialized:

```
 '(', topic-or-map, (' ', domain-module)+, ')'
```

For example, the highlighting domain (specialized from topic) supplies the following value: `(topic hi-d)`. A CPP domain that is specialized from the programming domain, which in turn is specialized from topic, supplies the following value: `(topic pr-d cpp-d)`.

structural constraint modules

The value includes the structural type ancestry followed by the name of the constraint domain:

```
 '(', inheritance-hierarchy qualifierTagname-c, ')'
```

where:

- *inheritance-hierarchy* is the specialization hierarchy, for example, `topic task`.
- *qualifier* is a string that is specific to the constraints module and characterizes it, for example, "strict" or "requiredTitle" or "myCompany-".
- *Tagname* is the element type name with an initial capital, for example, "Taskbody" or "Topic".
- The literal "-c" indicates that the name is the name of a constraint.

For example, the strictTaskbody constraint applies to the task module, which is specialized from topic, resulting in the following value: `(topic task strictTaskbody-c)`.

Optionally, a domains contribution can indicate a strong constraint by preceding the domains contribution with the letter "s". For example, `s(topic task strictTaskbody-c)` indicates a strong constraint.

domain constraint modules

The value includes the specialization ancestry followed by the name of the constraint domain:

```
 '(', inheritance-hierachy qualifierdomainDomain-c ')'
```

where:

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- *inheritance-hierarchy* is the specialization hierarchy, for example, `topic hi-d`.
- *qualifier* is a string that is specific to the constraints module and characterizes it, for example, "noSyntaxDiagram" or "myCompany-".
- *domain* is the name of the domain to which the constraints apply, for example, "Highlighting" or "Programming".
- The literal "-c" indicates that the name is the name of a constraint.

For example, a domain constraint module that restricts the highlighting domain includes a value like the following: `(topic hi-d basic-HighlightingDomain-c)`

attribute domains

The value uses an "a" before the initial parenthesis to indicate an attribute domain. Within the parenthesis, the value includes the attribute specialization hierarchy, starting with `@props` or `@base`:

```
'a(', props-or-base, (' ', attname)+, ')'
```

For example, the `@mySelectAttribute` specialized from `@props` results in the following value: `a(props mySelectAttribute)`

Example: Task with multiple domains

In this example, a document-type shell integrates the task structural module and the following domain modules:

Domain	Domain short name
User interface	ui-d
Software	sw-d
Programming	pr-d

The value of the `@domains` attribute includes one value from each module; the effective value is the following:

```
domains="(topic task) (topic ui-d) (topic sw-d) (topic pr-d)"
```

If the document-type shell also used a specialization of the programming domain that describes C++ programming (with a short name of "cpp-d"), the new C++ programming domain would add an additional value to the `@domains` attribute:

```
domains="(topic task) (topic ui-d) (topic sw-d) (topic pr-d) (topic pr-d cpp-d)"
```

Note that the value for the `@domains` attribute is not authored; Instead, the value is defaulted based on the modules that are included in the document type shell.

Related concepts

5.5.7 Processing documents with different values of the domains attribute (125)

When DITA elements are copied from one document to another, processors need to determine the validity of the copied elements. This copying might occur as the result of a content reference (conref) or key reference (keyref), or it might occur in the context of an author editing a DITA document.

6.3.8 Specializing to include non-DITA content

You can extend DITA to incorporate standard vocabularies for non-textual content, such as MathML and SVG, as markup within DITA documents. This is done by specializing the `<foreign>` or `<unknown>` elements.

There are three methods of incorporating foreign content into DITA.

- A domain specialization of the `<foreign>` or `<unknown>` element. This is the usual implementation.
- A structural specialization using the `<foreign>` or `<unknown>` element. This affords more control over the content.
- Directly embedding the non-DITA content within `<foreign>` or `<unknown>` elements. If the non-DITA content has interoperability or vocabulary naming issues such as those that are addressed by specialization in DITA, they must be addressed by means that are appropriate to the non-DITA content.

The `<foreign>` or `<unknown>` elements should not be used to include textual content or metadata in DITA documents, except where such content acts as an example or display, rather than as the primary content of a topic.

Example: Creating an element domain specialization for SVG

The following code sample, which is from the `svgDomain.ent` file, shows the domain declaration for the SVG domain.

```
<!-- ============================================================= -->
<!--                  SVG DOMAIN ENTITIES                          -->
<!-- ============================================================= -->

<!-- SVG elements must be prefixed, otherwise they conflict with
     existing DITA elements (e.g., <desc> and <title>).
  -->
<!ENTITY % NS.prefixed "INCLUDE" >
<!ENTITY % SVG.prefix "svg" >

<!ENTITY % svg-d-foreign
   "svg-container
   "
>

<!ENTITY   svg-d-att
  "(topic svg-d)"
>
```

Note that the SVG-specific `%SVG.prefix;` parameter entity is declared. This establishes the default namespace prefix to be used for the SVG content embedded with this domain. The namespace can be overridden in a document-type shell by declaring the parameter entity before the reference to the `svgDomain.ent` file. Other foreign domains might need similar entities when required by the new vocabulary.

For more information, see the `svgDomain.mod` file that is shipped with the OASIS DITA distributions. For an example of including the SVG domain in a document type shell, see `task.dtd`.

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6.3.9 Sharing elements across specializations

Specialization enables easy reuse of elements from ancestor specializations. However, it is also possible to reuse elements from non-ancestor specializations, as long as the dependency is properly declared in order to prevent invalid generalization or conref processing.

A structural specialization can incorporate elements from unrelated domains or other structural specializations by referencing them in the content model of a specialized element. The elements included in this manner must be specialized from ancestor content that is valid in the new context. If the reusing and reused specializations share common ancestry, the reused elements must be valid in the reusing context at every level they share in common.

Although a well-designed structural specialization hierarchy with controlled use of domains is still the primary means of sharing and reusing elements in DITA, the ability to also share elements declared elsewhere in the hierarchy allows for situations where relevant markup comes from multiple sources and would otherwise be developed redundantly.

Example: A specialization of <concept> reuses an element from the task module

A specialized concept topic could declare a specialized `<process>` section that contains the `<steps>` element that is defined in the task module. This is possible because of the following factors:

- The `<steps>` element is specialized from `<ol>`.
- The `<process>` element is specialized from `<section>`, and the content model of `<section>` includes `<ol>`.

The `<steps>` element in `<process>` always can be generalized back to `<ol>` in `<section>`.

Example: A specialization of <reference> reuses an element from the programming domain

A specialized reference topic could declare a specialized list (`<apilist>`) in which each `<apilistitem>` contains an `<apiname>` element that is borrowed from the programming domain.

6.4 Generalization

Generalization is the process of reversing a specialization. It converts specialized elements or attributes into the original types from which they were derived.

6.4.1 Overview of generalization

Specialized content can be generalized to any ancestor type. The generalization process can preserve information about the former level of specialization to allow round-tripping between specialized and unspecialized forms of the same content.

All DITA documents contain a mix of markup from at least one structural type and zero or more domains. When generalizing the document, any individual structural type or domain can be left as-is, or it can be generalized to any of its ancestors. If the document will be edited or processed in generalized form, it might be necessary to have a document-type shell that includes all non-generalized modules from the original document-type shell.

Generalization serves several purposes:

- It can be used to migrate content. For example, if a specialization is unsuccessful or is no longer needed, the content can be generalized back to a less specialized form.

- It can be used for temporary round-tripping. For example, if content is shared with a process that is not specialization aware, it can be temporarily generalized for that process and then returned to specialized form.
- It can allow reuse of specialized content in an enviroment that does not support the specialization. Similar to round-tripping, content can be generalized for sharing, without the need to re-specialize.

When generalizing for migration, the `@class` attribute and `@domains` attribute should be absent from the generalized instance document, so that the default values in the document-type shell are used. When generalizing for round-tripping, the `@class` attribute and `@domains` attribute **SHOULD** retain the original specialized values in the generalized instance document.

Note that when using constraints, a document instance can always be converted from a constrained document type to an unconstrained document type merely by switching the binding of the document instance to the less restricted document type shell (which would also have a different `@domains` attribute declaration). No renaming of elements is needed to remove constraints.

6.4.2 Element generalization

Elements are generalized by examining the `@class` attribute. When a generalization process detects that an element belongs to one of the modules that is being generalized, the element is renamed to a more general form.

For example, the `<step>` element has a `@class` attribute value of "`- topic/li task/step `". If the task module is being generalized, the `<step>` element is renamed to its more general form from the topic module: `<li>`.

For specific concerns when generalizing structural types with dependencies on non-ancestor modules, see Generalization with cross-specialization dependencies (143).

While the tag name of a given element is normally the same as the type name of the last token in the `@class` value, this is not required. For example, if a generalization process has already run on the element, the `@class` attribute could contain tokens from two or more modules based on the original specialization. In that case, the element name could already match the first token or an intermediate token in the `@class` attribute. A second generalization process could end up renaming the element again or could leave it alone, depending on the target module or document type.

Generalization and conref

To determine compatibility between a document instance and a target document type when resolving a conref reference, a generalization processor can use the `@domains` and `@class` attributes for the document instance and the `@domains` attribute for the target document type to determine how to rename elements in the resolved instance. For each element type, a generalization processor:

- Iterates over the `@class` attribute from specific to general, inspecting the vocabulary modules.
- Identifies the first vocabulary module that is both present in each document type, with a compatible set of constraints for that vocabulary module. If such a module is not found, the instance can only be generalized to a less constrained document type.

6.4.3 Processor expectations when generalizing elements

Generalization processors convert elements from one or more modules into their less specialized form. The list of modules can be supplied to a generalization processor, or it can be inferred based on knowledge of a target document-type shell.

The person or application initiating a generalization process can supply the source and target modules for each generalization, for example, "generalize from reference to topic". Multiple target modules can be

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specified, for example, "generalize from reference to topic and from ui-d to topic". When the source and target modules are not supplied, the generalization process is assumed to be from all structural types to the base (topic or map), and no generalization is performed for domains.

The person or application initiating a generalization process also can supply the target document-type shell. When the target document-type shell is not supplied, the generalized document will not contain a reference to a document-type shell.

A generalization processor **SHOULD** be able to handle cases where it is given:

- Only source modules for generalization (in which case the designated source types are generalized to topic or map)
- Only target modules for generalization (in which case all descendants of each target are generalized to that target)
- Both (in which case only the specified descendants of each target are generalized to that target)

For each structural type instance, the generalization processor checks whether the structural type instance is a candidate for generalization, or whether it has domains that are candidates for generalization. It is important to be selective about which structural type instances to process; if the process simply generalizes every element based on its `@class` attribute values, an instruction to generalize "reference" to "topic" could leave a specialization of reference with an invalid content model, since any elements it reuses from "reference" would have been renamed to topic-level equivalents.

The `@class` attribute for the root element of the structural type is checked before generalizing structural types:

	Source module unspecified	**Source module specified**
Target module unspecified	Generalize this structural type to its base ancestor	Check whether the root element of the topic type matches a specified source module; generalize to its base ancestor if it does, otherwise ignore the structural type instance unless it has domains to generalize.
Target module specified	Check whether the `@class` attribute contains the target module. If it does contain the target, rename the element to the value associated with the target module. Otherwise, ignore the element.	It is an error if the root element matches a specified source but its `@class` attribute does not contain the target. If the root element matches a specified source module and its `@class` attribute does contain the target module, generalize to the target module. Otherwise, ignore the structural type instance unless it has domains to generalize.

The `@domains` attribute for the root element of the structural type is checked before generalizing domains:

	Source module unspecified	**Source module specified**
Target module unspecified	Do not generalize domain specializations in this structural type.	Check whether the `@domains` attribute lists the specified domain; proceed with generalization if it does, otherwise ignore the structural type instance unless it is itself a candidate for generalization.
Target module specified	Check whether the `@domains` attribute contains the target module. If it does, generalize to the target module. Otherwise, skip the structural type instance unless it is itself a candidate for generalization.	It is an error if the `@domains` attribute matches a specified source but the domain value string does not contain the target. If the `@domains` attribute matches a specified source module and the domain value string does contain the target module, generalize to the target module. Otherwise, ignore the structural type instance unless it is itself a candidate for generalization.

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For each element in a candidate structural type instance:

	Source module unspecified	**Source module specified**
Target module unspecified	If the `@class` attribute starts with "-" (part of a structural type), rename the element to its base ancestor equivalent. Otherwise ignore it.	Check whether the last value of the `@class` attribute matches a specified source; generalize to its base ancestor if it does, otherwise ignore the element.
Target module specified	Check whether the `@class` attribute contains the target module; rename the element to the value associated with the target module if it does contain the target, otherwise ignore the element.	It is an error if the last value in the `@class` attribute matches a specified source but the previous values do not include the target. If the last value in the `@class` attribute matches a specified source module and the previous values do include the target module, rename the element to the value associated with the target module. Otherwise, ignore the element.

When renaming elements during round-trip generalization, the generalization processor **SHOULD** preserve the values of all attributes. When renaming elements during one-way or migration generalization, the process **SHOULD** preserve the values of all attributes except the `@class` and `@domains` attribute, both of which should be supplied by the target document type.

6.4.4 Attribute generalization

DITA provides a syntax to generalize attributes that have been specialized from the `@props` or `@base` attribute. Specialization-aware processors **SHOULD** process both the specialized and generalized forms of an attribute as equivalent in their values.

When a specialized attribute is generalized to an ancestor attribute, the value of the ancestor attribute consists of the name of the specialized attribute followed by its specialized value in parentheses. For example, if `@jobrole` is an attribute specialized from `@person`, which in turn is specialized from `@props`:

- `jobrole="programmer"` can be generalized to `person="jobrole(programmer)"` or to `props="jobrole(programmer)"`
- `props="jobrole(programmer)"` can be respecialized to `person="jobrole(programmer)"` or to `jobrole="programmer"`

In this example, processors performing generalization and respecialization can use the `@domains` attribute to determine the ancestry of the specialized `@jobrole` attribute, and therefore the validity of the specialized `@person` attribute as an intermediate target for generalization.

If more than one attribute is generalized, the value of each is separately represented in this way in the value of the ancestor attribute.

Generalized attributes are typically not expected to be authored or edited directly. They are used by processors to preserve the values of the specialized attributes during the time or in the circumstances in which the document is in a generalized form.

A single element **MUST NOT** contain both generalized and specialized values for the same attribute. For example, the following `<p>` element provides two values for the `@jobrole` attribute, one in a generalized syntax and the other in a specialized syntax:

```
<p person="jobrole(programmer)" jobrole="admin">
    <!-- ... -->
</p>
```

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This is an error condition, since it means the document has been only partially generalized, or that the document has been generalized and then edited using a specialized document type.

6.4.5 Generalization with cross-specialization dependencies

Dependencies across specializations limit generalization targets to those that either preserve the dependency or eliminate them. Some generalization targets will not be valid and should be detected before generalization occurs.

When a structural specialization has a dependency on a domain specialization, then the domain cannot be generalized without also generalizing the reusing structural specialization.

For example, a structural specialization codeConcept might incorporate and require the `<codeblock>` element from the programming domain. A generalization process that turns programming domain elements back into topic elements would convert `<codeblock>` to `<pre>`, making a document that uses codeConcept invalid. However, codeConcept could be generalized to concept or topic, without generalizing programming domain elements, as long as the target document type includes the programming domain.

When a structural specialization has a dependency on another structural specialization, then both must be generalized together to a common ancestor.

For example, if the task elements in checklist were generalized without also generalizing checklist elements, then the checklist content models that referenced task elements would be broken. And if the checklist elements were generalized to topic without also generalizing the task elements, then the task elements would be out of place, since they cannot be validly present in topic. However, checklist and task can be generalized together to any ancestor they have in common: in this case topic.

When possible, generalizing processes **SHOULD** detect invalid generalization target combinations and report them as errors.

6.5 Constraints

Constraint modules define additional constraints for vocabulary modules in order to restrict content models or attribute lists for specific element types, remove certain extension elements from an integrated domain module, or replace base element types with domain-provided, extension element types.

6.5.1 Overview of constraints

Constraint modules enable information architects to restrict the content models or attributes of OASIS-defined DITA grammars. A constraint is a simplification of an XML grammar such that any instance that conforms to the constrained grammar also will conform to the original grammar.

A constraint module can perform the following functions:

Restrict the content model for an element

Constraint modules can modify content models by removing optional elements, making optional elements required, or requiring unordered elements to occur in a specific sequence. Constraint modules cannot make required elements optional or change the order of element occurrence for ordered elements.

For example, a constraint for `<topic>` can require `<shortdesc>`, can remove `<abstract>`, and can require that the first child of `<body>` be `<p>`. A constraint cannot allow `<shortdesc>` to follow `<prolog>`, because the content model for `<topic>` requires that `<shortdesc>` precedes `<prolog>`.

Restrict the attributes that are available on an element

Constraint modules can restrict the attributes that are available on an element. They also can limit the set of permissible values for an attribute.

For example, a constraint for `<note>` can limit the set of allowed values for the `@type` attribute to "note" and "tip". It also can omit the `@othertype` attribute, since it is needed only when the value of the `@type` attribute is "other".

Restrict the elements that are available in a domain

Constraint modules can restrict the set of extension elements that are provided in a domain. They also can restrict the content models for the extension elements.

For example, a constraint on the programming domain can reduce the list of included extension elements to `<codeph>` and `<codeblock>`.

Replace base elements with domain extensions

Constraint modules can replace base element types with the domain-provided extension elements.

For example, a constraint module can replace the `<ph>` element with the domain-provided elements, making `<ph>` unavailable.

6.5.2 Constraint rules

There are certain rules that apply to the design and implementation of constraints.

Contribution to the @domains attribute

Each constraint that is integrated into a DITA document type **MUST** be declared in the `@domains` attribute for each structural type that is integrated into the document type. For DTDs, the contribution for the `@domains` attribute is specified in the constraint module file; for XSD and RELAX NG, the contribution to the `@domains` attribute is specified directly in the document type shell.

Content model

The content model for a constrained element must be at least as restrictive as the unconstrained content model for the element.

The content model and attributes of an element can be constrained by only one constraint module. If two constraint modules exist that constrain the content model or attributes for a specific element, those two modules must be replaced with a new constraint module that reflects the aggregation of the two original constraint modules.

Domain constraints

When a domain module is integrated into a document-type shell, the base domain element can be omitted from the domain extension group or parameter entity. In such a case, there is no separate constraint declaration, because the content model is configured directly in the document-type shell.

A domain module can be constrained by only one constraint module. This means that all restrictions for the extension elements that are defined in the domain must be contained within that one constraint module.

Structural constraints

Each constraint module can constrain elements from only one vocabulary module. For example, a single constraint module that constrains `<refsyn>` from `reference.mod` and constrains `<context>` from `task.mod` is not allowed. This rule maintains granularity of reuse at the module level.

Constraint modules that restrict different elements from within the same vocabulary module can be combined with one another. Such combinations of constraints on a single vocabulary module have no meaningful order or precedence.

6.5.3 Constraints, processing, and interoperability

Because constraints can make optional elements required, documents that use the same vocabulary modules might have incompatible constraints. Thus the use of constraints can affect the ability for content from one topic or map to be used in another topic or map.

A constraint does not change basic or inherited element semantics. The constrained instances remain valid instances of the unconstrained element type, and the element type retains the same semantics and `@class` attribute declaration. Thus, a constraint never creates a new case to which content processing might need to react.

For example, a document type constrained to require the `<shortdesc>` element allows a subset of the possible instances of the unconstrained document type with an optional `<shortdesc>` element. Thus, the content processing for topic still works when `<topic>` is constrained to require a short description.

A constrained document type allows only a subset of the possible instances of the unconstrained document type. Thus, for a processor to determine whether a document instance is compatible with another document type, the document instance **MUST** declare any constraints on the document type.

For example, an unconstrained task is compatible with an unconstrained topic, because the `<task>` element can be generalized to `<topic>`. However, if the topic is constrained to require the `<shortdesc>` element, a document type with an unconstrained task is not compatible with the constrained document type, because some instances of the task might not have a `<shortdesc>` element. However, if the task document type also has been constrained to require the `<shortdesc>` element, it is compatible with the constrained topic document type.

6.5.4 Weak and strong constraints

Constraints can be classified into two categories: Weak and strong. This classification determines whether processors enforce strict compatibility during `@conref` or `@conkeyref` resolution.

Strong constraints

Constraints for which processors enforce strict compatibility during `@conref` or `@conkeyref` resolution.

Weak constraints

Constraints for which a processor does not enforce strict compatibility during `@conref` or `@conkeyref` resolution.

By default, constraints are weak unless they are explicitly designated as strong.

Any constraint declaration can designate a constraint as strong. A constraint can be designated as strong by prefixing the letter "s" to the domains attribute contribution, for example, "`s(topic task strictTaskbody-c)`". Processors also can be configured to treat all constraints as strong.

The following behavior is expected of processors:

- Processors **MAY** perform constraint compatibility checking.
- If processors perform constraint compatibility checking, they **SHOULD** enforce strict compatibility for strong constraints.
- Processors **MAY** have an option for configuring whether all constraints are treated as strong constraints.

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6.5.5 Conref compatibility with constraints

To determine compatibility between two document instances, a conref processor checks the `@domains` attribute to confirm whether the referencing document has a superset of the vocabulary modules in the referenced document. If one or both of the document instances are constrained, the conref processor checks to confirm the compatibility of the constraints.

Conref processors take into account whether constraints are specified as strong. For strong constraints, the following rules apply:

Conref pull

For each vocabulary module used by both document types, the module in the document type that contains the referencing element must be less (or equally) constrained than the same module in the document type that contains the referenced element. For example, if each document type uses the highlighting domain module, that module must be less (or equally) constrained in the document type that contains the referencing element.

Conref push

For each vocabulary module used by both document types, the module in the document type that contains the referencing element must be more (or equally) constrained than the same module in the document type that contains the referenced element. For example, if each document type uses the highlighting domain module, that module must be more (or equally) constrained in the document type that contains the referencing element.

Example: Conref pull and constraint compatibility

The following table contains scenarios where conref pull occurs between constrained and unconstrained document instances. It assumes that the processor is **not** configured to treat all constraints as strong constraints.

Values of `@domains` attribute in document type that contains the referencing element	Values of `@domains` attribute in document type that contains the referenced element	Resolution	Comments
`(topic)`	`(topic shortdescReq-c)`	Allowed	The content model of the referenced topic is more constrained than the referencing topic.
`s(topic shortdescReq-c)`	`(topic)`	Prevented	The constraint is specified as a strong constraint, and the content model of the referenced topic is less constrained than the referencing topic.
`(topic shortdescReq-c)`	`(topic)`	Allowed	Although the content model of referenced topic is less constrained than the referencing topic, this is a weak constraint and so permitted.

Values of `@domains` attribute in document type that contains the referencing element	Values of `@domains` attribute in document type that contains the referenced element	Resolution	Comments
`(topic task) (topic hi-d) (topic hi-d basicHighlightingDomain-c)`	`(topic simpleSection-c) (topic task) (topic task simpleStep-c)`	Allowed	The referenced topic has a subset of the vocabulary modules that are integrated into the document-type shell for the referencing topic. Both document types integrate constraints, but for modules used in both document types, the referencing topic is less constrained than the referenced topic.
`(topic hi-d) (topic simpleSection-c) s(topic simpleP-c)`	`(topic simpleSection-c) (topic task) (topic hi-d) (topic hi-d basicHighlightingDomain-c)`	Prevented	The referencing document has constraints that are not present in the referenced document, including a strong constraint applied to the `<p>` element.

Example: Conref push and constraint compatibility

The following table contains scenarios where conref push occurs between constrained and unconstrained document instances. It assumes that the processor has **not** been configured to treat all constraints as strong constraints.

Values of `@domains` attribute in document type that contains the referencing element	Values of `@domains` attribute in document type that contains the referenced element	Resolution	Comments
`(topic)`	`(topic shortdescReq-c)`	Allowed	Although the content model of the referenced topic is more constrained than the referencing topic, this is a weak constraint and so permitted.
`(topic)`	`s(topic shortdescReq-c)`	Prevented	The constraint is specified as a strong constraint, and the content model of the referenced topic is more constrained than the referencing topic.

Values of `@domains` attribute in document type that contains the referencing element	Values of `@domains` attribute in document type that contains the referenced element	Resolution	Comments
`(topic shortdescReq-c)`	`(topic)`	Allowed	The content model of the referencing topic is more constrained than the referenced topic.
`(topic task) (topic hi-d) (topic hi-d basicHighlightingDomain-c)`	`(topic simpleSection-c) (topic task) (topic task simpleStep-c)`	Allowed	The referenced topic has a subset of the vocabulary modules that are integrated into the document-type shell for the referencing topic. For modules used in both document types, the referenced topic is more constrained than the referencing topic, but this is a weak constraint and so permitted.
`(topic simpleSection-c) (topic task) (topic hi-d) (topic hi-d basicHighlightingDomain-c)`	`(topic hi-d) (topic simpleSection-c) s(topic simpleP-c)`	Prevented	For the common topic module, the referenced document has more constraints than the referencing document, including a strong constraint applied to the `<p>` element.

6.5.6 Examples: Constraints

This section of the specification contains examples and scenarios. They illustrate a variety of ways that constraints can be used; they also provide examples of the DTD coding requirements for constraints and how constraints are integrated into document-type shells.

6.5.6.1 Example: Redefine the content model for the <topic> element

In this scenario, an information architect for Acme, Incorporated wants to redefine the content model for the topic document type. She wants to omit the `<abstract>` element and make the `<shortdesc>` element required; she also wants to omit the `<related-links>` element and disallow topic nesting.

1. She creates a .mod file using the following naming conventions: `*qualiferTagname*Constraint.mod`, where *qualifer* is a string the describes the constraint, and *Tagname* is the element type name with an initial capital. Her contraint module is named `acme-TopicConstraint.mod`.
2. She adds the following content to `acme-TopicConstraint.mod`:

```
<!-- ============================================================= -->
<!--                    CONSTRAINED TOPIC ENTITIES                 -->
<!-- ============================================================= -->

<!-- Declares the entity for the constraint module and defines     -->
```

```
<!-- its contribution to the @domains attribute.                   -->

<!ENTITY topic-constraints
  "(topic basic-Topic-c)"
>

<!-- Declares the entities referenced in the constrained content  -->
<!-- model.                                                       -->

<!ENTITY % title              "title">
<!ENTITY % titlealts          "titlealts">
<!ENTITY % shortdesc          "shortdesc">
<!ENTITY % prolog             "prolog">
<!ENTITY % body               "body">

<!-- Defines the constrained content model for <topic>.            -->

<!ENTITY % topic.content
                       "((%title;),
                         (%titlealts;)?,
                         (%shortdesc;),
                         (%prolog;)?,
                         (%body;)?)"
>
```

3. She then integrates the constraint module into her document-type shell for topic by adding the following section above the "TOPIC ELEMENT INTEGRATION" comment:

```
<!-- ============================================================= -->
<!--                    CONTENT CONSTRAINT INTEGRATION             -->
<!-- ============================================================= -->

<!ENTITY % topic-constraints-c-def
  PUBLIC "-//ACME//ELEMENTS DITA Topic Constraint//EN"
  "acme-TopicConstraint.mod">
%topic-constraints-c-def;
```

4. She then adds the constraint to the list of domains and constraints that need to be included in the value of the `@domains` attribute for `<topic>`:

```
<!-- ============================================================= -->
<!--                    DOMAINS ATTRIBUTE OVERRIDE                 -->
<!-- ============================================================= -->

<!ENTITY included-domains
                          "&hi-d-att;
                           &ut-d-att;
                           &indexing-d-att;
                           &topic-constraints;
  "
>
```

5. After updating the `catalog.xml` file to include the new constraints file, her work is done.

6.5.6.2 Example: Constrain attributes for the <section> element

In this scenario, an information architect wants to redefine the attributes for the `<section>` element. He wants to make the `@id` attribute required and omit the `@spectitle` attribute.

1. He creates a .mod file named `idRequiredSectionContraint.mod`, where "idRequired" is a string that characterizes the constraint.
2. He adds the following content to `idRequiredSectionContraint.mod`:

```
<!-- ============================================================= -->
<!--                    CONSTRAINED TOPIC ENTITIES                 -->
<!-- ============================================================= -->

<!ENTITY section-constraints
```

```
  "(topic idRequired-section-c)"
>

<!-- Declares the entities referenced in the constrained content  -->
<!-- model.                                                       -->
<!ENTITY % conref-atts
             'conref    CDATA #IMPLIED
              conrefend CDATA #IMPLIED
              conaction (mark|pushafter|pushbefore|pushreplace|-dita-use-conref-
target) #IMPLIED
              conkeyref CDATA #IMPLIED' >
<!ENTITY % filter-atts
             'props      CDATA #IMPLIED
              platform   CDATA #IMPLIED
              product    CDATA #IMPLIED
              audience   CDATA #IMPLIED
              otherprops CDATA #IMPLIED
              %props-attribute-extensions;' >
<!ENTITY % select-atts
             '%filter-atts;
              base      CDATA #IMPLIED
              %base-attribute-extensions;
              importance (default|deprecated|high|low|normal|obsolete|optional|
                          recommended|required|urgent|-dita-use-conref-target)
#IMPLIED
              rev       CDATA #IMPLIED
              status     (changed|deleted|unchanged|-dita-use-conref-target)
#IMPLIED' >
<!ENTITY % localization-atts
             'translate (no|yes|-dita-use-conref-target) #IMPLIED
              xml:lang CDATA #IMPLIED
              dir      (lro|ltr|rlo|rtl|-dita-use-conref-target) #IMPLIED' >

<!-- Declares the constrained content model. Original definition   -->
<!-- included %univ-atts; and spectitle; now includes-->
<!-- individual pieces of univ-atts, to make ID required.          -->

<!ENTITY % section.attributes
          "id          CDATA   #REQUIRED
           %conref-atts;
           %select-atts;
           %localization-atts;
           outputclass CDATA   #IMPLIED">
```

Note: The information architect had to declare all the parameter entities that are referenced in the redefined attributes for `<section>`. If he did not do so, none of the attributes that are declared in the `%conref-atts;`, `%select-atts;`, or `%localization-atts;` parameter entities would be available on the `<section>` element. Furthermore, since the `%select-atts;` parameter entity references the `%filter-atts;` parameter entity, the `%filter-atts;` must be declared and it must precede the declaration for the `%select-atts;` parameter entity. The `%props-attribute-extensions;` and `%base-attribute-extensions;` parameter entities do not need to be declared in the constraint module, because they are declared in the document-type shells before the inclusion of the constraint module.

Note: The information architect had to declare all the parameter entities that are referenced in the redefined attributes for `<section>`. If he did not do so, none of the attributes that are declared in the `%conref-atts;`, `%select-atts;`, or `%localization-atts;` parameter entities would be available on the `<section>` element. Furthermore, since the `%select-atts;` parameter entity references the `%filter-atts;` parameter entity, the `%filter-atts;` must be declared and it must precede the declaration for the `%select-atts;` parameter entity. The `%props-attribute-extensions;` and `%base-attribute-extensions;` parameter entities do not need to be declared in the constraint module, because they are declared in the document-type shells before the inclusion of the constraint module.

3. He then integrates the constraint module into the applicable document-type shells and adds it to his `catalog.xml` file.

6.5.6.3 Example: Constrain a domain module

In this scenario, an information architect wants to use only a subset of the elements defined in the highlighting domain. She wants to use `<b>` and `<i,>` but not `<line-through>`, `<overline>`, `<sup>`, `<sup>`, `<tt>`, or `<u>`. She wants to integrate this constraint into the document-type shell for task.

1. She creates `reducedHighlightingDomainConstraint.mod`, where "reduced" is a string that characterizes the constraint.
2. She adds the following content to `reducedHighlightingDomainConstraint.mod`:

```
<!-- ============================================================= -->
<!--      CONSTRAINED HIGHLIGHTING DOMAIN ENTITIES                 -->
<!-- ============================================================= -->

<!ENTITY HighlightingDomain-constraints
  "(topic hi-d basic-HighlightingDomain-c)"
>

<!ENTITY % HighlightingDomain-c-ph     "b | i"                 >
```

3. She then integrates the constraint module into her company-specific, document-type shell for the task topic by adding the following section directly before the "DOMAIN ENTITY DECLARATIONS" comment:

```
<!-- ============================================================= -->
<!--                    DOMAIN CONSTRAINT INTEGRATION              -->
<!-- ============================================================= -->

<!ENTITY % HighlightingDomain-c-dec
  PUBLIC "-//ACME//ENTITIES DITA Highlighting Domain Constraint//EN"
  "acme-HighlightingDomainConstraint.mod"
>%basic-HighlightingDomain-c-dec;
```

4. In the "DOMAIN EXTENSIONS" section, she replaces the parameter entity for the highlighting domain with the parameter entity for the constrained highlighting domain:

```
<!ENTITY % ph           "ph |
                         %HighlightingDomain-c-ph; |
                         %sw-d-ph; |
                         %ui-d-ph;
                        ">
```

5. She then adds the constraint to the list of domains and constraints that need to be included in the value of the `@domains` attribute for `<task>`:

```
<!-- ============================================================= -->
<!--                    DOMAINS ATTRIBUTE OVERRIDE                 -->
<!-- ============================================================= -->

<!ENTITY included-domains
                          "&task-att;
                           &hi-d-att;
                           &indexing-d-att;
                           &pr-d-att;
                           &sw-d-att;
                           &ui-d-att;
                           &taskbody-constraints;
                           &HighlightingDomain-constraints;
  "
>
```

6. After updating the `catalog.xml` file to include the new constraints file, her work is done.

6.5.6.4 Example: Replace a base element with the domain extensions

In this scenario, an information architect wants to remove the `<ph>` element but allow the extensions of `<ph>` that exist in the highlighting, programming, software, and user interface domains.

1. The information architect creates an entities file named `noPhConstraint.ent`, where "no" is a qualifier string that characterizes the constraint.
2. The information architect adds the following content to `noPhConstraint.ent`:

   ```
   <!-- ============================================================= -->
   <!--      CONSTRAINED HIGHLIGHTING DOMAIN ENTITIES                 -->
   <!-- ============================================================= -->

   <!ENTITY ph-constraints
     "(topic noPh-ph-c)"
   >
   ```

   Note: Because the highlighting and programming domains cannot be generalized without the `<ph>` element, this entity must be defined so that there is a separate parenthetical expression that can be included in the `@domains` attribute for the topic.

   Note: Because the highlighting and programming domains cannot be generalized without the `<ph>` element, this entity must be defined so that there is a separate parenthetical expression that can be included in the `@domains` attribute for the topic.
3. The information architect then integrates the constraint module into a document-type shell for concept by adding the following section above the "TOPIC ELEMENT INTEGRATION" comment:

   ```
   <!-- ============================================================= -->
   <!--                    CONTENT CONSTRAINT INTEGRATION             -->
   <!-- ============================================================= -->

   <!ENTITY % noPh-ph-c-def
     PUBLIC "-//ACME//ELEMENTS DITA Ph Constraint//EN"
     "acme-PhConstraint-constraints" "noPhConstraint.ent">
   %noPh-ph-c-def;
   ```
4. In the "DOMAIN EXTENSIONS" section, the information architect removes the reference to the `<ph>` element:

   ```
   <!-- Removed "ph | " so as to make <ph> not available, only the domain extensions. --
   >
   <!ENTITY % ph            "%pr-d-ph; |
                             %sw-d-ph; |
                             %ui-d-ph;
                            ">
   ```
5. She then adds the constraint to the list of domains and constraints that need to be included in the value of the `@domains` attribute:

   ```
   <!-- ============================================================= -->
   <!--                    DOMAINS ATTRIBUTE OVERRIDE                 -->
   <!-- ============================================================= -->

   <!ENTITY included-domains
                              "&concept-att;
                               &hi-d-att;
                               &indexing-d-att;
                               &pr-d-att;
                               &sw-d-att;
                               &ui-d-att;
                               &ph-constraint;
     "
   >
   ```

6. After updating the `catalog.xml` file to include the new constraints file, the information architect's work is done.

6.5.6.5 Example: Apply multiple constraints to a single document-type shell

You can apply multiple constraints to a single document-type shell. However, there can be only one constraint for a given element or domain.

Here is a list of constraint modules and what they do:

File name	What it constrains	Details	Contribution to the **`@domains`** attribute
`example-TopicConstraint.mod`	`<topic>`	• Removes `<abstract>` • Makes `<shortdesc>` required • Removes `<related-links>` • Disallows topic nesting	`(topic basic-Topic-c)`
`example-SectionConstraint.mod`	`<section>`	• Makes `@id` required • Removes `@spectitle` attribute	`(topic idRequired-section-c)`
`example-HighlightingDomainConstraint.mod`	Highlighting domain	Reduces the highlighting domain elements to `<b>` and `<i>`	`(topic hi-d basic-HighlightingDomain-c)`
`example-PhConstraint.ent`	`<ph>`	Removes the `<ph>` element	(topic noPh-ph-c)

All of these constraints can be integrated into a single document-type shell for `<topic>`, since they constrain distinct element types and domains. The constraint for the highlighting domain must be integrated before the "DOMAIN ENTITIES" section, but the order in which the other three constraints are listed does not matter.

Each constraint module provides a unique contribution to the `@domains` attribute. When integrated into the document-type shell for `<topic>`, the effective value of the domains attribute will include the following values, as well as values for any other modules that are integrated into the document-type shell:

```
(topic basic-Topic-c) (topic idRequired-section-c) (topic hi-d basic-HighlightingDomain-c)
(topic noPh-ph-c)
```

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6.5.6.6 Example: Correct the constraint for the machinery task

For DITA 1.3, the OASIS DITA TC failed to update the constraint for the machinery task. In this scenario, an information architect corrects that oversight; she makes the (new for DITA 1.3) `<tasktroubleshooting>` element available in the body of the machinery task.

Note: This example assumes that the information architect has already implemented her own document-type shell for the machinery task information type.

Note: This example assumes that the information architect has already implemented her own document-type shell for the machinery task information type.

1. She makes a copy of the `machineryTaskbodyConstraint.mod` file and renames it `correctedMachineryTaskbodyConstraint.mod`.
2. She modifies the `correctedMachineryTaskbodyConstraint.mod` file to declare the entity for the `<tasktroubleshooting>` element and make it available at the correct place within the task body. (Her modifications are highlighted in bold below.)

```
<!ENTITY taskbody-constraints
  "(topic task+taskreq-d machineryTaskbody-c)"
>
<!ENTITY % prelreqs                                        "prelreqs">
<!ENTITY % context                                         "context">
<!ENTITY % section                                         "section">
<!ENTITY % steps                                           "steps">
<!ENTITY % steps-unordered                                 "steps-unordered">
<!ENTITY % steps-informal                                  "steps-informal">
<!ENTITY % result                                          "result">
<!ENTITY % tasktroubleshooting                             "tasktroubleshooting">
<!ENTITY % example                                         "example">
<!ENTITY % closereqs                                       "closereqs">


<!ENTITY % taskbody.content
              "((%prelreqs; |
                 %context; |
                 %section;)*,
                (%steps; |
                 %steps-unordered; |
                 %steps-informal;)?,
                (%result;)?,
                (%tasktroubleshooting;)?,
                (%example;)*,
                (%closereqs;)?)"
```

3. She updates her company-specific document-type shell to integrate the updated constraint.
4. After updating the `catalog.xml` file to include the new constraints file, her work is done.

7 Coding practices for DITA grammar files

This section collects all of the rules for creating modular DTD and RELAX NG grammar files to represent DITA document types, specializations, and constraints.

7.1 Recognized XML-document grammar mechanisms

The DITA standard recognizes three XML-document grammar mechanisms by which conforming DITA vocabulary modules and document types can be constructed: document type declarations (DTDs), XML Schema declarations (XSDs), and RELAX NG grammars.

This specification defines implementation requirements for DTDs and RNGs. The OASIS DITA Technical Committee recognizes that other XML grammar languages might provide similar modularity and extensibility mechanisms. However, because the Technical Committee has not yet defined implementation requirements for those languages, their conformance cannot be determined.

Of these document grammar mechanisms, RELAX NG grammars offer the easiest-to-use syntax and the most precise constraints. For this reason, the RELAX NG definitions of the standard DITA vocabularies are the normative versions. The DTD version shipped by OASISis generated from the RELAX NG version using open source tools.

Related information

Tools for generating DTD or XSD from RELAX NG

7.2 Normative versions of DITA grammar files

The OASIS DITA Technical Committee uses the RELAX NG XML syntax for the normative versions of the XML grammar files that comprise the DITA release.

The DITA Technical Committee chose the RELAX NG XML syntax for the following reasons:

Easy use of foreign markup

The DITA grammar files maintained by OASIS depend on this feature of RELAX NG in order to capture metadata about document-type shells and modules; such metadata is used to generate the DTD- and XSD-based versions of the grammar files.

The foreign vocabulary feature also can be used to include Schematron rules directly in RELAX NG grammars. Schematron rules can check for patterns that either are not expressible with RELAX NG directly or that would be difficult to express.

RELAX NG <div> element

This general grouping element allows for arbitrary organization and grouping of patterns within grammar documents. Such grouping tends to make the grammar documents easier to work with, especially in XML-aware editors. The use or non-use of the RELAX NG `<div>` element does not affect the meaning of the patterns that are defined in a RELAX NG schema.

Capability of expressing precise restrictions

RELAX NG is capable of expressing constraints that are more precise than is possible with either DTDs or XSDs. For example, RELAX NG patterns can be context specific such that the same element type can allow different content or attributes in different contexts.

If you plan to generate DTD- or XSD-based modules from RELAX NG modules, avoid RELAX NG features that cannot be translated into DTD or XSD constructs. When RELAX NG is used directly for DITA document validation, the document-type shells for those documents can integrate constraint modules that use the full power of RELAX NG to enforce constraints that cannot be enforced by DTDs or XSDs. The grammar files provided by the OASIS DITA Technical Committee do not use any features of RELAX NG that cannot be translated into equivalent DTD or XSD constructs.

The DITA use of RELAX NG depends on the *RELAX NG DTD Compatibility* specification, which provides a mechanism for defining default attribute values and embedded documentation. Processors that use RELAX NG for DITA documents in which required attributes (for example, the `@domains` and `@class` attributes) are not explicitly present must implement the DTD compatibility specification in order to get default attribute values.

Related information

Tools for generating DTD or XSD from RELAX NG

7.3 DTD coding requirements

This section explains how to implement DTD based document-type shells, specializations, and constraints.

7.3.1 DTD: Overview of coding requirements

DITA coding practices for DTDs rely heavily on entities to implement specialization and constraints. As such, an understanding of entities is critical when working with DTD document-type shells, vocabulary modules, or constraint modules.

Entities can be defined multiple times within a single document type, but only the first definition is effective. How entities work shapes DTD coding practices. The following list describes a few of the more important entities that are used in DITA DTDs:

Elements defined as entities

In DITA DTDs, every element is defined as an entity. When elements are added to a content model, they are added using the entity. This enables extension with domain specializations. For example, the entity `%ph;` usually just means "the ph element", but can be (pre)defined in a document-type shell to mean "ph plus several elements from the highlighting domain". Because the document-type shell places that entity definition before the usual definition, every element that included `%ph;` in its content model now includes `<ph>` plus every phrase specialization in the highlighting domain.

Content models defined as entities

Every element in a DITA DTD defines its content model using an entity. For example, rather than directly setting what is allowed in `<ph>`, that element sets its content model to `%ph.content;`; that entity defines the actual content model. This is done to enable constraints; a constraint module can (pre)define the `%ph.content;` model to remove selected elements.

Attribute sets defined as entities

Every element in a DITA DTD defines its attribute using an entity. For example, rather than directly defining attributes for `<ph>`, that element sets its attributes using the `%ph.attributes;` entity; that entity defines the actual attributes. As above, this is done to enable constraints; a constraint module can (pre)define the `%ph.attributes;` model to remove selected attributes.

Note: When constructing a constraint module or document-type shell, new entities are usually viewed as "redefinitions" because they redefine entities that already exist. However, these new definitions only work because they are added to a document-type shell before the existing definitions, which is why they are described here as (pre)definitions. Most topics about DITA DTDs, including others in this specification, will describe these overrides as redefinitions to ease understanding.

Note: When constructing a constraint module or document-type shell, new entities are usually viewed as "redefinitions" because they redefine entities that already exist. However, these new definitions only work because they are added to a document-type shell before the existing definitions, which is why they are described here as (pre)definitions. Most topics about DITA DTDs, including others in this specification, will describe these overrides as redefinitions to ease understanding.

7.3.2 DTD: Coding requirements for document-type shells

A DTD-based document-type shell is organized into sections; each section contains entity declarations that follow specific coding rules.

The DTD-based approach to configuration, specialization, and constraints relies heavily upon parameter entities. Several of the parameter entities that are declared in document type shells contain references to other parameter entities. Because parameter entities must be declared before they are used, the order of the sections in a DTD-based document-type shell is significant.

A DTD-based document-type shell contains the following sections:

1. Topic [or map] entity declarations (0)
2. Domain constraint integration (0)
3. Domain entity declarations (0)
4. Domain attributes declarations (0)
5. Domain extensions (0)
6. Domain attribute extensions (0)
7. Topic nesting override (0)
8. Domains attribute override (0)
9. Content constraint integration (0)
10. Topic [or map] element integration (0)
11. Domain element integration (0)

Each of the sections in a DTD-based document-type shell follows a pattern. These patterns help ensure that the shell follows XML parsing rules for DTDs; they also establish a modular design that simplifies creation of new document-type shells. By convention, an `.ent` file extension is used to indicate files that define only parameter entities, while a `.mod` file extension is used to indicate files that define elements or constraints.

Topic [or map] entity declarations

This section declares and references an external parameter entity for each of the following:

- The top-level topic or map type that the document-type shell configures
- Any additional structural modules that are used by the document type shell

Each parameter entity (`.ent`) file contributes a domain token for structural topics or maps. The parameter entity is named *type-name*`-dec`.

For example, a document-type shell that integrates the `<concept>` specialization would include:

```
<!ENTITY % concept-dec
  PUBLIC "-//OASIS//ENTITIES DITA 1.3 Concept//EN"
         "concept.ent"
>%concept-dec;
```

Domain constraint integration

For each domain constraint module that is integrated into the document type shell, this section declares a parameter entity and references the constraint module file where the constraint is defined. The parameter entity is named *descriptorDomainName*-c-dec.

In the following example, the entity file for a constraint module that reduces the highlighting domain to a subset is included in a document type shell:

```
<!-- ============================================================= -->
<!--                   DOMAIN CONSTRAINT INTEGRATION               -->
<!-- ============================================================= -->

<!ENTITY % HighlightingDomain-c-dec
  PUBLIC "-//ACME//ENTITIES DITA Highlighting Domain Constraint//EN"
  "acme-HighlightingDomainConstraint.mod"
>%basic-HighlightingDomain-c-dec;
```

Domain entity declarations

For each element domain that is integrated into the document-type shell, this section declares a parameter entity and references the external entities file where the element domain is defined. The parameter entity is named *shortDomainName*-dec.

In the following example, the entity file for the highlighting domain is included in a document-type shell:

```
<!ENTITY % hi-d-dec PUBLIC
    "-//OASIS//ENTITIES DITA Highlight Domain//EN"
    "highlightDomain.ent"
>%hi-d-dec;
```

Domain attributes declarations

For each attribute domain that is integrated into the document-type shell, this section declares a parameter entity and references the external entities file where the attribute domain is defined. The parameter entity is named *domainName*-dec.

In the following example, the entity file for the `@deliveryTarget` attribute domain is included in a document-type shell:

```
<!ENTITY % deliveryTargetAtt-d-dec
  PUBLIC "-//OASIS//ENTITIES DITA 1.3 Delivery Target Attribute Domain//EN"
         "deliveryTargetAttDomain.ent"
>%deliveryTargetAtt-d-dec;
```

Domain extensions

For each element that is extended by one or more domains, this section redefines the parameter entity for the element. These entities are used by later modules to define content models; redefining the entity adds domain specializations wherever the base element is allowed.

In the following example, the entity for the `<pre>` element is redefined to add specializations from the programming, software, and user interface domains:

```
<!ENTITY % pre
    "pre        |
     %pr-d-pre; |
     %sw-d-pre; |
     %ui-d-pre;">
```

Domain attribute extensions

For each attribute domain that is integrated into the document-type shell, this section redefines the parameter entities for the attribute. It adds an extension to the parameter entity for the relevant attribute.

In the following example, the `@props` attribute is specialized to create the `@new` and `@othernew` attributes, while the `@base` attribute is specialized to create `@newfrombase` and `@othernewfrombase` attributes:

```
<!ENTITY % props-attribute-extensions
        "%newAtt-d-attribute;
         %othernewAtt-d-attribute;">
<!ENTITY % base-attribute-extensions
        "%newfrombaseAtt-d-attribute;
         %othernewfrombaseAtt-d-attribute;">
```

Topic nesting override

For each topic type that is integrated into the document-type shell, this section specifies whether and how subtopics nest by redefining the *`topictype`*`-info-types` entity. The definition is usually an OR list of the topic types that can be nested in the parent topic type. Use the literal root-element name, not the corresponding parameter entity. Topic nesting can be disallowed completely by specifying the `<no-topic-nesting>` element.

In the following example, the parameter entity specifies that `<concept>` can nest any number of `<concept>` or `<myTopicType>` topics, in any order:

```
<!ENTITY % concept-info-types "concept | myTopicType">
```

Domains attribute override

This section sets the effective value of the `@domains` attribute for the top-level document type that is configured by the document type shell. It redefines the `included-domains` entity to include the text entity for each domain, constraint, and structural specialization that is either included or reused in the document type shell.

In the following example, entities are included for both the troubleshooting specialization and the task specialization on which the troubleshooting specialization depends; for the highlighting and utilities element domains; for the `newAtt-d` attribute domain, and for the `noBasePre-c` constraint module:

```
<!ENTITY included-domains
    "&troubleshooting-att;
     &task-att;
     &hi-d-att;
     &ut-d-att;
     &newAtt-d-att;
     &noBasePre-c-ph;
   "
>
```

Note: Although parameter entities (entities that begin with "%") must be defined before they are referenced, text entities (entities that begin with "&") can be referenced before they are defined. This allows the `included-domains` entity to include the constraint entity, which is not defined until the constraint module is referenced later in the document type shell.

Note: Although parameter entities (entities that begin with "%") must be defined before they are referenced, text entities (entities that begin with "&") can be referenced before they are defined. This allows the `included-domains` entity to include the constraint entity, which is not defined until the constraint module is referenced later in the document type shell.

Content constraint integration

For each constraint module that is integrated into the document-type shell, this section declares and references the external module file where the constraint is defined. The parameter entity is named *`constraintName`*`-c-def`.

In the following example, the constraint module that constrains the content model for the `<taskbody>` element is integrated into the document-type shell for strict task:

```
<!ENTITY % strictTaskbody-c-def
  PUBLIC "-//OASIS//ELEMENTS DITA 1.3 Strict Taskbody Constraint//EN"
  "strictTaskbodyConstraint.mod"
>%strictTaskbody-c-def;
```

Topic [or map] element integration

For each structural module that is integrated into the document-type shell, this section declares a parameter entity and references the external module file where the structural module is defined. The parameter entity is named *`structuralType`*`-type`. The modules must be included in ancestry order, so that the parameter entities that are used in an ancestor module are available for use in specializations. When a structural module depends on elements from a vocabulary module that is not part of its ancestry, the module upon which the structural module has a dependency (and any ancestor modules not already included) should be included before the module with a dependency.

The following example declares and references the structural modules that are integrated into the document-type shell for troubleshooting:

```
<!ENTITY % topic-type
  PUBLIC "-//OASIS//ELEMENTS DITA 1.3 Topic//EN"
         "../../base/dtd/topic.mod"
>%topic-type;

<!ENTITY % task-type
  PUBLIC "-//OASIS//ELEMENTS DITA 1.3 Task//EN"
         "task.mod"
>%task-type;

<!ENTITY % troubleshooting-type
  PUBLIC "-//OASIS//ELEMENTS DITA 1.3 Troubleshooting//EN"
         "troubleshooting.mod"
>%troubleshooting-type;
```

Domain element integration

For each element domain that is integrated into the document-type shell, this section declares a parameter entity and references the external module file where the element domain is defined. The parameter entity is named *`domainName`*`-def`.

For example, the following code declares and references the parameter entity used for the highlighting domain:

```
<!ENTITY % hi-d-def PUBLIC
    "-//OASIS//ELEMENTS DITA Highlight Domain//EN"
    "highlightDomain.mod"
>%hi-d-def;
```

Note: If a structural module depends on a domain, the domain module should be included before the structural module. This erases the boundary between the final two sections, but it

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is necessary to ensure that modules are embedded after their dependencies. Technically, the only solid requirement is that both domain and structural modules be declared after all other modules that they specialize from or depend on.

Note: If a structural module depends on a domain, the domain module should be included before the structural module. This erases the boundary between the final two sections, but it is necessary to ensure that modules are embedded after their dependencies. Technically, the only solid requirement is that both domain and structural modules be declared after all other modules that they specialize from or depend on.

7.3.3 DTD: Coding requirements for element type declarations

This topic covers general coding requirements for defining element types in both structural and element-domain vocabulary modules. In addition, it covers how to create the `@domains` attribute contribution for these modules.

A vocabulary module that defines a structural or element domain specialization is composed of two files:

- An entity declaration (`.ent`) file, which declares the text entities that are used to integrate the vocabulary module into a document-type shell
- A definition module (`.mod`) file, which declares the element names, content models, and attribute lists for the element types that are defined in the vocabulary module

@domains attribute contribution

A domain declaration entity is used to construct the effective value of the `@domains` attribute for a map or topic type.

Text entity name

The name of the text entity is the structural type name or the domain abbreviation, followed by a hyphen ("-") and the literal `att`.

Text entity values

The value of the text entity is the `@domains` attribute contribution for the current module. See domains attribute rules and syntax (134) for details on how to construct this value.

For example, the `@domains` attribute contributions for the concept structural module and the highlighting domain module are are constructed as follows.

- `<!ENTITY concept-att "(topic concept)">`
- `<!ENTITY hi-d-att "(topic hi-d)">`.

Element definitions

A structural or domain vocabulary module must contain a declaration for each element type that is named by the module. While the XML standard allows content models to refer to undeclared element types, the DITA standard does not permit this. All element types or attribute lists that are named within a vocabulary module must be declared in one of the following objects:

- The vocabulary module
- A base module of which the vocabulary module is a direct or indirect specialization
- (If the vocabulary module is a structural module) A required domain module

The following components make up a single element definition in a DITA DTD-based vocabulary module.

Element name entities

For each element type, there must be a parameter entity with a name that matches the element type name. The default value is the element type name. This parameter entity provides a layer of abstraction when setting up content models; it can be redefined in a document-type shell in order to create domain extensions or constraints. Element name entities for a single vocabulary module are typically grouped together at the top of the vocabulary module.

For example: `<!ENTITY % topichead "topichead">`

Content-model parameter entity

For each element type, there must be a parameter entity that defines the content model. The name of the parameter entity is `*tagname*.content`, and the value is the content model definition. Consistent use and naming of the `*tagname*.content` parameter entity enables the use of constraint modules to restrict the content model.

For example:

```
<!ENTITY % topichead.content
  "((%topicmeta;)?,
    (%anchor; |
     %data.elements.incl; |
     %navref; |
     %topicref;)*)
">
```

Attribute-list parameter entity

For each element type, there must be a parameter entity that declares the attributes that are available on the element. The name of the parameter entity is `*tagname*.attributes`, and the value is a list of the attributes that are used by the element type (except for `@class`). Consistent use and naming of the `*tagname*.attributes` parameter entity enables the use of constraint modules to restrict attributes.

For example:

```
<!ENTITY % topichead.attributes
 "keys CDATA #IMPLIED
  copy-to CDATA #IMPLIED
  %topicref-atts-no-locktitle;
  %univ-atts;"
>
```

Element declaration

For each element type, there must be an element declaration that consists of a reference to the content-model parameter entity.

For example:

```
<!ELEMENT topichead    %topichead.content;>
```

Attribute list declaration

For each element type, there must be an attribute list declaration that consists of a reference to the attribute-list parameter entity.

For example:

```
<!ATTLIST topichead    %topichead.attributes;>
```

Specialization attribute declarations

A vocabulary module must define a `@class` attribute for every element that is declared in the module. The value of the attribute is constructed according to the rules in class attribute rules and syntax (133).

For example, the `ATTLIST` definition for the `<topichead>` element (a specialization of the `<topicref>` element in the base map type) includes the definition of the `@class` attribute, as follows:

```
<!ATTLIST topichead  class CDATA "+ map/topicref  mapgroup-d/topichead ">
```

7.3.4 DTD: Coding requirements for structural modules

A structural vocabulary module defines a new topic or map type as a specialization of a topic or map type.

Required topic and map element attributes

The topic or map element type must set the `@DITAArchVersion` attribute to the version of DITA in use, typically by referencing the `arch-atts` parameter entity. It must also set the `@domains` attribute to the `included-domains` entity. These attributes give processors a reliable way to check the architecture version and look up the list of domains available in the document type.

The following example shows how these attributes are defined for the `<concept>` element in DITA 1.3:

```
<!ATTLIST concept
  %concept.attributes;
  %arch-atts;
  domains   CDATA   "&included-domains;">
```

Controlling nesting in topic types

Specialized topics typically use a parameter entity to define what topic types are permitted to nest. While there are known exceptions described below, the following rules apply when using parameter entities to control nesting.

Parameter entity name

The name of the parameter entity is the topic element name plus the `-info-types` suffix.

For example, the name of the parameter entity for the concept topic is `concept-info-types`.

Parameter entity value

To set up default topic nesting rules, set the entity to the desired topic elements. The default topic nesting will be used when a document-type shell does not set up different rules.

For example, the following parameter entity sets up default nesting so that `<concept>` will nest only other `<concept>` topics:

```
<!ENTITY % concept-info-types "%concept;">
```

As an additional example, the following parameter entity sets up a default that will not allow any nesting:

```
<!ENTITY % glossentry-info-types "no-topic-nesting">
```

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Default topic nesting in a structural module often set up to use the `%info-types;` parameter entity rather than using a specific element. When this is done consistently, a shell that includes multiple structural modules can set common nesting rules for all topic types by setting `%info-types;` entity. The following example shows a structural module that uses `%info-types;` for default topic nesting:

```
<!ENTITY % concept-info-types "%info-types;">
```

Content model of the root element

The last position in the content model defined for the root element of a topic type **SHOULD** be the *`topictype`*`-info-types` parameter entity. A document-type shell then can control how topics are allowed to nest for this specific topic type by redefining the *`topictype`*`-info-types` entity for each topic type. If default nesting rules reference the `info-types` parameter entity, a shell can efficiently create common nesting rules by redefining the `info-types` entity.

For example, with the following content model defined for `<concept>`, a document-type shell that uses the concept specialization can control which topics are nested in `<concept>` by redefining the `concept-info-types` parameter entity:

```
<!ENTITY % concept.content
  "((%title;),
    (%titlealts;)?,
    (%abstract; | %shortdesc;)?,
    (%prolog;)?,
    (%conbody;)?,
    (%related-links;)?,
    (%concept-info-types;)*)"
>
```

In rare cases, it might not be desirable to control topic nesting with a parameter entity. For example:

- If a specialized topic type should never allow any nested topics, regardless of context, it can be defined without any entity or any nested topics.
- If a specialized topic type should only ever allow specific nesting patterns, such as allowing only other topic types that are defined in the same module, it can nest those topics directly in the same way that other nested elements are defined.

7.3.5 DTD: Coding requirements for element domain modules

The vocabulary modules that define element domains have an additional coding requirement. The entity declaration file must include a parameter entity for each element that the domain extends.

Parameter entity name

The name of the parameter entity is the abbreviation for the domain, followed by a hyphen ("-"), and the name of the element that is extended.

Parameter entity value

The value of the parameter entity is a list of the specialized elements that can occur in the same locations as the extended element. Each element must be separated by the vertical line (|) symbol.

Example

Because the highlighting domain extends the `<ph>` element, the entity declaration file for that domain must include a parameter entity corresponding to the `<ph>` element. The name of the entity uses the short name of the domain (`hi-d`) followed by the name of the base element. The value includes each specialization of `<ph>` in the domain.

```
<!ENTITY % hi-d-ph "b | u | i | line-through | overline | tt | sup | sub">
```

7.3.6 DTD: Coding requirements for attribute domain modules

The vocabulary modules that define attribute domains have additional coding requirements. The module must include a parameter entity for the new attribute, which can be referenced in document-type shells, as well as a text entity that specifies the contribution to the `@domains` attribute for the attribute domain.

An attribute domain's name is the name of the attribute plus "Att". For example, for the attribute named "deliveryTarget" the attribute domain name is "deliveryTargetAtt". The attribute domain name is used to construct entity names for the domain.

Parameter entity name and value

The name of the parameter entity is the attribute domain name, followed by the literal "-d-attribute". The value of the parameter entity is a DTD declaration for the attribute.

Text entity name and value

The text entity name is the attribute domain name, followed by the literal `-d-Att`. The value of the text entity is the `@domains` attribute contribution for the module; see domains attribute rules and syntax (134) for details on how to construct this value.

Example

The `@deliveryTarget` attribute can be defined in a vocabulary module using the following two entities.

```
<!ENTITY % deliveryTargetAtt-d-attribute
  "deliveryTarget  CDATA  #IMPLIED"
>

<!ENTITY deliveryTargetAtt-d-att "a(props deliveryTarget)" >
```

7.3.7 DTD: Coding requirements for constraint modules

A structural constraint module defines the constraints for a map or topic element type. A domain constraint module defines the constraints for an element or attribute domain.

Structural constraint modules

Structural constraint modules have the following requirements:

@domains contribution entity name and value

The constraint module should contain a declaration for a text entity with the name `*tagname*-constraints`, where *tagname* is the name of the element type to which the constraints apply. The value of the text entity is the `@domains` attribute contribution for the module; see domains attribute rules and syntax (134) for details on how to construct this value.

For example, the following text entity provides the declaration for the strict task constraint that is shipped with the DITA standard.

```
<!ENTITY taskbody-constraints
  "(topic task strictTaskbody-c)"
>
```

The *tagname*.attributes parameter entity

When the attribute set for an element is constrained, there must be a declaration of the *tagname*.attributes parameter entity that defines the constrained attributes.

For example, the following parameter entity defines a constrained set of attributes for the <note> element that removes most of the values defined for @type, and also removes @spectitle and @othertype:

```
<!ENTITY % note.attributes
       "type  (attention | caution | note ) #IMPLIED
        %univ-atts;">
```

The *tagname*.content parameter entity

When the content model for an element is constrained, there must be a declaration of the *tagname*.content parameter entity that defines the constrained content model.

For example, the following parameter entity defines a more restricted content model for <topic>, in which the <shortdesc> element is required.

```
<!ENTITY % topic.content

  "((%title;),
    (%titlealts;)?,
    (%shortdesc;),
    (%prolog;)?,
    (%body;)?,
    (%topic-info-types;)*)"
>
```

Domain constraint modules

Domain constraint modules have the following requirements:

@domains contribution entity name and value

The constraint module should contain a declaration for a text entity with the name *domain*Domain-constraints, where *domain* is the name of the domain to which the constraints apply, for example, "Highlighting" or "Programming". The value of the text entity is the @domains attribute contribution for the module; see domains attribute rules and syntax (134) for details on how to construct this value.

For example, the following text entity provides the declaration for a constraint module that restricts the highlighting domain:

```
<!ENTITY HighlightingDomain-constraints
  "(topic hi-d basic-HighlightingDomain-c)"
>
```

Parameter entity

When the set of extension elements are restricted, there must be a parameter entity that defines the constrained content model.

For example, the following parameter entity restricts the highlighting domain to `<b>` and `<i>`:

```
<!ENTITY % HighlightingDomain-c-ph     "b | i"  >
```

Constraining to replace a base element with domain extensions

When element domains are used to extend a base element, those extensions can be used to replace the base element. This form of constraint is done inside the document-type shell.

Within a document-type shell, domain extensions are implemented by declaring an entity for a base element. The value of the entity can omit any base element types from which the other element types that are listed are specialized. Omitting a base type constitutes a form of constraint; as with any other constraint, this form of constraint must contribute a token to the `@domains` attribute. That token can be defined in a module file (which does not define any other entities or values), or the token can be placed directly into the document-type shell definition for the `included-domains` entity.

In the following example, the `<pre>` base type is removed from the entity declaration, effectively allowing only specializations of `<pre>` but not `<pre>` itself. This omission would require the use of a `@domains` contribution token within the `included-domains` entity.

```
<!ENTITY % pre
    "%pr-d-pre; |
     %sw-d-pre; |
     %ui-d-pre;">
```

7.4 RELAX NG coding requirements

This section explains how to implement RELAX NG based document-type shells, specializations, and constraints.

7.4.1 RELAX NG: Overview of coding requirements

RELAX NG modules are self-integrating, which means that they automatically add to the content models and attribute sets they extend. This means that information architects do not have much work to do when assembling vocabulary modules and constraints into document type shells.

In addition to simplifying document-type shells, the self-integrating aspect of RELAX NG results in the following coding practices:

- Each specialized vocabulary module consists of a single file, unlike the two required for DTDs.
- Domain modules directly extend elements, unlike DTDs, which rely on an extra file and extensions within the document-type shell.
- Constraint modules directly include the modules that they extend, which means that just by referencing a constraint module, the document-type shell gets everything it needs to both define and constrain a vocabulary module.

RELAX NG grammars for DITA document-type shells, vocabulary modules, and constraint modules **MAY** do the following:

- Use the `<a:documentation>` element anywhere that foreign elements are allowed by RELAX NG. The `<a:documentation>` element refers to the `<documentation>` element type from the

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`http://relaxng.org/ns/compatibility/annotations/1.0` as defined by the DTD compatibility specification. The prefix "a" is used by convention.

- Use `<div>` to group pattern declarations.
- Include embedded Schematron rules or any other foreign vocabulary. Processors **MAY** ignore any foreign vocabularies within DITA grammars that are not in the `http://relaxng.org/ns/compatibility/annotations/1.0` or `http://dita.oasis-open.org/architecture/2005/` namespaces.

Syntax for RELAX NG grammars

The RELAX NG specification defines two syntaxes for RELAX NG grammars: the XML syntax and the compact syntax. The two syntaxes are functionally equivalent, and either syntax can be reliably converted into the other by using, for example, the open-source Trang tool.

DITA practitioners can author DITA modules using one RELAX NG syntax, and then use tools to generate modules in the other syntax. The resulting RELAX NG modules are conforming if there is a one-to-one file correspondence. Conforming RELAX NG-based DITA modules **MAY** omit the annotations and foreign elements that are used in the OASIS grammar files to enable generation of other XML grammars, such as DTDs and XML Schema. When such annotations are used, conversion from one RELAX NG syntax to the other might lose the information, as processors are not required to process the annotations and information from foreign vocabularies.

The DITA coding requirements are defined for the RELAX NG XML syntax. Document type shells, vocabulary modules, and constraint modules that use the RELAX NG compact syntax can use the same organization requirements as those defined for the RELAX NG XML syntax.

7.4.2 RELAX NG: Coding requirements for document-type shells

A document-type shell integrates one or more topic type or map type modules, zero or more domain modules, and zero or more constraint modules.

Because RELAX NG modules are self-integrating, document-type shells only need to include vocabulary modules. Unlike DTDs, there is no separate specification required in order to integrate domain and nested topic elements into the base content models.

Root element declaration

Document type shells use the RELAX NG start declaration to specify the root element of the document type. The `<start>` element defines one root element, using a reference to a *`tagname`*`.element` pattern.

For example:

```
<div>
  <a:documentation>ROOT ELEMENT DECLARATION</a:documentation>
  <start combine="choice">
    <ref name="topic.element"/>
  </start>
</div>
```

DITA domains attribute

The document-type shell must list the domain or structural modules that are named as dependencies in the `@domains` attribute value. Unlike DTDs, a default value for `@domains` cannot automatically be constructed using RELAX NG facilities. Instead, the values used to construct `@domains` are taken from each vocabulary and constraint module, in addition to any domains contributions based on constraints implemented within the shell.

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For example:

```
<div>
  <a:documentation>DOMAINS ATTRIBUTE</a:documentation>
  <define name="domains-att">
    <optional>
      <attribute name="domains"
                 a:defaultValue="(topic hazard-d)
                                 (topic hi-d)
                                 (topic indexing-d)
                                 (topic ut-d)
                                 a(props deliveryTarget)"
      />
    </optional>
  </define>
</div>
```

Content constraint integration

The document-type shell must include any constraint modules. Constraint modules include the module they override and override the patterns that they constrain directly in the constraint module itself. Any module that is constrained in this section (including the base topic or map modules) will be left out of the following section.

For example, when the following constraint is included for the task module, the task module itself will *not* be included in the shell; the task module itself is included within `strictTaskbodyConstraintMod.rng`:

```
<div>
<a:documentation>CONTENT CONSTRAINT INTEGRATION</a:documentation>
  <include href="strictTaskbodyConstraintMod.rng">
    <define name="task-info-types">
      <ref name="task.element"/>
    </define>
  </include>
</div>
```

Module inclusions

The document-type shell must include any unconstrained domain or structural module. If the top-level map or topic type is unconstrained, it is also included in this section.

For example:

```
<div>
  <a:documentation>MODULE INCLUSIONS</a:documentation>
  <include href="topicMod.rng"/>
  <include href="highlightDomainMod.rng"/>
  <include href="utilitiesDomainMod.rng"/>
  <include href="indexingDomainMod.rng"/>
  <include href="hazardstatementDomainMod.rng"/>
</div>
```

Constraining domains in the shell

Domains can be constrained to disallow some extension elements without the use of a separate module file. This is done by overriding the base type pattern within the reference to the domain module. In this case, the constraint represented by the pattern redefinition still must be declared in the `@domains` attribute; the `@domains` contribution should be documented in the document-type shell with the constraint. There is not a designated section of the document-type shell for this type of constraint; it can be placed either in Content constraint integration (0   ) or Module inclusions (0   ).

The following example demonstrates the portion of a document type shell that includes the highlight domain module while directly constraining that module to remove the `<u>` element. The `<ditaarch:domainsContribution>` element is used to document the `@domains` contribution for this constraint.

```
<div>
  <a:documentation>MODULE INCLUSIONS</a:documentation>
  <include href="topicMod.rng"/>
  <include href="hazardstatementDomainMod.rng"/>
  <include href="highlightDomainMod.rng">
    <ditaarch:domainsContribution
      >(topic hi-d-noUnderline-c)</ditaarch:domainsContribution>
    <define name="u">
      <notAllowed></notAllowed>
    </define>
  </include>
  <include href="indexingDomainMod.rng"/>
  <include href="utilitiesDomainMod.rng"/>
</div>
```

ID-defining element overrides

This section must declare any element in the document type that uses an `@id` attribute with an XML data type of "ID". This declaration is required in order to avoid errors from RELAX NG parsers that would otherwise complain about different uses of the `@id` attribute.

Typically, this section lists only a few elements, such as topic types or the `<anchor>` element, but it could include specializations that constrain `@id`. In addition, foreign vocabularies require you to include exclusions for the namespaces used by those domains.

For example, this section declares that `<topic>` and `<task>` use an `@id` attribute with an XML data type of ID, along with any elements in the SVG or MathML namespaces. Each of these is excluded from the "any" pattern by placing them within the `<except>` rule as shown below:

```
<div>
    <a:documentation> ID-DEFINING-ELEMENT OVERRIDES </a:documentation>
    <define name="any">
       <zeroOrMore>
          <choice>
             <ref name="idElements"/>
             <element>
                <anyName>
                   <except>
                      <name>topic</name>
                      <name>task</name>
                      <nsName ns="http://www.w3.org/2000/svg"/>
                      <nsName ns="http://www.w3.org/1998/Math/MathML"/>
                   </except>
                </anyName>
                <zeroOrMore>
                   <attribute>
                      <anyName/>
                   </attribute>
                </zeroOrMore>
                <ref name="any"/>
             </element>
             <text/>
          </choice>
       </zeroOrMore>
    </define>
</div>
```

7.4.3 RELAX NG: Coding requirements for element type declarations

Structural and domain vocabulary modules have the same coding requirements for element type declarations. Each RELAX NG vocabulary module consists of a single module file.

Element definitions

A structural or element-domain vocabulary module must contain a declaration for each specialized element type that is named in the module. While the XML standard allows content models to refer to undeclared element types, all element types that are named in content models or attribute list declarations within a vocabulary module must have a RELAX NG element declaration. The RELAX NG element declaration can occur in one of the following:

- The vocabulary module
- A base module of which the vocabulary module is a direct or indirect specialization
- (If the vocabulary module is a structural module) A required domain or structural module

The element type patterns are organized into the following sections:

Element type name patterns

For each element type that is declared in the vocabulary module, there must be a pattern whose name is the element type name and whose content is a reference to the element type `tagname.element` pattern. For example:

```
<div>
  <a:documentation>ELEMENT TYPE NAME PATTERNS</a:documentation>
  <define name="b">
    <ref name="b.element"/>
  </define>
  <!-- ... -->
</div>
```

The element-type name pattern provides a layer of abstraction that facilitates redefinition. The element-type name patterns are referenced from content model and domain extension patterns. Specialization modules can re-declare the patterns to include specializations of the type, allowing the specialized types in all contexts where the base type is allowed.

The declarations can occur in any order.

Common content-model patterns

Structural and element-domain modules can include a section that defines the patterns that contribute to the content models of the element types that are defined in the module.

Common attribute sets

Structural and element-domain modules can include a section that defines patterns for attribute sets that are common to one or more of the element types that are defined in the module.

Element type declarations

For each element type that is declared in the vocabulary module, the following set of patterns must be used to define the content model and attributes for the element type. Each set of patterns is typically grouped within a `<div>` element for clarity.

- `tagname.content` defines the complete content model for the element *tagname*. The content model pattern can be overridden in constraint modules to further constrain the content model for the element type.

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- *tagname*`.attributes` defines the complete attribute list for the element *tagname*, except for `@class`. The attribute list declaration can be overridden in constraint modules to further constrain the attribute list for the element type.
- *tagname*`.attlist` is an additional attribute list pattern with a `@combine` attribute set to the value "interleave". This pattern contains only a reference to the *tagname*`.attributes` pattern.
- *tagname*`.element` is the actual element type definition. It contains an `<element>` element whose `@name` value is the element type name and whose content is a reference to the *tagname*`.content` and *tagname*`.attlist` patterns. In OASIS grammar files, the `@longName` attribute in the DITA architecture namespace is also used to help enable generation of DTD and XSD grammar files.

The following example shows the declaration for the `<topichead>` element, including the definition for each pattern described above.

```
<div>
  <a:documentation>LONG NAME: Topic Head</a:documentation>
  <define name="topichead.content">
    <optional>
      <ref name="topicmeta"/>
    </optional>
    <zeroOrMore>
      <choice>
        <ref name="anchor"/>
        <ref name="data.elements.incl"/>
        <ref name="navref"/>
        <ref name="topicref"/>
      </choice>
    </zeroOrMore>
  </define>
  <define name="topichead.attributes">
    <optional>
      <attribute name="keys"/>
    </optional>
    <optional>
      <attribute name="copy-to"/>
    </optional>
    <ref name="topicref-atts-no-locktitle"/>
    <ref name="univ-atts"/>
  </define>
  <define name="topichead.element">
    <element name="topichead" ditaarch:longName="Topic head">
      <a:documentation>The &lt;topichead> element provides a title-only entry in a 
navigation map,
        as an alternative to the fully-linked title provided by the &lt;topicref> 
element.
        Category: Mapgroup elements</a:documentation>
      <ref name="topichead.attlist"/>
      <ref name="topichead.content"/>
    </element>
  </define>
  <define name="topichead.attlist" combine="interleave">
    <ref name="topichead.attributes"/>
  </define>
</div>
```

idElements pattern contribution

Element types that declare the `@id` attribute as type "ID", including all topic and map element types, must provide a declaration for the `idElements` pattern. This is needed to correctly configure the "any" pattern override in document-type shells and avoid errors from RELAX NG parsers. The declaration is specified with a `@combine` attribute set to the value "choice". For example:

```
<div>
  <a:documentation>LONG NAME: Map</a:documentation>
  <!-- ... -->
  <define name="idElements" combine="choice">
    <ref name="map.element"/>
  </define>
</div>
```

Specialization attribute declarations

A vocabulary module must define a `@class` attribute for every specialized element. This is done in a section at the end of each module that includes a *`tagname`*`.attlist` pattern for each element type that is defined in the module. The declarations can occur in any order.

The *`tagname`*`.attlist` pattern for each element defines that element's `@class` attribute. `@class` is declared as an optional attribute; the default value is declared using the `@a:defaultValue` attribute, and the value of the attribute is constructed according to the rules in class attribute rules and syntax (133).

For example:

```
<define name="anchorref.attlist" combine="interleave">
  <optional>
    <attribute name="class"
        a:defaultValue="+ map/topicref mapgroup-d/anchorref "
    />
  </optional>
</define>
```

7.4.4 RELAX NG: Coding requirements for structural modules

A structural vocabulary module defines a new topic or map type as a specialization of a topic or map type.

All vocabulary and constraint modules must document their `@domains` attribute contribution. The value of the contribution is constructed according to the rules found in domains attribute rules and syntax (134). The OASIS grammar files use a `<domainsContribution>` element to document the contribution; this element is used to help enable generation of DTD and XSD grammar files. An XML comment or `<a:documentation>` element can also be used.

Required topic and map element attributes

The topic or map element type must reference the `arch-atts` pattern, which defines the `@DITAArchVersion` attribute in the DITA architecture namespace and sets the attribute to the version of DITA in use. In addition, the topic or map element type must reference the `domains-att` pattern, which will pull in a definition for the `@domains` attribute. These attributes give processors a reliable way to check the architecture version and list of available domains.

For example, the following definition references the `arch-atts` and `domains-att` patterns as part of the definition for the `<concept>` element.

```
<div>
  <a:documentation> LONG NAME: Concept </a:documentation>
  <!-- ... -->
  <define name="concept.attlist" combine="interleave">
    <ref name="concept.attributes"/>
    <ref name="arch-atts"/>
    <ref name="domains-att"/>
  </define>
```

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```
  <!-- ... -->
</div>
```

Controlling nesting in topic types

Specialized topics typically define an `info-types` style pattern to specify default topic nesting. Document type shells can then control how topics are allowed to nest by redefining the pattern. While there are known exceptions described below, the following rules apply when using a pattern to control topic nesting.

Pattern name

The pattern name is the topic element name plus the suffix `-info-types`. For example, the info-types pattern for the concept topic type is `concept-info-types`.

Pattern value

To set up default topic nesting rules, set the pattern to the desired topic elements. The default topic nesting will be used when a document-type shell does not set up different rules. For example:

```
<div>
  <a:documentation>INFO TYPES PATTERNS</a:documentation>
  <define name="mytopic-info-types">
    <ref name="subtopictype-01.element"/>
    <ref name="subtopictype-02.element"/>
  </define>
  <!-- ... -->
</div>
```

If the topic does not permit nested topics by default, this pattern uses the `<empty>` element. For example:

```
<define name="learningAssessment-info-types">
  <empty/>
</define>
```

The `info-types` pattern can also be used to refer to common nesting rules across the document-type shell. For example:

```
<div>
  <a:documentation>INFO TYPES PATTERNS</a:documentation>
  <define name="mytopic-info-types">
    <ref name="info-types"/>
  </define>
  <!-- ... -->
</div>
```

Content model of the root element

In the declaration of the root element of a topic type, the last position in the content model **SHOULD** be the *`topictype`*`-info-types` pattern. For example, the `<concept>` element places the pattern after `<related-links>`:

```
<div>
  <a:documentation>LONG NAME: Concept</a:documentation>
  <define name="concept.content">
    <!-- ... -->
    <optional>
      <ref name="related-links"/>
    </optional>
    <zeroOrMore>
      <ref name="concept-info-types"/>
    </zeroOrMore>
  </define>
</div>
```

In rare cases, it might not be desirable to control topic nesting with the `info-types` pattern. For example:

- If a specialized topic type should never allow any nested topics, regardless of context, it can be defined without any pattern or any nested topics.
- If a specialized topic type should only ever allow specific nesting patterns, such as allowing only other topic types that are defined in the same module, it can nest those topics directly in the same way that other nested elements are defined.

7.4.5 RELAX NG: Coding requirements for element domain modules

Vocabulary modules that define element domains must define an extension pattern for each element that is extended by the domain. These patterns are used when including the domain module in a document-type shell.

All vocabulary and constraint modules must document their `@domains` attribute contribution. The value of the contribution is constructed according to the rules found in domains attribute rules and syntax (134). The OASIS grammar files use a `<domainsContribution>` element to document the contribution; this element is used to help enable generation of DTD and XSD grammar files. An XML comment or `<a:documentation>` element can also be used.

For each element type that is extended by the element domain module, the module must define a domain extension pattern. The pattern consists of a choice group of references to element-type name patterns, with one reference to each extension of the base element type.

The name of the pattern uses the following format, where *shortName* is the short name for the domain, and *elementName* is the name of the element that is extended:

```
shortName-d-elementName
```

For example, the following pattern extends the `<ph>` element type by adding the specializations of `<ph>` that are defined in the highlighting domain:

```
<define name="hi-d-ph">
  <choice>
    <ref name="b.element"/>
    <ref name="i.element"/>
    <ref name="sup.element"/>
    <ref name="sub.element"/>
    <ref name="tt.element"/>
    <ref name="u.element"/>
  </choice>
</define>
```

For each element type that is extended by the element domain module, the module extends the element type pattern with a `@combine` value of "choice" that contains a reference to the domain extension pattern. Because the pattern uses a `@combine` value of "choice", the effect is that the domain-provided elements are automatically added to the effective content model of the extended element in any grammar that includes the domain module.

For example, the following pattern adds the highlighting domain specializations of the `<ph>` element to the content model of the `<ph>` element:

```
<define name="ph" combine="choice">
  <ref name="hi-d-ph"/>
</define>
```

7.4.6 RELAX NG: Coding requirements for attribute domain modules

An attribute domain vocabulary module declares a new attribute specialized from either the `@props` or `@base` attribute. An attribute domain module defines exactly one new attribute type.

All vocabulary and constraint modules must document their `@domains` attribute contribution. The value of the contribution is constructed according to the rules found in domains attribute rules and syntax (134). The OASIS grammar files use a `<domainsContribution>` element to document the contribution; this element is used to help enable generation of DTD and XSD grammar files. An XML comment or `<a:documentation>` element can also be used.

An attribute domain's name is the name of the attribute plus "Att". For example, for the attribute named "deliveryTarget" the attribute domain name is "deliveryTargetAtt". The attribute domain name is used to construct pattern names for the domain.

An attribute domain consists of one file, which has three sections:

Domains attribute contribution

The `@domains` contribution must be documented in the module. The value is constructed according to the rules found in domains attribute rules and syntax (134).

Attribute extension pattern

The attribute extension pattern extends either the `@props` or `@base` attribute set pattern to include the attribute specialization.

For specializations of `@props` the pattern is named `props-attribute-extensions`. The pattern specifies a `@combine` value of "interleave", and the content of the pattern is a reference to the specialized attribute declaration pattern. For example:

```
<define name="props-attribute-extensions" combine="interleave">
    <ref name="deliveryTargetAtt-d-attribute"/>
</define>
```

For specializations of `@base` the pattern is named `base-attribute-extensions`. The pattern specifies a `@combine` value of "interleave", and the content of the pattern is a reference to the specialized attribute declaration pattern. For example:

```
<define name="base-attribute-extensions" combine="interleave">
    <ref name="myBaseSpecializationAtt-d-attribute"/>
</define>
```

Attribute declaration pattern

The specialized attribute is declared in a pattern named *`domainName`*`-d-attribute`. The attribute must be defined as optional. For example, the `@deliveryTarget` specialization of `@props` is defined as follows:

```
<define name="deliveryTargetAtt-d-attribute">
  <optional>
    <attribute name="deliveryTarget"/>
  </optional>
</define>
```

7.4.7 RELAX NG: Coding requirements for constraint modules

A structural constraint module defines the constraints for a map or topic element type. A domain constraint module defines the constraints for an element or attribute domain.

All vocabulary and constraint modules must document their `@domains` attribute contribution. The value of the contribution is constructed according to the rules found in domains attribute rules and syntax (134). The OASIS grammar files use a `<domainsContribution>` element to document the contribution; this element is used to help enable generation of DTD and XSD grammar files. An XML comment or `<a:documentation>` element can also be used.

Constraint modules are implemented by importing the constraint module into a document type shell in place of the module that the constraint modifies. The constraint module itself imports the base module to be constrained; within the import, the module redefines patterns as needed to implement the constraint.

For example, a constraint module that modifies the `<section>` element needs to import the base module `topicMod.rng`. Within that import, it will constrain the `section.content` pattern:

```
<include href="topicMod.rng">
  <define name="section.content">
    <!-- Define constrained model here -->
  </define>
</include>
```

For a more complete example, see `strictTaskbodyConstraintMod.rng`, delivered with the DITA 1.3 grammar files.

Because the constraint module imports the module that it modifies, only one constraint module can be used per vocabulary module (otherwise the module being constrained would be imported multiple times). If multiple constraints are combined for a single vocabulary module, they must be implemented in one of the following ways:

- The constraints can be combined into a single module. For example, when combining separate constraints for `<section>` and `<shortdesc>`, a single module can be defined as follows:

  ```
  <include href="topicMod.rng">
    <define name="section.content">
      <!-- Constrained model for section -->
    </define>
    <define name="shortdesc.content">
      <!-- Constrained model for shortdesc -->
    </define>
  </include>
  ```

- Constraints can be chained so that each constraint imports another, until the final constraint imports the base vocabulary module. For example, when combining separate constraints for `<section>`, `<shortdesc>`, and `<li>` from the base vocabulary, the `<section>` constraint can import the `<shortdesc>` constraint, which in turn imports the `<li>` constraint, which finally imports `topicMod.rng`.

Example: contribution to the @domains attribute for structural constraint module

The following code fragment specifies the contribution to the `@domains` attribute as `(topic task strictTaskbody-c)`:

```
<moduleDesc>
  <!-- ... -->
  <moduleMetadata>
    <!-- ... -->
    <domainsContribution>(topic task strictTaskbody-c)</domainsContribution>
```

```
  </moduleMetadata>
</moduleDesc>
```

Example: contribution to the @domains attribute for domain constraint module

The following code fragment illustrates the domains contribution for a constraint module that restricts the task requirements domain:

```
<moduleDesc>
  <!-- ... -->
  <moduleMetadata>
    <!-- ... -->
    <domainsContribution>(topic task taskreq-d requiredReqcondsTaskreq-c)</
domainsContribution>
  </moduleMetadata>
</moduleDesc>
```

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8 Element reference

This section of the DITA specification contains a topic for each DITA element, as well as information about DITA attributes.

8.1 DITA elements, A to Z

This section provides links to all of the DITA elements in alphabetical order.

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longquoteref (209)
lq (210)
map (239)
mapref (254)
media-autoplay (308)
media-controls (309)
media-loop (309)
media-muted (310)
media-source (311)
media-track (312)
messagepanel (292)
metadata (267)
navref (243)
navtitle (187)
no-topic-nesting (280)
note (210)
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othermeta (267)
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ux-window (249)
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8.2 Topic elements

The topic elements are the core building blocks of the DITA topic. These building blocks include topic, short description, body, and related-links, as well as elements like `<p>` and `<ph>` that are used in many topic specializations.

Some topic elements also are available inside the `<topicmeta>` element in DITA maps.

8.2.1 Basic topic elements

The generic topic type is used for simple topics and as a specialization base.

8.2.1.1 <abstract>

The `<abstract>` element occurs between the topic title and the topic body. It is presented as the initial content of a topic. The `<abstract>` can contain paragraph-level content as well as one or more `<shortdesc>` elements which can be used for providing link previews or summaries.

Usage information

The `<abstract>` element cannot be overridden by maps, but its contained `<shortdesc>` elements can be, for the purpose of creating link summaries or previews.

Use the `<abstract>` element when the initial paragraph of a topic is unsuitable for use as a link preview or for summaries, because, for example, it contains lists or tables, or because only a portion of the paragraph is suitable. Note that when the initial paragraph is suitable as a summary, that content should be placed in a `<shortdesc>` element rather than in an `<abstract>` element. The `<abstract>` element allows for a wider range of content in your initial paragraph, such as lists and tables, and allows you to identify portions of the `<abstract>` content as useful for previews or summaries by embedding the `<shortdesc>` element within `<abstract>`.

Processing expectations

When the contained `<shortdesc>` occurs within phrase-level content, it is treated as phrase-level content and should not create a separate paragraph on output of the topic. When the contained `<shortdesc>` occurs as a peer to paragraph-level content, it is treated as block-level content and should create a separate paragraph on output of the topic. When multiple `<shortdesc>` elements are included in an `<abstract>`, they are concatenated in output of link previews or summaries (separated by spaces).

When a `<shortdesc>` element occurs in a DITA map, it overrides the short description provided in the topic for the purpose of generating link previews, but does not replace the `<shortdesc>` in the rendered topic itself. This means that generated links to this topic will use the short description from the map for purposes any link previews provided with the link, while the rendered topic continues to use the short description inside the topic. If the `<topicref>` element in the DITA map also specifies the `@copy-to` attribute, the content of the `<shortdesc>` element in the DITA map also overrides the short description provided in the topic. In this case, the rendered topic itself will display the `<shortdesc>` contents from the map in place of the `<shortdesc>` originally specified in the topic. Processors might not implement this behavior.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example: <abstract> with phrase-level short description

```
<abstract>The abstract is being used to provide more complex content.
    <shortdesc>The shortdesc must be directly contained by the abstract.</shortdesc>
The abstract can put text around the shortdesc.
</abstract>
```

Topic output

The abstract is being used to provide more complex content. The shortdesc must be directly contained by the abstract. The abstract can put text around the shortdesc.

Preview/summary output

The shortdesc must be directly contained by the abstract.

Example: <abstract> with block-level short description

```
<abstract><p>The abstract is being used to provide more complex content.</p>
    <shortdesc>The shortdesc must be directly contained by the abstract.</shortdesc>
<p>The abstract can put text around the shortdesc.</p>
</abstract>
```

Topic output

The abstract is being used to provide more complex content.

The shortdesc must be directly contained by the abstract.

The abstract can put text around the shortdesc.

Preview/summary output

The shortdesc must be directly contained by the abstract.

Example: <abstract> with multiple short descriptions

```
<abstract>The abstract is being used to provide more complex content.
    <shortdesc>The shortdesc must be directly contained by the abstract.</shortdesc>
    <p>The abstract can put text around the shortdesc.</p>
    <shortdesc>There can be more than one shortdesc.</shortdesc>
</abstract>
```

Topic output

The abstract is being used to provide more complex content. The shortdesc must be directly contained by the abstract.

The abstract can put text around the shortdesc.

There can be more than one shortdesc.

Preview/summary output

The shortdesc must be directly contained by the abstract. There can be more than one shortdesc.

Related reference

8.8.2.1.8 shortdesc (189)
A short description describes the purpose or main point of a topic.

8.2.1.2 <body>

The body contains the main content of a topic.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

The following code sample shows a DITA topic that contains a title and a body.

```
<topic>
  <title>Mycompany Style Guide: the <xmlelement>b</xmlelement> element</title>
  <body><p>Use the bold tag <b>for visual emphasis only</b>; do not use it if another
phrase-level element better signifies the reason for the emphasis.</p></body>
</topic>
```

8.2.1.3 <bodydiv>

The `<bodydiv>` element is used to contain informal blocks of information within the body of a topic.

Usage information

The `<bodydiv>` element is specifically designed to be a grouping element, without any explicit semantics, other than to organize subsets of content into logical groups that are not intended or should not be contained as a topic. As such, it does not contain an explicit title to avoid enabling the creation of deeply nested content that would otherwise be written as separate topics. For content that requires a title, use a `<section>` element or a nested topic.

The `<bodydiv>` element can nest itself, which means that it can be used as a specialization base to create structured information within a body. Another common use case for the `<bodydiv>` element is to group a sequence of related elements for reuse, so that another topic can reference the entire set with a single `@conref` attribute.

Because the `<bodydiv>` element allows `<section>`, it cannot be used within `<section>` elements. Use the `<div>` element to group content that might occur in both topic bodies and sections.

Attributes

The following attributes are available on this element: Universal attribute group (356).

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Example

```
<topic id="sample" xml:lang="en">
 <title>Sample for bodydiv</title>
 <body>
  <bodydiv id="div">
   <p>This set of information is reusable as a group.</p>
   <p>Lists of three contain three items.</p>
   <ul>
    <li>This is one item.</li>
    <li>This is another item.</li>
    <li>This is the third item.</li>
   </ul>
  </bodydiv>
  <p>This concludes my topic.</p>
 </body>
</topic>
```

8.2.1.4 <dita>

The `<dita>` element provides a top-level container for multiple topics when you create documents using the ditabase document type.

Usage information

The `<dita>` element lets you create any sequence of topics, and the ditabase document type lets you nest these topic types inside each other. The `<dita>` element has no particular output implications; it simply allows you to create multiple topics of different types at the same level in a single document.

The `<dita>` element cannot be specialized.

Attributes

The following attributes are available on this element: `@xmlns:ditaarch` and `@DITAArchVersion` from Architectural attribute group (360), and Localization attribute group (359).

Example

```
<dita>
  <concept id="batintro"><title>Intro to bats</title><conbody><!-- ... --></conbody></
concept>
  <reference id="batparts"><title>Parts of bats</title><refbody><!-- ... --></refbody></
reference>
  <task id="batfeeding"><title>Feeding a bat</title><taskbody><!-- ... --></taskbody></task>
  <task id="battraining"><title>Training a bat</title><taskbody><!-- ... --></taskbody></
task>
  <task id="batcleanup"><title>Cleaning a bat</title><taskbody><!-- ... --></taskbody></
task>
</dita>
```

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8.2.1.5 <navtitle>

A navigation title is an alternate title for a resource; this alternate title is optimized for situations where the topic title is unsuitable for use in a table of contents or navigation pane.

Usage information

Navigation titles can be used in both topics and maps. When used in maps, a navigation title can serve as an alternate title or simply as an aid to understanding the DITA map.

Because the `<navtitle>` element is available within `<topicmeta>`, a `<navtitle>` element might occur in contexts where a navigation title does not make sense, for example, on a `<topicgroup>` element. In those situations, the `<navtitle>` element has no defined purpose.

Processing expectations

When the `<navtitle>` element is used in a topic, processors **SHOULD** use the contents of the element to generate the navigation title.

When the `<navtitle>` element is used in a map, processors **SHOULD** retrieve the navigation title in the following order:

1. From the content of a `<navtitle>` element in the map, if the containing `<topicref>` element sets the value of the `@locktitle` attribute to "yes"
2. From the contents of a `<navtitle>` element in the referenced topic
3. From the title of the referenced topic

Attributes

The following attributes are available on this element: Universal attribute group (356).

Examples

The following code sample shows a `<navtitle>` element used in a topic. The `<navtitle>` element contains a shorter title that processors render in a TOC or navigation pane when the topic is published.

```
<task id="publishing-dita">
  <title>Publishing a DITA information set in PDF</title>
  <titlealts>
    <navtitle>Publishing in PDF</navtitle>
  </titlealts>
  <shortdesc>You can quickly publish your DITA information to PDF.
  </shortdesc>
  <!-- ... -->
</task>
```

Figure 39: <navtitle> in a topic

The following code sample shows `<navtitle>` elements used in a DITA map. The first `<navtitle>` is not locked; its content simply serves to indicate information about the content of the referenced DITA topic. When the DITA map is published, the navigation title is retrieved from `GUID-gibberish.dita`. However, the second `<navtitle>` is locked, so when the DITA map is published, processors render “Publishing to ePub” as the navigation title.

```
<map xml:lang="en">
  <title>Publishing a DITA information set</title>
  <topicref href="GUID-gibberish.dita">
    <topicmeta>
```

```
      <navtitle>Publishing to PDF</navtitle>
    </topicmeta>
  </topicref>
  <topicref href="publishing-ePub.dita" locktitle="yes">
    <topicmeta>
      <navtitle>Publishing to ePub</navtitle>
    </topicmeta>
  </topicref>
</map>
```

Figure 40: <navtitle> in a map

8.2.1.6 <related-links>

The related information links of a topic (`<related-links>` element) are stored in a special section following the body of the topic.

Processing expectations

After a topic is processed into its final output form, the related links usually are displayed at the end of the topic, although some Web-based help systems might display them in a separate navigation frame.

Links specified within the `<related-links>` element typically are displayed together with links generated based on a map context.

The following lists contains processing expectations for the `<related-link>` element:

1. Links within a `<linklist>` element appear in the order defined, while those outside of a `<linklist>` might be sorted and displayed in a different order or location (based upon their role, target, importance, or other qualifiers).
2. PDF or print-oriented output typically ignores hierarchical links such as those with roles of ancestor, parent, child, descendant, next, previous, or sibling, although this behavior is not required.

Attributes

The following attributes are available on this element: Universal attribute group (356), Link-relationship attribute group (366) (apart from `@href`), and The role and otherrole attributes (385).

Example

The following indicates that the two external links are always applicable to this topic, regardless of how the topic is used.

```
<related-links scope="external" format="html">
  <link href="http://www.example.org">
    <linktext>Example 1</linktext>
  </link>
  <link href="http://www.example.com">
    <linktext>Example 2</linktext>
  </link>
</related-links>
```

8.2.1.7 <searchtitle>

The `<searchtitle>` element is used to specify a title that is displayed by search tools that locate the topic.

Usage information

This is most useful when the topic has a title that makes sense in the context of a single information set, but might be too general in a list of search results; for example, a topic title of "Markup example" might make sense as part of a guide to DITA, but when found among thousands of unrelated topics, a search title of "DITA markup example" is more useful.

Processing expectations

When a topic is rendered as XHTML, the contents of the `<searchtitle>` will typically appear in the XHTML's title element, which used in the result summary for many search engines. This element might not be supported for output formats that do not support distinct search titles for topics.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

In the following example, the general title "Programming Example" is likely very useful in a set of information about XSLT basics; however, the same title is not helpful among a set of search results from the entire internet. In that case, "Example of basic programming in XSLT" will be much more helpful.

```
<task id="progexample">
 <title>Programming Example</title>
  <titlealts><searchtitle>Example of basic
             programming in XSLT</searchtitle></titlealts>
 <taskbody> . . . </taskbody>
</task>
```

When `<searchtitle>` is used in maps, the element provides a new search title for the topic when used in a specific context. For example, the if the following map includes information about programming in many languages, searches among that information set will be most useful when they return "Example of programming in XSLT":

```
<topicref href="progexample.dita">
  <topicmeta>
    <navtitle>Programming example</navtitle>
    <searchtitle>Example of programming in XSLT</searchtitle>
  </topicmeta>
</topicref>
```

8.2.1.8 <shortdesc>

A short description describes the purpose or main point of a topic.

Usage information

XDITA

<shortdesc>

HDITA

First element in article, if it is a paragraph, after title

MDITA (core and extended profiles)

First block, if it is a paragraph, after title

When present in topics, the short description is the first paragraph of the topic. It also is used for link previews and search results.

When present in maps, the `<shortdesc>` element is associated with `<topicref>` elements. This enables map authors to accomplish the following goals:

- Associate a short description with a non-DITA object.
- Provide a short description that is specific to the map context and used for link previews.
- Override the short description located in the associated DITA topic, when the `@copy-to` attribute is specified. Processors might not implement this behavior.

  When a `<shortdesc>` element applies to an entire DITA map, it serves as description only.

Rendering expectations

Processors **SHOULD** render the content of the shortdesc element as the initial paragraph of the topic.

When processors generate link previews that are based on the map context, they **SHOULD** use the content of the `<shortdesc>` that is located in the map rather than the `<shortdesc>` that is located in the DITA topic. However, processors **SHOULD** use the content of the `<shortdesc>` element in the DITA topic when they render the topic itself, unless the `@copy-to` attribute is specified on the topic reference to the element.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Examples

The following code sample shows how a `<shortdesc>` element can be used in a topic:

```
<topic id="concept">
 <title>Introduction to bird calling</title>
 <shortdesc>If you want to attract more birds to your Acme Bird Feeder,
learn the art of bird calling. Bird calling is an efficient way
to alert more birds to the presence of your bird feeder.</shortdesc>
 <body>
   <p>Bird calling requires learning:</p>
   <ul>
    <li>Popular and classical bird songs</li>
    <li>How to whistle like a bird</li>
   </ul>
 </body>
</topic>
```

Figure 41: Short description in a topic

The following code sample shows how a short description can be used in a DITA map to provide information about a non-DITA resource. The content of the `<shortdesc>` element is used when a link preview to the Web site for the American Birding Association is generated.

```
<map>
  <title>Enjoying birds</title>
```

```
    ...
    <topicref href="birds-in-colorado.dita"/>
    <topicref href="bird-calling.dita"/>
    <topicref href="https://www.birding.example.com/" format="external" type="html">
      <topicmeta>
        <shortdesc>The American Birding Association is only organization
        in North America that specifically caters to recreational birders.
        Its mission is to "inspire all people to enjoy and protect wild birds."
      </topicmeta>
    </topicref>
    ...
</map>
```

Figure 42: Short description in a map

Related reference

8.8.2.1.1 abstract (183)

The `<abstract>` element occurs between the topic title and the topic body. It is presented as the initial content of a topic. The `<abstract>` can contain paragraph-level content as well as one or more `<shortdesc>` elements which can be used for providing link previews or summaries.

8.2.1.9 <title>

A title is a heading or label for an object. Titles can be associated with topics, maps, sections, examples, figures, tables, and other structures.

Attributes

The following attributes are available on this element: Universal attribute group (356) (without the Metadata attribute group), plus `@base` and `@rev` from the Metadata attribute group (357).

Example

The following code sample shows how titles are used for both the topic and a figure within the topic:

```
<topic id="topicid">
  <title>Monitoring your heart rate with ThisDevice</title>
  <body>
    <!-- ... -->
    <fig id="adjust-the-monitor">
      <title>Adjusting your monitor</title>
      <p>If the monitor is not reporting, follow the directions
         in the video to adjust your equipment.</p>
      <!-- ... -->
    </fig>
  </body>
</topic>
```

8.2.1.10 <titlealts>

The `<titlealts>` element allows the insertion of alternate titles, such as titles that should be used in creating a table of contents for navigation or a title specific to search results.

Usage information

When the `<titlealts>` element is absent, the `<title>` element is used for all title purposes.

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Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

```
<task id="progexample">
   <title>Example of Required Programming</title>
      <titlealts><navtitle>Programming Example</navtitle></titlealts>
   <taskbody> . . . </taskbody>
</task>
```

8.2.1.11 <topic>

A topic is a standalone unit of information.

Attributes

The following attributes are available on this element: Universal attribute group (356) (with a narrowed definition of `@id`, given below) and Architectural attribute group (360).

@id (REQUIRED)

Provides an anchor point. This ID is usually required as part of the `@href` or `@conref` syntax when cross referencing or reusing content within the topic; it also enables `<topicref>` elements in DITA maps to optionally reference a specific topic within a DITA document. This attribute is defined with the XML Data Type ID.

Example

The following code sample shows the primary structural components of a topic: title, short description, prolog, body, and related links.

```
<topic id="topic">
  <title>The basic structure of a topic</title>
  <shortdesc/>
  <prolog/>
  <body/>
  <related-links/>
</topic>
```

8.2.2 Body elements

The body elements support the most common types of content authoring for topics: paragraphs, lists, phrases, figures, and other common types of exhibits in a document.

8.2.2.1 <alt>

Alternate text is a textual description of an image. Systems can display the alternate text when the image cannot be rendered or viewed by the reader.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

The following code sample shows how alternate text is associated with an image of a marketing banner:

```
<image href="newCampaign.jpg">
  <alt>Marketing banner for new product campaign</alt>
</image>
```

8.2.2.2 <cite>

A citation indicates the title of a bibliographic resource.

Attributes

The following attributes are available on this element: Universal attribute group (356) and `@keyref`.

Example

In the following code sample, the `<cite>` element is used to mark up the title of an article.

```
<p>The online article <cite>Specialization in the Darwin Information Typing
Architecture</cite> provides a detailed explanation of how to define new
topic types.</p>
```

8.2.2.3 <dd>

The definition description is the definition for a term in a definition list entry.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

See dl (196).

8.2.2.4 <desc>

A description is a statement that describes or contains additional information about an object.

Usage information

The following list outlines common uses of the `<desc>` element:

<table> and <fig>

Provides more information than can be contained in the title

<xref> and <link>

Provides a description of the target

<object>

Provides alternate content to use when the context does not permit displaying the object

Rendering expectations

When used in conjunction with `<fig>` or `<table>` elements, processors **SHOULD** consider the content of `<desc>` elements to be part of the content flow.

When used in conjunction with `<xref>` or `<link>` elements, processors **MAY** choose to render the content of `<desc>` elements as hover help.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Examples

In the following code sample, the `<figure>` element contains a reference to an image of a famous painting by Leonardo Da Vinci. The title `<element>` provides the name of the painting, while the `<desc>` element contains information about when the portrait is thought to have been painted.

```
<fig>
<title>Mona Lisa</title>
<desc>Circa 1503-06, perhaps continuing until 1517</desc>
<image href="mona-lisa.jpg">
 <alt>Photograph of Mona Lisa painting</alt>
</image>
</fig>
```

Figure 43: Description of a figure

In the following code sample, the `<link>` element contains a `<desc>` element. Some processors might render the content of the `<desc>` element as hover help.

```
<link keyref="dita-13-02">
  <linktext>DITA 1.3 Errata 02</linktext>
  <desc>Final errata version of DITA 1.3, published 19 June 2018</desc>
</link>
```

Figure 44: Description of a cross reference

8.2.2.5 <ddhd>

The `<ddhd>` element provides an optional heading or title for a column of descriptions or definitions in a definition list (`<dl>`).

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

See dl (196).

8.2.2.6 <div>

A division is a logical grouping of content within a topic. There is no additional semantic meaning.

Usage information

The `<div>` element is useful primarily as a specialization base and for reuse.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

In the following example, a `<div>` element is used to organize several elements together so that they can be referenced by `@conref` or `@conkeyref`:

```
...
<div id="div-01">
 <p>The first paragraph</p>
 <p>The second paragraph</p>
 <note>This is a note</note>
</div>
...
```

Without using a `<div>` element, the content could not be grouped for content referencing since the start and end elements are of different types.

Figure 45: Using <div> for grouping

In the following example, `<div>` is used as the basis for specializing a new domain element, `<pullquote>`:

```
<!ENTITY % pullquote.content
  "(%div.cnt;)*"
>
<!ENTITY % pullquote.attributes
              "%univ-atts;"
>
<!ELEMENT pullquote    %pullquote.content;>
<!ATTLIST pullquote    %pullquote.attributes;>

<!ATTLIST pullquote      class CDATA "+ topic/div pubcontent-d/pullquote ">
```

Instances of `<pullquote>` could then be used in both `<body>` and `<section>` contexts:

```
<topic id="article-01">
  <title>My Article</title>
  <body>
    <p>Something pithy someone said</p>
    <pullquote><p>Something Pithy</p></pullquote>
    <!-- ... -->
    <section spectitle="Deep Dive">
      <p>This is really really pithy</p>
      <pullquote><p>Really Pithy</p></pullquote>
      <!-- ... -->
    </section>
  </body>
</topic>
```

Figure 46: Using <div> for specialization

8.2.2.7 <dl>

A definition list is a list of terms and corresponding definitions.

Attributes

The following attributes are available on this element: Universal attribute group (356), compact (0), and spectitle (0).

Examples

The following code sample shows how a definition list can be used to describe the message levels that are generated by a monitoring application. The `@compact` attribute instructs processors to tighten the vertical spacing.

```
<dl compact="yes">
  <dlentry>
    <dt>Warning</dt>
    <dd>Problems were detected, but the software will continue to monitor activity.</dd>
  </dlentry>
  <dlentry>
    <dt>Error</dt>
    <dd>Problems were detected, and the software is in danger of shutting down.</dd>
  </dlentry>
  <dlentry>
    <dt>Severe</dt>
    <dd>Monitoring activity has ceased.</dd>
  </dlentry>
</dl>
```

8.2.2.8 <dlentry>

A definition list entry is a group within a definition list. It associates a term with its definition.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

See dl (196).

8.2.2.9 <dlhead>

The `<dlhead>` element contains optional headings for the term and description columns in a definition list (`<dl>`). The definition list heading might contain a heading for the column of terms (`<dthd>`) and a heading for the column of descriptions (`<ddhd>`).

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

```
<dl>
 <dlhead>
  <dthd>Image File View Selection</dthd>
  <ddhd>Resulting Information</ddhd>
 </dlhead>
 <dlentry>
  <dt>File Type</dt>
  <dd>Image's file extension</dd>
 </dlentry>
 <dlentry>
  <dt>Image Class</dt>
  <dd>Image is raster, vector, metafile or 3D</dd>
 </dlentry>
 <dlentry>
  <dt>Number of pages</dt>
  <dd>Number of pages in the image</dd>
 </dlentry>
 <dlentry>
  <dt>Fonts</dt>
  <dd>Names of the fonts contained within a vector image</dd>
 </dlentry>
</dl>
```

Figure 47: Definition list with a heading

Rendering of definition lists will vary by application and by display format. Processors might render the second example as follows.

File Type
    Image's file extension

Image Class
    Image is raster, vector, metafile or 3D

Number of pages
    Number of pages in the image

Fonts
    Names of the fonts contained within a vector image

8.2.2.10 <dt>

A definition term is the term or phrase that is defined in a definition list entry.

Attributes

The following attributes are available on this element: Universal attribute group (356) and `@keyref`.

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Example

See dl (196).

8.2.2.11 <draft-comment>

A draft comment is content that is intended for review and discussion, such as questions, comments, and notes to reviewers. This content is not intended to be included in production output.

Processing expectations

By default, processors **SHOULD NOT** render `<draft-comment>` elements. Processors **SHOULD** provide a mechanism that causes the content of the `<draft-comment>` element to be rendered in draft output only.

Attributes

The following attributes are available on this element: Universal attribute group (356) (with a narrowed definition for `@translate`, given below) and the attributes defined below.

@translate

Indicates whether the content of the element should be translated. The default value is "no". Setting to `@translate` "yes" will override the default. The DITA architectural specification contains a list of each OASIS DITA element and its common processing default for the translate value; because this element uses an actual default, it will always be treated as `translate="no"` unless overridden as described. Available values are:

no

The content of this element is not translateable.

yes

The content of this element is translateable.

-dita-use-conref-target

See Using the -dita-use-conref-target value (372) for more information.

@author

Designates the originator of the draft comment.

@time

Describes when the draft comment was created.

@disposition

Status of the draft comment.

Example

The following example illustrates how an content developer can use a `<draft-comment>` element to pose a question to reviewers.

```
<draft-comment
  author="EBP"
  time="23 May 2017"
  status="missing-info">
```

```
Where's the usage information for this section?
</draft-comment>
```

Processors might render the information from the highlighted attributes at viewing or publishing time. Authors might use the value of the `@status` attribute to track the work that remains to be done on a content collection.

8.2.2.12 <dthd>

The `<dthd>` element provides an optional heading for the column of terms in a definition list (`<dl>`).

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

See dl (196).

8.2.2.13 <example>

The `<example>` element is a section that contains examples that illustrate or support the current topic.

Usage information

Use `<example>` to contain both sample code (or similar artifacts) and the discussion that illustrates the sample. For example, a DITA topic about programming code could use the `<example>` element to contain both the sample code and the text that describes the code. Similarly, a sample that included preformatted text might use the `<pre>` element along with a paragraph or list to elaborate upon sections of that text.

Attributes

The following attributes are available on this element: Universal attribute group (356) and spectitle (0).

Example

```
<example id="example">
  <title>Example</title>
  <codeblock>&lt;p&gt;Example of the p element&lt;/p&gt;</codeblock>
</example>
```

8.2.2.14 <fallback>

The `<fallback>` element provides content to be presented when multimedia objects cannot be rendered.

Processing expectations

The contents of this element should be displayed only when the media that is referenced by the containing `<object>` element cannot be displayed.

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Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

See `<object>` for examples of this element.

8.2.2.15 <fig>

A figure is a container for a variety of objects, including artwork, images, code samples, equations, and tables.

Attributes

The following attributes are available on this element: Universal attribute group (356), Display attribute group (365), and spectitle (0).

Example

The following code sample shows how a `<fig>` element can associate a title and a description with an image.

```
<fig>
<title>The handshake</title>
<desc>This image shows two hands clasped in a formal,
business-like handshake.</desc>
<image href="59j0p66.jpg">
 <alt>A handshake</alt>
</image>
</fig>
```

8.2.2.16 <figgroup>

A figure group organizes segments within a figure.

Usage information

The `<figgroup>` element is useful primarily as a base for complex specializations, such as nestable groups of syntax within a syntax diagram.

The `<figgroup>` element can nest; it also can contain multiple cross-references, footnotes, and keywords.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

```
<fig>
  <title>Sample complex figure</title>
  <figgroup>
    <title>First group</title>
    <ph>These elements</ph>
    <ph>are grouped together</ph>
    <ph>for some purpose</ph>
  </figgroup>
  <figgroup>
    <title>Second group</title>
    <data name="MetaItem" value="13"/>
    <data name="MetaThing" value="31"/>
    <ph>These elements</ph>
    <ph>are grouped with associated metadata</ph>
  </figgroup>
</fig>
```

8.2.2.17 <fn>

A footnote is ancillary information that typically is rendered in the footer of a page or at the end of an online article. Such content is usually inappropriate for inline inclusion.

Usage information

There are two types of footnotes: *single-use footnote* and *use-by-reference footnote*.

Single-use footnote

This is produced by a `<fn>` element that does not specify a value for the `@id` attribute.

Use-by-reference footnote

This is produced by a `<fn>` element that specifies a value for the `@id` attribute. It must be used in conjunction with an `<xref>` element with `@type` set to "fn."

To reference a footnote that is located in another topic, the conref mechanism is used.

Rendering expectations

The two footnote types typically produce different types of output:

Single-use footnote

When rendered, a superscript symbol (numeral or character) is produced at the location of the `<fn>` element. The superscript symbol is hyperlinked to the content of the footnote, which is placed at the bottom of a PDF page or the end of an online article. The superscript symbol can be specified by the value of the `@callout` attribute. When no `@callout` value is specified, footnotes are typically numbered.

Use-by-reference footnote

Nothing is rendered at the location of the `<fn>` element. The content of a use-by-reference footnote is only rendered when it is referenced by an `<xref>` with the `@type` attribute set to "fn". If an `<xref>` with the `@type` attribute set to "fn" is present, a superscript symbol is rendered at the location of the `<xref>` element. Unless conref is used, the `<fn>` and `<xref>` must be located in the same topic.

However, the details of footnote processing and formatting are implementation dependent. For example, a tool that renders DITA as PDF might lack support for the `@callout` attribute, or footnotes might be collected as end notes for certain types of publications.

Attributes

The following attributes are available on this element: Universal attribute group (356) and the attribute defined below.

@callout

Specifies the character that is used for the footnote link, for example, a number or an alphabetical character. The attribute also can specify a short string of characters.

Examples

The following code sample shows a single-use footnote. It contains a simple `<fn>` element, with no `@id` or `@callout` attribute.

```
The memory storage capacity of the computer is
2 GB<fn>A GB (gigabyte) is equal to
1000 million bytes</fn> with error correcting support.
```

When rendered, typically a superscript symbol is placed at the location of the `<fn>` element; this superscript symbol is hyperlinked to the content of the `<fn>`, which is typically is placed at the bottom of a PDF page or the end of an online article. The type of symbol used is implementation specific.

The above code sample might produce output similar to the following:

> The memory storage capacity of the computer is 2 GB^1 with error correcting support.
>
> . . . . . .
>
> ^{1} A GB (gigabyte) is equal to 1000 million bytes
>
> ----- [bottom of page] ---

Figure 48: Example of a single-use footnote

The following code sample shows a single-use footnote that uses a `@callout` attribute:

```
The memory storage capacity of the computer is
2 GB<fn callout="#">A GB (gigabyte) is equal to
1000 million bytes</fn> with error correcting support.
```

The rendered output is similar to that of the previous example, although processors that support it will render the footnote symbol as # (hashtag).

Figure 49: Example of a single-use footnote with a @callout attribute

The following code sample shows use-by-reference footnotes. The `<fn>` elements have `@id` attributes, and inline `<xref>` elements reference those `<fn>` elements:

```
<fn id="dog-name">Fido</fn>
<fn id="cat-name">Puss</fn>
<fn id="llama-name">My llama</fn>
...
<p>I like pets. At my house, I have a dog<xref href="#topic/dog-name" type="fn"/>, a
cat<xref href="#topic/cat-name" type="fn"/>, and a
llama<xref href="#topic/llama-name" type="fn"/>.</p>
```

The code sample might produce output similar to the following:

> . . . . . .
>
> I like pets. At my house, I have a dog^1, a cat^2, and a llama^3.
>
> . . . . . .
>
> ^{1}Fido
>
> ^{2}Puss
>
> ^{3}My llama

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----- [bottom of page] --

Figure 50: Example of a use-by-reference footnote

The following code sample shows footnotes stored in a shared topic (`footnotes.dita`):

```
<!-- Content from footnotes.dita -->
<topic id="footnotes">
...
  <fn id="strunk">Elements of Style</fn>
  <fn id="DQTI">Developing Quality Technical Information, 2nd edition</fn>
...
</topic>
```

To use those footnotes, authors conref them into the relevant topics:

```
<p>See the online resource<fn conref="footnotes.dita#footnotes/DQTI"/> for more
   information about how to assess the quality of technical documentation ...</p>
```

Figure 51: Example of a single-use footnote that uses conref

The following code sample shows a use-by-reference footnote that uses conref:

```
<topic id="evaluating-quality">
  <title>Evaluating documentation quality</title>
  <body>
  ...
  <fn conref="footnotes.dita#footnotes/DQTI" id="dqti"/>
  ...
  <p>See the online resource<xref="./evaluating-quality/dqti" type="fn"/> for more
     information about how to assess the quality of technical documentation ...</p>
  ...
  </body>
<topic>
```

Figure 52: Example of a use-by-reference footnote that uses conref

8.2.2.18 <image>

An image is a reference to artwork that is stored outside of the content.

Rendering expectations

The image addressed by the `@keyref` or `@href` attribute on `<image>` typically is rendered in the main flow of the content.

Processors **SHOULD** scale the object when values are provided for the `@height` and `@width` attributes. The following expectations apply:

- If a height value is specified and no width value is specified, processors **SHOULD** scale the width by the same factor as the height.
- If a width value is specified and no height value is specified, processors **SHOULD** scale the height by the same factor as the width.
- If both a height value and width value are specified, implementations **MAY** ignore one of the two values when they are unable to scale to each direction using different factors.

Attributes

The following attributes are available on this element: Universal attribute group (356), `@keyref`, and the attributes defined below.

@href

Provides a reference to the image. See The href attribute (369) for detailed information on supported values and processing implications.

@scope

Identifies the closeness of the relationship between the current document and the target resource. Allowable values are local, peer, external, and -dita-use-conref-target. See The scope attribute (384) for more information on values.

@format

Identifies the format of the resource that is referenced. See The format attribute (383) for details on supported values.

@height

Indicates the vertical dimension for the resulting display. The value of this attribute is a real number (expressed in decimal notation) optionally followed by a unit of measure from the set of pc, pt, px, in, cm, mm, em (picas, points, pixels, inches, centimeters, millimeters, and ems respectively). The default unit is px (pixels). Possible values include: "5", "5in", and "10.5cm".

@width

Indicates the horizontal dimension for the resulting display. The value of this attribute is a real number (expressed in decimal notation) optionally followed by a unit of measure from the set of pc, pt, px, in, cm, mm, em (picas, points, pixels, inches, centimeters, millimeters, and ems respectively). The default unit is px (pixels). Possible values include: "5", "5in", and "10.5cm".

@align

Controls the horizontal alignment of an image when placement is specified as "break". Common values include left, right, and center.

@scale

Specifies a percentage as an unsigned integer by which to scale the image in the absence of any specified image height or width; a value of 100 implies that the image should be presented at its intrinsic size. If a value has been specified for the `@height` or `@width` attribute (or both), the `@scale` attribute is ignored.

It is an error if the value of this attribute is not an unsigned integer. In this case, the implementation might give an error message and might recover by ignoring this attribute.

@scalefit

Allows an image to be scaled up or down to fit within available space. Allowable values are yes, no, and -dita-use-conref-target. If, for a given image, any one of `@height`, `@width`, or `@scale` is specified, those attributes determine the graphic size, and any setting of `@scalefit` is ignored. If none of those attributes are specified and `scalefit="yes"`, then the image is scaled (the same factor in both dimensions) so that the graphic will just fit within the available height or width (whichever is more constraining).

The available width would be the prevailing column (or table cell) width - that is, the width a paragraph of text would have if the graphic were a paragraph instead. The available height is implementation dependent, but if feasible, it is suggested to be the page (or table cell) height or some other reasonable value.

@placement

Indicates whether an image is displayed inline or on a separate line. The default value is inline. Allowable values are: inline, break, or and -dita-use-conref-target.

Example

The following code sample shows how an image is referenced. The `@placement` attribute is set to "break"; this ensures that the image is not rendered inline.

```
<image href="bike.gif" placement="break">
  <alt>Two-wheeled bicycle</alt>
</image>
```

8.2.2.19 <include>

The i`<include>` specifies that non-DITA content from a resource outside the current document should be placed at that location. The resource is specified using either a URI or a key reference. Processing expectations for the referenced data can also be specified.

Usage information

The `<include>` element is primarily intended for the following use cases:

- The transclusion of non-DITA XML within `<foreign>` element using `parse="xml"`.
- The transclusion of preformatted textual content within `<pre>` element using `parse="text"`.
- The transclusion of plain-text prose within DITA elements using `parse="text"`.

It is an error when the `<include>` element is used to reference DITA content. Authors should use `@conref` or `@conkeyref` to reuse DITA content.

Processing expectations

The `<include>` element instructs processors to insert the contents of the referenced resource at the location of the `<include>` element. If the content is unavailable to the processor or cannot be processed using the specified `@parse` value, the contents of the `<fallback>` element, if any, are presented instead. If the processor cannot process the referenced content using the rules implied by the `@parse` attribute, either because the referenced scheme is not supported or because there was a processing error, processors should issue a warning or error.

The `@parse` attribute specifies the processing expectations for the referenced resource. Processors must support the following values:

text

The contents should be treated as plain text. Reserved XML characters should be displayed, and not interpreted as XML markup.

xml

The contents of the referenced resource should be treated as an XML document, and the referenced element should be inserted at the location of the `<include>` element. If a fragment identifier is included in the address of the content, processors must select the element with the specified ID. If no fragment identifier is included, the root element of the referenced XML document is selected. Any grammar processing should be performed during resolution, such that default attribute values are explicitly populated. Prolog content must be discarded.

It is an error to use `parse="xml"` anywhere other than within `<foreign>` or a specialization thereof.

Processors may support other values for the `@parse` attribute with proprietary processing semantics. Processors should issue warnings and use `<fallback>` when they encounter unsupported `@parse` values. Non-standard `@parse` instructions should be expressed as URIs.

Note: Proprietary `@parse` values will likely limit the portability and interoperability of DITA content, so should be used with care.

Note: Proprietary `@parse` values will likely limit the portability and interoperability of DITA content, so should be used with care.

The `@encoding` attribute specifies the character encoding to use when translating the character data from the referenced content. If not specified, processors may make attempts to automatically determine the correct encoding, for example using HTTP headers, through analysis of the binary structure of the referenced data, or the `<?xml?>` processing instruction when including XML as text. The resource should be treated as UTF-8 if no other encoding information can be determined.

When `parse="xml"`, standard XML parsing rules apply for the detection of character encoding. The necessity and uses of `@encoding` for non-standard values of `@parse` are implementation-dependent.

Attributes

The following attributes are available on this element: Universal attribute group (356), Link-relationship attribute group (366), The keyref attribute (370) and the attributes defined below.

@parse

Indicates the processing expectations for the referenced non-DITA content.

@encoding

Indicates the encoding that processors use when interpreting textual data. The value should be a valid encoding name.

Examples

For the most part, `<include>` should be used as a basis for specialization. The following examples use it directly for purposes of illustration.

```
<fig>
  <title>JSP Tag Library Elements and Attributes</title>
  <foreign outputclass="tld">
    <include href="../src/main/webapp/WEB-INF/jsp-tag-library.tld"
             parse="xml" format="tld"/>
  </foreign>
</fig>
```

Figure 53: Inclusion of XML markup other than SVG or MathML

```
<shortdesc>
  <include href="../src/README.txt" parse="text" encoding="UTF-8">
    <fallback>This topic describes XYZ.</fallback>
  </include>
</shortdesc>
```

Figure 54: Inclusion of README text into a DITA topic, with fallback

```
<pre>
```

```
  <include href="../src/config.json" format="json" parse="text" encoding="UTF-8"/>
</pre>
```

Figure 55: Inclusion of preformatted text

```
<section>
  <include href="about.md" encoding="UTF-8"
    parse="http://www.example.com/dita/includeParsers/markdown-to-dita">
      <fallback>This section not available.</fallback>
  </include>
</section>
```

Figure 56: Inclusion of README as Markdown converted to DITA using a proprietary @parse value, with fallback

```
<fig>
  <title>Data Table</title>
  <include href="data.csv"  encoding="UTF-8"
    parse="http://www.example.com/dita/includeParsers/csv-to-simpletable"/>
</fig>
```

Figure 57: Proprietary vendor handling for CSV tables

8.2.2.20 <keyword>

A keyword is text or a token that has a unique or key-like value, such as a product name or unit of reusable text.

Processing expectations

When used within the `<keywords>` element, the content of a `<keyword>` element is considered to be metadata and should be processed as appropriate for the given output medium.

Elements that are specialized from the `<keyword>`element might have extended processing, such as specific formatting or automatic indexing.

Attributes

The following attributes are available on this element: Universal attribute group (356) and `@keyref`.

Example

In the following code sample, the `<keyword>` element holds a product name.

```
<keyword id="acme-bird-feeder">ACME Bird Feeder</keyword>
```

The product name can be referenced using one of the DITA reuse mechanisms: content reference (conref), content key reference (conkeyref), or key reference (keyref).

Figure 58: <keyword> element used to store a product name

In the following code sample, "Big data" is specified as metadata that applies to the topic.

```
<prolog>
  <metadata>
    <keywords>
      <keyword>Big data</keyword>
    </keywords>
  </metadata>
</prolog>
```

Figure 59: <keyword> element as metadata

8.2.2.21 <li>

A list item is an item in either an ordered or unordered list.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

See ol (215) or ul (223)

8.2.2.22 <lines>

Lines are lines of text where line breaks are significant but white space is not. It can be used to represent dialogs, poetry, or other text fragments where line breaks are significant.

Rendering expectations

Processors use the following conventions:

- Line breaks are preserved.
- Extra white space within the `<lines>` element is not preserved.

Attributes

The following attributes are available on this element: Universal attribute group (356), Display attribute group (365), xml:space (0), and spectitle (0).

Example

In the following code sample, a `<lines>` element contains an excerpt from Sonnet 18, one of the best-known of the 154 sonnets written by the English playwright and poet William Shakespeare.

```
<lines>
Shall I compare thee to a summer's day?
Thou art more lovely and more temperate:
Rough winds do shake the darling buds of May,
and summer's lease hath all too short a date:
...</lines>
```

8.2.2.23 <longdescref>

A long description reference is a reference to a textual description of a graphic or object.

Attributes

The following attributes are available on this element: Universal attribute group (356), Link-relationship attribute group (366), and `@keyref`.

Example

In the following code sample, the `<longdescref>` references a detailed image description that is stored in a DITA topic.

```
<image href="llama.jpg">
  <alt>Llama picture</alt>
  <longdescref href="my-pet-llama.dita"/>
</image>
```

Figure 60: <longdescref> which references a local DITA description

In this code sample, the long description is stored remotely, on a external Web site.

```
<image href="puffin.jpg">
  <alt>Puffin pigure</alt>
  <longdescref href="http://www.example.org/birds/puffin.html"
               scope="external"
               format="html"/>
</image>
```

Figure 61: <longdescref> which references an external description

8.2.2.24 <longquoteref>

A long quotation reference is a reference to the source of a lengthy quotation.

Processing expectations

Rendering of this element is left up to DITA processors. Depending on the presentation format, it might be appropriate to ignore the element, present it as a link, use it to turn the entire quotation into a link, or do something else.

Attributes

The following attributes are available on this element: Universal attribute group (356), Link-relationship attribute group (366), and `@keyref`.

Example

In the following code sample, the `<longdescref>` element references an online version of *As You Like It*.

```
<p>The following is one of the most frequently used quotations from a Shakespearean play:
  <lq>All the world's a stage, and all the men and women merely players. They have
      their exits and their entrances; And one man in his time plays many parts.’
    <longquoteref href="http://www.example.org/shakespeare/as-you-like-it"
scope="external"/>
```

```
  </lq>
</p>
```

8.2.2.25 <lq>

A long quotation is a quotation that contains one or more paragraphs. The title and source of the document that is being quoted can be specified.

Rendering expectations

Processors typically render a `<lq>` as an indented block.

Attributes

The following attributes are available on this element: Universal attribute group (356), Link-relationship attribute group (366) (with a narrowed definition for `@type`, given below), and `@keyref`, and the attributes defined below.

@reftitle

The title of the document or topic that is quoted.

@type

Indicates the location of the source of the quote. Note that this differs from the `@type` attribute on many other DITA elements. See The type attribute (381) for detailed information on the usual supported values and processing implications.

Example

The following code sample contains a quotation. The `@reftitle` attribute specifies the title of the document that is quoted, and the `@href` attribute indicates a Web site where the full text of the address can be accessed.

```
<p>This is the first line of the address that
Abraham Lincoln delivered on November 19, 1863 for the dedication
of the cemetery at Gettysburg, Pennsylvania.</p>
<lq reftitle="Gettysburg address"
href="https://en.wikisource.org/wiki/Gettysburg_Address_(Nicolay_draft)" format="html"
scope="external">Four score and seven years ago our fathers brought forth on this continent
a new
nation, conceived in liberty, and dedicated to the proposition that all men
are created equal.</lq>
```

8.2.2.26 <note>

A note contains information that expands on or calls attention to a particular point.

Usage information

Variant types of `<note>` (tip, caution, danger, restriction, etc.) can be indicated through values selected on the `@type` attribute.

Attributes

The following attributes are available on this element: Universal attribute group (356), spectitle (0   ), and the attributes defined below.

@type
: Defines the type of a note. For example, if the note is a tip, the word **Tip** might be used to draw the reader's attention to it. Note that this differs from the `@type` attribute on many other DITA elements. See The type attribute (381) for detailed information on supported values and processing implications. Available values are note, tip, fastpath, restriction, important, remember, attention, caution, notice, danger, warning, trouble, other, and -dita-use-conref-target.

@othertype
: Indicates an alternate note type, when the type is not available in the `@type` attribute value list. This value is used as the user-provided note title when the `@type` attribute value is set to "other".

Example

The following code sample shows a `<note>` with `@type` set to "tip":

```
<note type="tip">Thinking of a seashore, green meadow, or cool
mountain overlook can help you to relax and be more
patient.</note>
```

8.2.2.27 <object>

The DITA `<object>` element corresponds to the HTML `<object>` element, and attribute semantics derive from their HTML definitions. For example, the `@type` attribute differs from the `@type` attribute on many other DITA elements.

Usage information

The `<object>` element enables authors to include animated images, applets, plug-ins, ActiveX controls, video clips, and other multimedia objects in a topic.

Rendering expectations

Processors **SHOULD** scale the object when values are provided for the `@height` and `@width` attributes. The following expectations apply:

- If a height value is specified and no width value is specified, processors **SHOULD** scale the width by the same factor as the height.
- If a width value is specified and no height value is specified, processors **SHOULD** scale the height by the same factor as the width.
- If both a height value and width value are specified, implementations **MAY** ignore one of the two values when they are unable to scale to each direction using different factors.

When an object cannot be rendered in a meaningful way, processors **SHOULD** present the contents of the `<fallback>` element, if it is present.

Attributes

The following attributes are available on this element: Universal attribute group (356) and the attributes defined below.

@archive

Specifies a space-separated list of URIs indicating resources needed by the object. These resources might include those URIs specified by the `@classid` and `@data` attributes. Preloading these resources usually results in faster loadtimes for objects. The URIs in the list should be relative to the URI specified in the `@codebase` attribute.

@archivekeyrefs

Key references to one or more archives, as for `@archive`. The value is a space-separated list of key names. Each resolvable key reference is treated as a URI as though it had been specified on the `@archive` attribute. When specified, and at least one key name is resolvable, the key-provided archive list is used. If `@archive` is specified, it is used as a fallback when no key names can be resolved to a URI.

@classid

Contains a URI that specifies the location of an object's implementation. It can be used together with the `@data` attribute which is specified relative to the value of the `@codebase` attribute.

@classidkeyref

Key reference to the URI that specifies the location of an object's implementation, as for `@classid`. When specified, and the key is resolvable, the key-provided class ID URI is used. If `@classid` is specified, it is used as a fallback when the key cannot be resolved to a URI.

@codebase

Specifies the base URI used for resolving the relative URI values given for `@classid`, `@data`, and `@archive` attributes. If `@codebase` is not set, the default is the base URI of the current element.

@codebasekeyref

Key reference to the base URI used for resolving other attributes, as for `@codebase`. When specified, and the key is resolvable, the key-provided code base URI is used. If `@codebase` is specified, it is used as a fallback if the key cannot be resolved to a URI. If no URI results from processing `@codebasekeyref` and `@codebase` is not specified, the default is the base URL of the current element.

@data

Contains a reference to the location of an object's data. If this attribute is a relative URL, it is specified relative to the value of the `@codebase` attribute. If this attribute is set, the `@type` attribute should also be set.

@datakeyref

Provides a key reference to the object. When specified and the key is resolvable, the key-provided URI is used. A key that has no associated resource, only link text, is considered to be unresolved. If `@data` is specified, it is used as a fallback when the key cannot be resolved to a resource.

@declare

When this attribute is set to "declare", the current object definition is a declaration only. The object must be instantiated by a later nested object definition referring to this declaration. The only allowable value is "declare".

@type

Indicates the content type (MIME type) for the data specified by the `@data` or `@datakeyref` attribute. This attribute should be set when the `@data` attribute is set to avoid loading unsupported content types. Note that this differs from the `@type` attribute on many other DITA elements (it specifies a MIME type rather than a content type). If `@type` is not specified, the effective type value for the key named by the `@datakeyref` attribute is used as the this attribute's value.

@standby

Contains a message to be displayed while an object is loading.

@height

Indicates the vertical dimension for the resulting display. The value of this attribute is a real number (expressed in decimal notation) optionally followed by a unit of measure from the set of pc, pt, px, in, cm, mm, em (picas, points, pixels, inches, centimeters, millimeters, and ems respectively). The default unit is px (pixels). Possible values include: "5", "5in", and "10.5cm".

@width

Indicates the horizontal dimension for the resulting display. The value of this attribute is a real number (expressed in decimal notation) optionally followed by a unit of measure from the set of pc, pt, px, in, cm, mm, em (picas, points, pixels, inches, centimeters, millimeters, and ems respectively). The default unit is px (pixels). Possible values include: "5", "5in", and "10.5cm".

@usemap

Indicates that a client-side image map is to be used. An image map specifies active geometric regions of an included object and assigns a link to each region. When a link is selected, a document might be retrieved or a program might run on the server.

@name

Defines a unique name for the object.

@tabindex

Position the object in tabbing order.

Example

Output processors might need to modify data in order to enable compatible function across various browsers, so these examples are only representative:

```
<p>Cutting the keys from the system unit:</p>
<object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
 codebase="http://download.macromedia.com/pub/shockwave/cabs/
flash/swflash.cab#version=6,0,0,0"
 data="cutkey370.swf"
 type="application/x-shockwave-flash"
 height="280"
 width="370"
 id="cutkey370">
 <desc>A description of the task</desc>
 <fallback>Media not available.</fallback>
 <param name="movie" value="cutkey370.swf"/>
 <param name="quality" value="high"/>
 <param name="bgcolor" value="#FFFFFF"/>
</object>
```

```
<p>What's EIM?</p>
<object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
 codebase="http://download.macromedia.com/pub/shockwave/cabs/
flash/swflash.cab#version=6,0,0,0"
 data="eim.swf"
 height="400"
 width="500"
 id="eim">
 <desc>Some great, glorious info</desc>
 <fallback><image href="media-not-available.png"/></fallback>
 <param name="movie" value="eim.swf"/>
 <param name="quality" value="high"/>
 <param name="bgcolor" value="#FFFFFF"/>
 <param name="pluginspace"
 value="http://www.macromedia.com/go/getflashplayer"/>
</object>
```

```
<object
  id="E5123_026.mp4"
  width="300"
  height="300">
  <fallback>Media not available.</fallback>
  <param name="poster"
     keyref="E5123_026_poster"
  />
  <param name="source"
     keyref="E5123_026_video"
  />
</object>
```

Where the keys could be:

```
<map>
  <!-- ... -->
  <keydef keys="E5123_026_poster"
      href="../images/E5123_026_poster.png"
      type="video/mp4"
  />
  <keydef keys="E5123_026_video"
      href="../media/E5123_026_poster.mp4"
      type="video/mp4"
  />
  <!-- ... -->
</map>
```

Figure 62: Object with reference to video using key reference on the <param> elements

```
<object
 classidkeyref="video_classid"
 codebasekeyref="video_codebase"
 datakeyref="cutkey370"
 height="280"
 width="370"
 id="cutkey370">
 <desc>A description of the task</desc>
 <fallback>Media not available.</fallback>
 <param name="movie" keyref="cutkey370"/>
 <param name="quality" value="high"/>
 <param name="bgcolor" value="#FFFFFF"/>
</object>
```

Where the key could be:

```
<map>
  <!-- ... -->
  <!-- NOTE: Using @scope="external" because
       the class ID is a URI that is not intended to
       be directly resolved.
    -->
  <keydef keys="video_classid"
    href="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
    scope="external"
  />
  <!-- NOTE: Using @scope="external" to avoid systems trying to
             download this file when they don't need to.
    -->
  <keydef keys="video_codebase"
    href="http://download.macromedia.com/pub/shockwave/cabs/
flash/swflash.cab#version=6,0,0,0"
    format="shockwave"
    scope="external"
  />
  <!-- Using @scope="external" here because the referenced URL
       is not intended to be resolved in isolation but relative
```

```
        to the codebase URI.
     -->
   <keydef keys="cutkey370"
       href="cutkey370.swf"
       type="application/x-shockwave-flash"
       scope="external"
   />
   <!-- ... -->
</map>
```

Figure 63: Object with indirect reference to a flash file and fallback @data value

8.2.2.28 <ol>

An ordered list is a list of items that are sorted by sequence or order of importance.

Attributes

The following attributes are available on this element: Universal attribute group (356), compact (0), and spectitle (0).

Example

The following code sample shows the use of an ordered list:

```
<p>Here are Rotten Tomatoes' five best movies of all time:</p>
<ol>
 <li>The Wizard of Oz (1939)</li>
 <li>Citizen Kane (1941)</li>
 <li>Get Out (2017)</li>
 <li>The Third Man (1949)</li>
 <li>Mad Max: Fury Road (2015)</li>
</ol>
```

8.2.2.29 <p>

A paragraph is a single unit of text that contains a main idea.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

The following code sample contains a paragraph:

```
<p>A paragraph is a group of related sentences that support a central
idea. Paragraphs typically consist of three parts: a topic sentence, body sentences,
and a concluding or bridging sentence.</p>
```

8.2.2.30 <param>

The `<param>` (parameter) element specifies a set of values that might be required by an `<object>` at runtime.

Usage information

Any number of `<param>` elements might appear in the content of an `<object>` in any order, but must be placed at the start of the content of the enclosing object. This element is comparable to the XHMTL `<param>` element, and its attributes' semantics derive from their HTML definitions. For example, the `@type` attribute differs from the `@type` attribute on many other DITA elements.

Attributes

The following attributes are available on this element: Universal attribute group (356) and the attributes defined below.

@name (REQUIRED)

The name of the parameter.

@value

Specifies the value of a run-time parameter that is specified by the `@name` attribute.

@valuetype

Specifies the type of the `@value` attribute. Allowed values are:

data

A value of data means that the value will be evaluated and passed to the object's implementation as a string.

ref

A value of ref indicates that the value of the `@value` attribute is a URL that designates a resource where run-time values are stored. This allows support tools to identify URLs that are given as parameters.

object

A value of object indicates that the value of `@valuetype` is an identifier that refers to an object declaration in the document. The identifier must be the value of the ID attribute set for the declared object element.

-dita-use-conref-target

See Using the -dita-use-conref-target value (372) for more information.

@type

This attribute specifies for a user agent the type of values that will be found at the URI designated by `@value`. Note that this differs from the `@type` attribute on many other DITA elements.

1. When `@valuetype` is set to "ref", this attribute directly specifies the content type of the resource designated by `@value`.
2. Otherwise, if `@type` is specified and `@keyref` is specified and resolvable, this attribute specifies the content type of the resource designated by `@keyref`.
3. Otherwise, if `@type` is not specified and `@keyref` is specified and is resolvable, the effective type value specified for the key that is named by the `@keyref` attribute is used as the value of the `@type` attribute.

@keyref

Key reference to the thing the parameter references. If `@valuetype` is specified but is not set to "ref", this attribute is ignored. When `@valuetype` is not specified and `@keyref` is specified, it implies a setting of `valuetype="ref"`. When `@keyref` is specified and the effective value of `@valuetype` is "ref":

1. When the key specified by `@keyref` is resolvable and has an associated URI, that URI is used as the value of this element (overriding `@value`, if that is specified).
2. When the key specified by `@keyref` is resolvable and has no associated resource (only link text), the `@keyref` attribute is considered to be unresolvable for this element. If `@value` is specified, it is used as fallback.
3. When the key specified by `@keyref` is not resolvable, the value of the `@value` attribute is used as a fallback target for the `<param>` element.

Example

See object (211).

8.2.2.31 <ph>

A phrase is a small group of words that stand together as a unit, typically forming a component of a clause.

Usage information

The `<ph>` element often is used to enclose a phrase for reuse or conditional processing.

The `<ph>` element frequently is used as a specialization base, to create phrase-level markup that can provide additional semantic meaning or trigger specific processing or formatting. For example, all highlighting domain elements are specializations of `<ph>`.

Attributes

The following attributes are available on this element: Universal attribute group (356) and `@keyref`.

Example

The following code sample shows `<ph>` elements that are used for conditional processing:

```
<p>The Style menu is the <ph product="Software1000"/>third item</ph>
<ph product="Software9000"/>fourth item</ph> from the left on the menu bar.</p>
```

8.2.2.32 <pre>

Preformatted text is text that contains line breaks and spaces that are intended to be preserved at publication time.

Rendering expectations

Processors **SHOULD** preserve line the breaks and spaces that are present in a `<pre>` element.

Attributes

The following attributes are available on this element: Universal attribute group (356), Display attribute group (365), xml:space (0), and spectitle (0).

Example

The following code sample shows preformatted text that contains white space and line breaks. When the following code sample is published, the white space and line breaks are preserved.

```
<pre>
          MEMO: programming team fun day
Remember to bring a kite, softball glove, or other favorite
outdoor accessory to tomorrow's fun day outing at Zilker Park.
Volunteers needed for the dunking booth.
</pre>
```

8.2.2.33 <q>

A quotation is a small group of words that is taken from a text or speech and repeated by someone other than the original author or speaker.

Rendering expectations

Processors add appropriate styling, such as locale-specific quotation marks, around the contents of the `<q>` element and render it inline.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

In the following code sample, the `<q>` element contains a quotation. Note that no quotation marks are included; locale-specific quotation marks will be generated during processing.

```
<p>
George said, <q>Disengage the power supply before servicing the unit.</q>
</p>
```

8.2.2.34 <section>

A section is an organizational division in a topic. Sections are used to organize subsets of information that are directly related to the topic; they can have titles.

Usage information

Multiple `<section>` elements within a single topic do not represent a hierarchy, but rather peer divisions of that topic. Sections cannot be nested.

Note: For maximum flexibility in creating specialization, sections allow plain text as well as phrase and block level elements. Because of the way XML grammars are defined within a DTD, any element that allows plain text cannot restrict the order or frequency of other elements. As a result, the `<section>` element allows `<title>` to appear anywhere as a child of `<section>`. However, the intent of the specification is that `<title>` should only be used once in any `<section>`, and when used, it should precede any other text or element content.

Note: For maximum flexibility in creating specialization, sections allow plain text as well as phrase and block level elements. Because of the way XML grammars are defined within a DTD, any element that allows plain text cannot restrict the order or frequency of other elements. As a result, the `<section>` element allows `<title>` to appear anywhere as a child of `<section>`. However, the intent of the specification is that `<title>` should only be used once in any `<section>`, and when used, it should precede any other text or element content.

Rendering expectations

Processors **SHOULD** treat the presence of more than one `<title>` element in a `<section>` element as an error.

Attributes

The following attributes are available on this element: Universal attribute group (356) and spectitle (0).

Example

The following code sample shows how element-reference topics in the DITA specification use titled sections to provide a consistent structure for grouping information:

```
<reference id="sub" xml:lang="en-us">
  <title>p</title>
  <shortdesc conkeyref="library-short-descriptions/p"/>
  <refbody>
    <section><title>Usage information</title>
      <p>...</p>
    </section>
    <section><title>Rendering expectations</title>
      <p>...</p>
    </section>
    <section><title>Processing expectations</title>
      <p>...</p>
    </section>
    <section><title>Specialization hierarchy</title>
      <p>...</p>
    </section>
    <section><title>Attributes</title>
      <p>...</p>
    </section>
    <example><title>Example</title>
      <p>...</p>
    </example>
  </refbody>
</reference>
```

8.2.2.35 <sectiondiv>

A section division is a logical grouping of content within a section. There is no additional semantic meaning attached. It is useful primarily as a specialization base and for reuse.

Usage information

The `<sectiondiv>` element cannot contain a title; the lowest level of titled content within a topic is the section itself. If additional hierarchy is required, use nested topics instead of the section.

The `<sectiondiv>` element nests itself, so it can be specialized to create structured information within sections. Another common use case for the `<sectiondiv>` element is to group a sequence of related elements for reuse, so that another topic can reference the entire set with a single `@conref` attribute.

Because the `<sectiondiv>` element can only be used within `<section>` elements, use the `<div>` element to group content that might occur in both topic bodies and sections.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

In the example below, the `<sectiondiv>` element is used to group content that can be reused elsewhere.

```
<section>
  <title>Nice pets</title>
  <sectiondiv id="smallpets">
    <p>Cats are nice.</p>
    <p>Dogs are nice.</p>
    <p>Friends of mine really love their hedgehogs.</p>
  </sectiondiv>
  <sectiondiv id="biggerpets">
    <p>Lots of people want ponies when they grow up.</p>
    <p>Llamas are also popular.</p>
  </sectiondiv>
</section>
```

8.2.2.36 <sl>

A simple list is a list that contains a few items of short, phrase-like content.

Attributes

The following attributes are available on this element: Universal attribute group (356),, compact (0), and spectitle (0).

Example

In a reference topic that discusses related modules, the following markup could be used:

```
<section>
  <title>Messages</title>
  <p>Messages from the ags_open module are identical with messages from:</p>
  <sl>
    <sli>ags_read</sli>
    <sli>ags_write</sli>
    <sli>ags_close</sli>
  </sl>
</section>
```

8.2.2.37 <sli>

A simple list item is a component of a simple list. A simple list item contains a brief phrase or text content, adequate for describing package contents, for example.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

See sl (220).

8.2.2.38 <term>

The `<term>` element identifies words that might have or require extended definitions or explanations.

Usage information

The `@keyref` attribute can be used to associate a term with a resource, typically a definition of the term. The `@keyref` attribute can also be used to supply the text content for `<term>` using standard `@keyref` processing for variable text.

Attributes

The following attributes are available on this element: Universal attribute group (356) and `@keyref`.

Example

```
<p>A <term>reference implementation</term> of DITA implements the standard,
fallback behaviors intended for DITA elements.</p>
```

8.2.2.39 <text>

The `<text>` element associates no semantics with its content. It exists to serve as a container for text where a container is needed (for example, as a target for content references, or for use within restricted content models in specializations).

Usage information

Unlike `<ph>`, `<text>` cannot contain images. Unlike `<keyword>`, `<text>` does not imply keyword-like semantics. The `<text>` element contains only text data, or nested `<text>` elements.

Attributes

The following attributes are available on this element: Universal attribute group (356).

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Example

```
<p>This an example of <keyword><text id="reuse">Text
   that is reusable</text></keyword>, with no extra
   semantics attached to the text when it is reused.</p>
```

8.2.2.40 <tm>

The `<tm>` element identifies a term or phrase that is trademarked. Trademarks include registered trademarks, service marks, slogans, and logos.

Usage information

The business rules for indicating and displaying trademarks might differ from company to company. These business rules can be enforced by either authoring policy or processing.

Attributes

The following attributes are available on this element: Universal attribute group (356) and the attributes defined below.

@tmtype (REQUIRED)

Specifies the trademark type. Allowable values are:

tm

trademark (tm)

reg

registered trademark (regtm)

service

service mark (service)

-dita-use-conref-target

See Using the -dita-use-conref-target value (372) for more information.

@trademark

The trademarked term.

@tmowner

The trademark owner, for example "OASIS".

@tmclass

Classification of the trademark. This can be used to differentiate different groupings of trademarks.

Example

```
<p>The advantages of using <tm trademark="DB2 Universal Database" tmtype="tm">
<tm trademark="DB2" tmtype="reg" tmclass="ibm">DB2</tm> Universal Database</tm> are
well known.</p>
```

8.2.2.41 <ul>

An unordered list is a list in which the order of items is not significant.

Attributes

The following attributes are available on this element: Universal attribute group (356), compact (0), and spectitle (0).

Example

The following code sample shows a list in which the order of items is unimportant:

```
<p>Here are the countries that I have visited:</p>
<ul>
 <li>Germany</li>
 <li>France</li>
 <li>Japan</li>
 <li>Mexico</li>
</ul>
```

8.2.2.42 <xref>

A cross reference is an inline link. A cross reference can link to a different location within the current topic, another topic, a specific location in another topic, or an external resource such as a PDF or Web page.

Attributes

The following attributes are available on this element: Universal attribute group (356), Link-relationship attribute group (366), and `@keyref`.

Examples

The following code sample shows a cross reference to another topic; link text is not provided. Processor typically use the topic title as the link text.

```
<p>Background information about DITA is provided in
<xref href="overview-of-dita.dita"/>.</p>
```

The same cross reference could be created using `@keyref` instead of `@href`; using `@keyref` allows the link to be redirected to different resources when the topic is used in different contexts.

Figure 64: Cross reference to another topic, without link text

The following code sample shows a cross reference that specifies link text:

```
<p>While this set of tutorials gives several simple examples of
<xref keyref="markup-examples">common DITA features</xref>, a comprehensive
list of DITA features is available in the DITA specification
<xref keyref="dita-conformance">conformance clause</xref>.</p>
```

Figure 65: Cross references with link text specified

The following code sample shows a cross reference that contains an ampersand:

```
<xref href="https://www.example.com/docview.wss?rs=757&context=SSVNX5"
scope="external" format="html">Part number SSVNX5</xref>
```

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Because the `@href` attribute value needs to be a valid URI, the ampersand must be escaped, as shown in the revised code sample below:

```
<xref href="https://www.example.com/docview.wss?rs=757&amp;context=SSVNX5"
scope="external" format="html">Part number SSVNX5</xref>
```

Although the entity is in the DITA source, the entity might not show up when the link target is displayed in an editor or a Web browser; the URI might be shown as the following:

```
https://www.example.com/docview.wss?rs=757&context=SSVNX5
```

Figure 66: Cross reference to a URI that contains an ampersand

Related concepts

4 DITA addressing (61)

DITA provides two addressing mechanisms. DITA addresses either are direct URI-based addresses, or they are indirect key-based addresses. Within DITA documents, individual elements are addressed by unique identifiers specified on the `@id` attribute. DITA defines two fragment-identifier syntaxes; one is the full fragment-identifier syntax, and the other is an abbreviated fragment-identifier syntax that can be used when addressing non-topic elements from within the same topic.

Related reference

8.8.2.3.1 link (224)

The `<link>` element defines a relationship to another topic or non-DITA resource.

8.2.3 Related links elements

The related-links section of DITA topics is a special structure that contains links. Links support navigation from a topic to other related topics or resources.

Links are different from cross-references. While cross-references occur only within the body of a topic and can target any element in the topic or other topics, links only represent topic-to-topic connections or connections to non-DITA resources. Links occur after the body of a topic, in the related-links (188) element.

Links can also be managed indirectly using DITA maps, which provide a more efficient way to manage links. Using maps to define links avoids embedded pointers in each topic. This helps keep topics free from specific contexts and makes it easier to reuse those topics in new locations.

8.2.3.1 <link>

The `<link>` element defines a relationship to another topic or non-DITA resource.

Usage information

The optional container elements for link (`<linkpool>` and `<linklist>`) enable authors to define groups with common attributes or to preserve the authored sequence of links in the rendered output.

Processing expectations

When displayed, links are typically sorted based on their attributes, which define the type or role of the link target in relation to the current topic.

Links placed in a `<linkpool>` might be rearranged or removed for display purposes (combined with other local or map-based links); links in a `<linklist>` should be displayed in the order in which they are defined.

Attributes

The following attributes are available on this element: Universal attribute group (356), Link-relationship attribute group (366), `@keyref`, and The role and otherrole attributes (385).

Example

```
<related-links>
  <linkpool type="concept">
    <link href="czez.dita#czez" role="next"/>
    <link href="czunder.dita"/>
    <link format="html" href="czover.htm#sqljsupp" role="parent">
      <linktext>Overview of the CZ</linktext>
    </link>
    <link format="html" href="czesqlj.htm#sqljemb">
      <linktext>Working with CZESQLJ</linktext>
      <desc>When you work with CZESQLJ, you need to know...</desc>
    </link>
  </linkpool>
</related-links>
```

Related concepts

4 DITA addressing (61)
DITA provides two addressing mechanisms. DITA addresses either are direct URI-based addresses, or they are indirect key-based addresses. Within DITA documents, individual elements are addressed by unique identifiers specified on the `@id` attribute. DITA defines two fragment-identifier syntaxes; one is the full fragment-identifier syntax, and the other is an abbreviated fragment-identifier syntax that can be used when addressing non-topic elements from within the same topic.

Related reference

8.8.2.2.42 xref (223)
A cross reference is an inline link. A cross reference can link to a different location within the current topic, another topic, a specific location in another topic, or an external resource such as a PDF or Web page.

8.2.3.2 <linkinfo>

The `<linkinfo>` element enables authors to place a descriptive paragraph after the links that are contained in a `<linklist>` element.

Processing expectations

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

```
<linklist>
  <title>Repairing widgets</title>
  <link href="debug.dita" type="task"/>
  <link href="repair.dita" type="task"/>
  <link href="test.dita" type="task"/>
  <linkinfo>To repair a reciprocating widget,
you must follow the instructions very carefully. Note
the sequence to follow. Do it.</linkinfo>
</linklist>
```

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8.2.3.3 <linklist>

The `<linklist>` element defines an author-arranged group of links.

Usage information

There are two ways to organize related information links within a topic. First, you can add them all in no particular order, either by using `<linkpool>` elements or by placing `<link>` elements directly within `<related-links>`, in which case the rendering is implementation dependent. For example, a tool could sort all links based on the role or type; a tool could also move or remove links to fit the context (for example, moving a prerequisite link to the top of a browser window, or removing links to the next topic if it is rendered on the same page in a PDF). These behaviors are examples only and are not required.

Second, links can be grouped using one or more `<linklist>` elements. When you group them using `<linklist>`, then the order of the links within each `<linklist>` is preserved when rendered. You can also use a combination of the two approaches, which will allow some links to be automatically sorted while the others are left as-is.

Attributes set on the `<linkpool>` and `<linklist>` elements are inherited by their descendants. For example, if you have a `<linklist>` element that contains all external links, you can set `scope="external"` on that outer `<linklist>` element and leave it off the `<link>` elements within that `<linklist>`.

Processing expectations

When rendering links, processors **SHOULD** preserve the order of links specified within a `<linklist>` element.

Attributes

The following attributes are available on this element: Universal attribute group (356), collection-type (0), The role and otherrole attributes (385), spectitle (0), mapkeyref (0), and the attributes defined below. This element also uses `@format`, `@scope`, and `@type` from Link-relationship attribute group (366).

@duplicates

Specifies whether duplicate links are filtered out of a group of links. Allowable values are:

yes

Allow duplicate links

no

Filter out duplicate links

-dita-use-conref-target

See Using the -dita-use-conref-target value (372) for more information.

Conceptually, two links are duplicates if they address the same resource using the same properties, such as link text and link role. The details of determining duplicate links is processor specific.

The suggested processing default is "yes" within `<linklist>` elements and "no" for other links.

@collection-type

See collection-type (0) for a full definition and list of supported values.

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Example

```
<related-links>
  <linklist scope="external">
    <title>Example links</title>
    <desc>These links will always appear in this order.</desc>
    <link href="http://www.example.org">
      <linktext>Example 1</linktext>
    </link>
    <link href="http://www.example.com">
      <linktext>Example 2</linktext>
    </link>
  </linklist>
</related-links>
```

8.2.3.4 <linkpool>

The `<linkpool>` element defines a group of links that have common characteristics, such as type or audience or source. When links are in a `<linkpool>` element, the organization of links on final output is determined by the output process, not by the order that the links actually occur in the DITA topic.

Usage information

There are two ways to organize related information links within a topic. First, you can add them all in no particular order, either by using `<linkpool>` elements or by placing `<link>` elements directly within `<related-links>`, in which case the rendering is implementation dependent. For example, a tool could sort all links based on the role or type; a tool could also move or remove links to fit the context (for example, moving a prerequisite link to the top of a browser window, or removing links to the next topic if it is rendered on the same page in a PDF). These behaviors are examples only and are not required.

Second, links can be grouped using one or more `<linklist>` elements. When you group them using `<linklist>`, then the order of the links within each `<linklist>` is preserved when rendered. You can also use a combination of the two approaches, which will allow some links to be automatically sorted while the others are left as-is.

Attributes set on the `<linkpool>` and `<linklist>` elements are inherited by their descendants. For example, if you have a `<linklist>` element that contains all external links, you can set `scope="external"` on that outer `<linklist>` element and leave it off the `<link>` elements within that `<linklist>`.

Attributes

The following attributes are available on this element: Universal attribute group (356), collection-type (0), The role and otherrole attributes (385), mapkeyref (0), and the attributes defined below. This element also uses `@format`, `@scope`, and `@type` from Link-relationship attribute group (366).

@duplicates

Specifies whether duplicate links are filtered out of a group of links. Allowable values are:

yes

Allow duplicate links

no

Filter out duplicate links

-dita-use-conref-target

See Using the -dita-use-conref-target value (372) for more information.

Conceptually, two links are duplicates if they address the same resource using the same properties, such as link text and link role. The details of determining duplicate links is processor specific.

The suggested processing default is "yes" within `<linklist>` elements and "no" for other links.

@collection-type

See collection-type (0) for a full definition and list of supported values.

Example

```
<related-links>
  <linkpool type="concept">
    <link href="czez.dita#czez" role="next"/>
    <link href="czunder.dita"/>
    <link format="html" href="czover.htm#sqljsupp" role="parent">
      <linktext>Overview of the CZ</linktext>
    </link>
    <link format="html" href="czesqlj.htm#sqljemb">
      <linktext>Working with CZESQLJ</linktext>
      <desc>When you work with CZESQLJ, you need to know...</desc>
    </link>
  </linkpool>
</related-links>
```

8.2.3.5 <linktext>

Link text is the label for a link or resource.

Usage information

For links to local DITA topics, the text of a link typically can be resolved during processing. Use the `<linktext>` element only when the target cannot be reached, such as when it is a peer or external link, or when the target is local but not in DITA format. When used inside of a `<link>` element inside a topic, `<linktext>` is used as the text for the specified link; when used within a map, `<linktext>` is used as the text for generated links that refer to the specified topic.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Examples

See keydef (253) for an example of `<linktext>` used with key definitions.

Figure 67: Link text with key definitions

The following code sample shows a `<linktext>` element used in a relationship table. The generated link from `maintenance.dita` to `installation.dita` will use the specified link text, while the link from `installation.dita` to `maintenance.dita` will use link text based on the title of the topic.

```
<map>
  <title>Relationship map</title>
  <reltable>
    <relrow>
```

```
      <relcell>
        <topicref href="installation.dita">
          <topicmeta>
            <linktext>Initial set-up information</linktext>
          </topicmeta>
        </topicref>
      </relcell>
      <relcell>
        <topicref href="maintenance.dita"/>
      </relcell>
    </relrow>
  </reltable>
</map>
```

Figure 68: Link text in a map

The following code sample shows a `<linktext>` element used within a topic to provide text for a related link to a non-DITA resource:

```
<related-links>
  <link href="SQLJ-example.html" format="html" scope="local">
    <linktext>Accessing relational data with SQLJ</linktext>
  </link>
</related-links>
```

Figure 69: Link text within a topic

8.2.4 Table elements

DITA topics support two types of tables. The `<table>` element uses the OASIS Exchange Table Model (formerly known as the CALS table model). The OASIS table supports the spanning of multiple rows or columns for special layout or organizational needs, and provides a wide variety of controls over the display properties of the data and even the table structure itself.

The other table structure in DITA is called `<simpletable>`. As the name implies, it is structurally less complex than the OASIS table, and can be used as a very simple, regular table for which close control of formatting is not as important. The main advantage of simpletable is for describing lists of data with regular headings, such as telephone directory listings, display adapter configuration data, or API properties.

8.2.4.1 <colspec>

The `<colspec>` element contains a column specification for a table, including assigning a column name and number, cell content alignment, and column width.

Attributes

The following attributes are available on this element: Universal attribute group (356) (without the Metadata attribute group), `@base` from the Metadata attribute group (357), and the attributes defined below. This element also uses `@align`, `@char`, `@charoff`, `@colsep`, `@rowsep`, and `@rowheader` from Complex-table attribute group (362).

@colnum

Indicates the number of a column in the table, counting from the first logical column to the last column.

@colname

Specifies a name for the column defined by this element. The `<entry>` element can use `@colname` to refer to the name of this column.

@colwidth

Describes the column width.

Example

See table (233).

8.2.4.2 <entry>

The `<entry>` element defines a single cell in a table.

Attributes

The following attributes are available on this element: Universal attribute group (356) (without the Metadata attribute group), `@base` and `@rev` from the Metadata attribute group (357), and the attributes defined below. This element also uses `@align`, `@char`, `@charoff`, `@colsep`, `@rowsep`, and `@valign` from the Complex-table attribute group (362).

@rotate

Indicates whether the contents of the entry is rotated. While the attribute is declared with the XML data type CDATA, the only predefined values are:

1

The contents of the cell are rotated 90 degrees counterclockwise.

0

No rotation occurs.

-dita-use-conref-target

See Using the -dita-use-conref-target value (372) for more information.

If this attribute is not specified, no rotation occurs. In situations where a stylesheet or other formatting mechanism specifies table cell orientation, the `@rotate` attribute can be ignored.

@colname

Specifies the column name in which an entry is found. The value is a reference to the `@colname` attribute on the `<colspec>` element.

@namest

Specifies the first logical column that is included in a horizontal span. The value is a reference to the `@colname` attribute on the `<colspec>` element.

@nameend

Specifies the last logical column that is included in a horizontal span. The value is a reference to the `@colname` attribute on the `<colspec>` element.

@morerows

Specifies the number of additional rows to add in a vertical span.

@scope

The presence of the `@scope` attribute indicates that the current entry is a header for the specified scope. Allowable values are:

row

The current entry is a header for all cells in the row.

col

The current entry is a header for all cells in the column.

rowgroup

The current entry is a header for all cells in the rows spanned by this entry.

colgroup

The current entry is a header for all cells in the columns spanned by this entry.

@headers

Identifies one or more entry element headers that apply to its entry. The `@headers` attribute contains an unordered set of unique space-separated tokens, each of which is an ID reference of an entry from the same table.

Example

See table (233).

8.2.4.3 <row>

The `<row>` element contains a single row in a table.

Attributes

The following attributes are available on this element: Universal attribute group (356), along with `@rowsep` and `@valign` from Complex-table attribute group (362).

Example

See table (233).

8.2.4.4 <simpletable>

Simple tables are tables that are regular in structure and do not need a caption.

Usage information

Choose the `<simpletable>` element when you want to show information in regular rows and columns. For example, multi-column tabular data such as phone directory listings or parts lists are good candidates for `<simpletable>`. Another good use of `<simpletable>` is for information that seems to beg for a three-part definition list; the `@keycol` attribute can be used to indicate which column represents the "key" or term-like column of the structure.

The `@keycol` attribute indicates which column represents the "key" or term-like column of the structure.

The close match of `<simpletable>` to tabular, regular data makes `<simpletable>` suitable as the basis for specialized structures such as `<properties>` (for programming information) and choice tables (for tasks).

Attributes

The following attributes are available on this element: Universal attribute group (356), Display attribute group (365), Simpletable attribute group (368), and spectitle (0).

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Examples

The following code sample shows a simple table that is used to represent a truth table from Boolean logic:

```
<simpletable>
  <sthead>
    <stentry>P</stentry>
    <stentry>not P</stentry>
  </sthead>
  <strow>
    <stentry>true</stentry>
    <stentry>false</stentry>
  </strow>
  <strow>
    <stentry>false</stentry>
    <stentry>true</stentry>
  </strow>
</simpletable>
```

Figure 70: Example of a simple table

The following code sample shows how the `@keycol` attribute can be used. The value of the `@keycol` attribute specifies that the first column is the header column. This indicates that items in the first column are headers for the row. Rendering of the header column is left up to the implementation.

```
<simpletable keycol="1">
 <sthead>
  <stentry>Term</stentry>
  <stentry>Categorization</stentry>
  <stentry>Definition</stentry>
 </sthead>
 <strow>
  <stentry>Widget</stentry>
  <stentry>noun</stentry>
  <stentry>Thing that is used for something</stentry>
 </strow>
 <strow>
  <stentry>Frustration</stentry>
  <stentry>noun</stentry>
  <stentry>What you feel when you drop the widget</stentry>
 </strow>
</simpletable>
```

Figure 71: Example using @keycol

8.2.4.5 <stentry>

A simple table entry represents a single cell within a simple table.

Attributes

The following attributes are available on this element: Universal attribute group (356) and specentry (0).

Example

See simpletable (231).

8.2.4.6 <sthead>

A simple table header is an optional header row for a simple table.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

See simpletable (231).

8.2.4.7 <strow>

A simple table row is a single row in a simple table.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

See simpletable (231).

8.2.4.8 <table>

The `<table>` element organizes arbitrarily complex relationships of tabular information. This standard table markup allows column or row spanning and table captions or descriptions. An optional title allowed inside the `<table>` element provides a caption to describe the table.

Usage information

The DITA table is based on the OASIS Exchange Table Model, augmented with DITA attributes that enable it for accessibility, specialization, conref, and other DITA processing. In addition, the table includes a `<desc>` element, which enables table description that is parallel with figure description. See simpletable (231) for a simplified table model that can be specialized to represent more regular relationships of data.

In DITA tables, in place of the `@expanse` attribute used by other DITA elements, the `@pgwide` attribute is used in order to conform to the OASIS Exchange Table Model. The `@pgwide` attribute has a similar semantic (1=page width; 0=resize to galley or column).

Note: The `@scale` attribute represents a stylistic markup property that is currently maintained in tables for legacy purposes. External stylesheets should enable less dependency on this attribute. Use the `@scale` attribute judiciously.

Note: The `@scale` attribute represents a stylistic markup property that is currently maintained in tables for legacy purposes. External stylesheets should enable less dependency on this attribute. Use the `@scale` attribute judiciously.

Attributes

The following attributes are available on this element: Universal attribute group (356), `@frame` and `@scale` from Display attribute group (365), and the attributes defined below. This element also uses `@colsep`, `@rowsep`, and `@rowheader` from Complex-table attribute group (362).

@orient

Specifies the orientation of the table in page-based outputs. This attribute is primarily useful for print-oriented display. Allowable values are:

port

The same orientation as the text flow.

land

90 degrees counterclockwise from the text flow.

-dita-use-conref-target

See Using the -dita-use-conref-target value (372) for more information.

In situations where a stylesheet or other formatting mechanism specifies table orientation based on other criteria, or for non-paginated outputs, the `@orient` attribute can be ignored.

@pgwide

Determines the horizontal placement of the element. Supported values are 1 and 0, although these are not mandated by the DTD, Schema, or RNG.

For print-oriented display, the value "1" places the element on the left page margin; "0" aligns the element with the left margin of the current text line and takes indention into account.

Example

```
<table>
<tgroup cols="2">
<colspec colname="COLSPEC0" colwidth="121*"/>
<colspec colname="COLSPEC1" colwidth="76*"/>
<thead>
<row>
<entry colname="COLSPEC0" valign="top">Animal</entry>
<entry colname="COLSPEC1" valign="top">Gestation</entry>
</row>
</thead>
<tbody>
<row>
<entry>Elephant (African and Asian)</entry>
<entry>19-22 months</entry>
</row>
<row>
<entry>Giraffe</entry>
<entry>15 months</entry>
</row>
<row>
<entry>Rhinoceros</entry>
<entry>14-16 months</entry>
</row>
<row>
<entry>Hippopotamus</entry>
<entry>7 1/2 months</entry>
</row>
</tbody>
```

```
</tgroup>
</table>
```

Figure 72: DITA source

The formatted output might be displayed as follows:

Animal	**Gestation**
Elephant (African and Asian)	19-22 months
Giraffe	15 months
Rhinoceros	14-16 months
Hippopotamus	7 1/2 months

In this example, the use of the `<thead>` element for the header allows processors or screen readers to identify a header relationship between any cell in the table body and the matching header cell above that column.

Example: Complex table with implied accessibility markup

In the following example, the table uses `<thead>` to identify header rows and `@rowheader` to identify a header column. This header relationship can be used to automatically create renderings of the table in other formats, such as HTML, that can be navigated using a screen reader or other assistive technology.

```
<table frame="all" rowheader="firstcol">
  <title>Sample of automated table accessibility</title>
<desc>Names are listed in the column c1. Points are listed in both data columns, with
expected points in column c2 and actual points in column c3.</desc>
  <tgroup cols="3">
    <colspec colname="c1"/>
    <colspec colname="c2"/>
    <colspec colname="c3"/>
    <thead>
      <row>
        <entry morerows="1">Name</entry>
        <entry namest="c2" nameend="c3">points</entry>
      </row>
      <row>
        <entry>expected</entry>
        <entry>actual</entry>
      </row>
    </thead>
    <tbody>
      <row>
        <entry>Mark</entry>
        <entry>10,000</entry>
        <entry>11,123.45</entry>
      </row>
      <row>
        <entry>Peter</entry>
        <entry>9,000</entry>
        <entry>11,012.34</entry>
      </row>
      <row>
        <entry>Cindy</entry>
        <entry>10,000</entry>
        <entry>10,987.64</entry>
      </row>
     </tbody>
```

```
   </tgroup>
</table>
```

Figure 73: DITA source

In this sample, navigation information for assistive technology is derived from two sources:

- The `<thead>` element contains two rows, and indicates that each `<entry>` in those rows is a header cell for that column. This means that each body cell can be associated with the header cell or cells above the column. For example, in the second body row, the entry "Peter" can be associated with the header "Name"; similarly, the entry "9,000" can be associated with the headers "expected" and "points".
- The `@rowheader` attribute implies that the first column plays a similar roll as a header. This means that each body cell in columns two and three can be associated with the header cell in column one. For example, in the second body row, the entry "9,000" can be associated with the header "Peter".

As a result of these two sets of headers, a rendering of the table can associate the entry "9,000" with three headers: "Peter", "expected", and "points", making it fully navigable by a screen reader or other assistive technology.

The formatted output might be displayed as follows:

Table 7: Sample of automated table accessibility

Names are listed in the column c1. Points are listed in both data columns, with expected points in column c2 and actual points in column c3.

Name	**points**	
	expected	**actual**
Mark	10,000	11,123.45
Peter	9,000	11,012.34
Cindy	10,000	10,987.64

Complex table with some manually specified accessibility markup

In some complex tables, the `<thead>` element and `@rowheader` attribute might not be enough to support all accessibility needs. Assume that the table above is flipped so that the names are listed across the top row, instead of in the first column, as follows:

Table 8: Sample with two header columns

Name		**Mark**	**Peter**	**Cindy**
points	**expected**	10,000	9,000	10,000
	actual	11,123.45	11,012.34	10,987.64

In this case the `@rowheader` attribute cannot be used, because it is only able to specify the first column as a header column. In this case, the `@scope` attribute can be used to indicate that entries in the first and second columns function as headers for the entire row (or row group, in the case of a cell that spans more than one row). The following code sample demonstrates the use of `@scope` to facilitate navigation of these rows by a screen reader or other assistive technology; note that the `<thead>` element is still used to imply a header relationship with the names at the top of each column.

```
<table frame="all">
 <title>Sample with two header columns</title>
 <tgroup cols="5">
  <colspec colname="c1"/>
  <colspec colname="c2"/>
  <colspec colname="c3"/>
  <colspec colname="c4"/>
  <colspec colname="c5"/>
  <thead>
   <row>
    <entry namest="c1" nameend="c2">Name</entry>
    <entry>Mark</entry>
    <entry>Peter</entry>
    <entry>Cindy</entry>
   </row>
  </thead>
  <tbody>
   <row>
    <entry morerows="1" scope="rowgroup"><b>points</b></entry>
    <entry scope="row"><b>expected</b></entry>
    <entry>10,000</entry>
    <entry>9,000</entry>
    <entry>10,000</entry>
   </row>
   <row>
    <entry scope="row"><b>actual</b></entry>
    <entry>11,123.45</entry>
    <entry>11,012.34</entry>
    <entry>10,987.64</entry>
   </row>
  </tbody>
 </tgroup>
</table>
```

Example: complex table with manual accessibility markup

In extremely complex tables, such as those with a single header cell in the middle of the table, extremely fine grained accessibility controls are available to explicitly associate any content cell with any header cell. This might also be useful for cases where processors do not support the implied accessibility relationships described above.

In the following sample, header cells are identified using the `@id` attribute, which is referenced using the `@headers` attribute on appropriate content cells. This makes all header relationships in the table explicit. Note that this sample ignores the `@scope` attribute, which could be used to exercise manual control without setting as many attribute values; it also ignores the fact that `<thead>` creates a header relationship even when the `@id` and `@headers` attributes are not used.

```
<table frame="all">
  <title>Sample with fully manual accessibility control</title>
<desc>Names are listed in the column c1. Points are listed in both data columns, with
expected points in column c2 and actual points in column c3.</desc>
  <tgroup cols="3">
    <colspec colname="c1"/>
    <colspec colname="c2"/>
    <colspec colname="c3"/>
    <thead>
      <row>
        <entry morerows="1"> </entry>
        <entry namest="c2" nameend="c3" id="pts">points</entry>
      </row>
      <row>
        <entry id="exp" headers="pts">expected</entry>
        <entry id="act" headers="pts">actual</entry>
      </row>
    </thead>
    <tbody>
      <row>
        <entry id="name1">Mark</entry>
        <entry headers="name1 exp pts">10,000</entry>
        <entry headers="name1 act pts">11,123.45</entry>
```

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```
        </row>
        <row>
          <entry id="name2">Peter</entry>
          <entry headers="name2 exp pts">9,000</entry>
          <entry headers="name2 act pts">11,012.34</entry>
        </row>
        <row>
          <entry id="name3">Cindy</entry>
          <entry headers="name3 exp pts">10,000</entry>
          <entry headers="name3 act pts">10,987.64</entry>
        </row>
      </tbody>
    </tgroup>
</table>
```

Figure 74: DITA source

The formatted output might be displayed as follows:

Table 9: Sample with fully manual accessibility control

Names are listed in the column c1. Points are listed in both data columns, with expected points in column c2 and actual points in column c3.

	points	
	expected	**actual**
Mark	10,000	11,123.45
Peter	9,000	11,012.34
Cindy	10,000	10,987.64

8.2.4.9 <tbody>

The `<tbody>` element contains the rows in a table.

Attributes

The following attributes are available on this element: Universal attribute group (356) and `@valign` from Complex-table attribute group (362).

Example

See table (233).

8.2.4.10 <tgroup>

The `<tgroup>` element in a table contains the header and body rows of a table.

Attributes

The following attributes are available on this element: Universal attribute group (356) and the attribute defined below. This element also uses `@colsep`, `@rowsep`, and `@align` from Complex-table attribute group (362).

@cols (REQUIRED)

Indicates the number of columns in a `<tgroup>`.

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Example

See table (233).

8.2.4.11 <thead>

The `<thead>` element is a table header that precedes the table body (`<tbody>`) element in a complex table.

Attributes

The following attributes are available on this element: Universal attribute group (356) and `@valign` from Complex-table attribute group (362).

Example

See table (233).

8.3 Map elements

Map elements include the core components of DITA maps, such as `<topicref>` and `<reltable>`, as well as general purpose map specializations in the map group domain.

8.3.1 Basic map elements

DITA maps are built from a few core elements that are used for referencing and organizing topics. The `<topicmeta>` element is also available to specify metadata for the map, for individual topics, or for groups of topics. Many elements inside `<topicmeta>` are also available inside the topic prolog.

8.3.1.1 <map>

A DITA map is the mechanism for aggregating topic references and defining a context for those references. It contains references to topics, maps, and other resources; these references are organized into hierarchies, groups, and tables.

Usage information

A map describes the relationships among a set of DITA topics. The following are types of relationships that can be described in a map:

Hierarchical

Nested topics create a hierarchical relationship. The topic that does the nesting is the parent, and the topics that are nested are the children.

Ordered

Child topics can be labeled as having an ordered relationship, which means they are referenced in a definite sequence.

Family

Child topics can be labeled as having a family relationship, which means they all refer to each other.

Rendering expectations

When rendering a map, processors might make use of the relationships defined in the map to create a Table of Contents (TOC), aggregate topics into a PDF document, or create links between topics in the output.

The `<title>` element can be used to provide a title for the map. In some scenarios the title is purely informational; it is present only as an aid to the author. In other scenarios, the title might be useful or even required. In a map referenced by another map, the title might be discarded as topics from the submap are aggregated into a larger publication.

Attributes

The following attributes are available on this element: Universal attribute group (356) (with a narrowed definition of `@id`, given below), Attributes common to many map elements (360), Architectural attribute group (360), and the attributes defined below. This element also uses `@type`, `@scope`, and `@format` from Link-relationship attribute group (366).

@id

Allows an ID to be specified for the map. Note that maps do not require IDs (unlike topics), and the map ID is not included in references to elements within a map. This attribute is defined with the XML Data Type ID.

@anchorref

Identifies a location within another map document where this map will be anchored. Resolution of the map is deferred until the final step in the delivery of any rendered content. For example, `anchorref="map1.ditamap#a1"` allows the map with `@anchorref` to be pulled into the location of the anchor point "a1" inside `map1.ditamap` when `map1.ditamap` is rendered for delivery.

Example

The following code sample contains six `<topicref>` elements. The `<topicref>` elements are nested and have a hierarchical relationship. The file `bats.dita` is the parent topic and the other topics are its children. The hierarchy could be used to generate a PDF, a navigation pane in an information center, a summary of the topics, or related links between the parent topic and its children.

```
<map id="mybats">
  <title>Bats</title>
  <topicref href="bats.dita">
    <topicref href="batcaring.dita"/>
    <topicref href="batfeeding.dita"/>
    <topicref href="batsonar.dita"/>
    <topicref href="batguano.dita"/>
    <topicref href="bathistory.dita"/>
  </topicref>
</map>
```

8.3.1.2 <topicref>

A topic reference is the mechanism for referencing a topic (or another resource) from a DITA map. It can nest, which enables the expression of navigation and table-of-content hierarchies, as well as containment hierarchies and parent-child relationships.

Attributes

The following attributes are available on this element: Universal attribute group (356), Link-relationship attribute group (366) (with a narrowed definition of `@href`, given below), Attributes common to many map elements (360), Topicref-element attributes group (368), `@keys`, and `@keyref`.

@href

Points to the resource that is represented by the `<topicref>`. See The href attribute (369) for detailed information on supported values and processing implications. References to DITA content cannot be below the topic level: that is, you cannot reference individual elements inside a topic. References to content other than DITA topics should use the `@format` attribute to identify the kind of resource being referenced.

Example

The following code sample shows a simple map that organizes several topics about the software product ExampleToolBuilder. The `<topicref>` that refers to `setup.dita` uses the `@collection-type` attribute to indicate that the order of three sub-topics in that section is important.

```
<map>
  <title>ExampleToolBuilder version 1.2.3</title>
  <topicref href="setup.dita" collection-type="sequence">
    <topicref href="prerequisites.dita"/>
    <topicref href="installing.dita"/>
    <topicref href="validating.dita"/>
  </topicref>
  <topicref href="everyday-use.dita">
    <!-- ... -->
  </topicref>
  <topicref href="troubleshooting.dita">
    <!-- ... -->
  </topicref>
</map>
```

Figure 75: Common map hierarchy using <topicref> elements

8.3.1.3 <topicmeta>

Topic metadata is metadata that applies to a topic based on its context in a map.

Usage information

The metadata specified in a `<topicmeta>` element is specific to a given context within a map. If a reference to a single resource appears more than once in a map or set of maps, unique metadata can be specified in each instance. For example, when the parent `<topicref>` element results in a link, elements within the `<topicmeta>` element can be used to provide context-specific information about the link, such as link text or a short description.

Attributes

The following attributes are available on this element: Universal attribute group (356) and the attribute defined below.

@lockmeta

Determines whether the metadata that is specified in the map supplements or overrides the metadata that is specified in the topic. When the `@lockmeta` attribute is set to "yes", the topic metadata is overriden. Allowable values are "yes", "no", and Using the -dita-use-conref-target value (372).

Example

The following example shows how the `<topicmeta>` element can contain a navigation title:

```
<map>
  <title>Highlighting domain elements</title>
  <topicref href=sub.dita">
    <topicmeta>
      <navtitle>Subscript</navtitle>
    </topicmeta>
  </topicref>
</map>
```

Because the `@lockmeta` is not specified, if the `sub.dita` topic also contains a navigation title, the navigation title from the topic is used.

Related concepts

3.3.4.4 Cascading of metadata attributes in a DITA map (50)
Certain map-level attributes cascade throughout a map, which facilitates attribute and metadata management. When attributes *cascade*, they apply to the elements that are children of the element where the attributes were specified. Cascading applies to a containment hierarchy, as opposed to a element-type hierarchy.

Related reference

3.3.4.5 Reconciling topic and map metadata elements (53)
The `<topicmeta>` element in maps contains numerous elements that can be used to declare metadata. These metadata elements have an effect on the parent `<topicref>` element, any child `<topicref>` elements, and – if a direct child of the `<map>` element – on the map as a whole.

8.3.1.4 <anchor>

The `<anchor>` element provides an integration point that another map can reference in order to insert its navigation into the referenced map's navigation tree. For those familiar with Eclipse help systems, this serves the same purpose as the `<anchor>` element in that system. It might not be supported for all output formats.

Usage information

The `<anchor>` element is typically used to allow integration of run-time components. For build-time integration, you can use a `<topicref>` element to reference another map, or use the `@conref` or `@conkeyref` attribute on an element inside the map.

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Processing expectations

The mechanism by which map processors discover maps to be anchored is processor specific.

Attributes

The following attributes are available on this element: Universal attribute group (356) (with a narrowed definition of `@id`, given below).

@id (REQUIRED)

Provides an integration point that another map can reference in order to insert its navigation into the current navigation tree. The `@anchorref` attribute on a map can be used to reference this attribute. See ID attribute (61) for more details.

Example

In this example, the `map1.ditamap` contains an `<anchor>` element with an `@id` attribute set to "a1".

```
<map>
  <title>MyComponent tasks</title>
  <topicref href="start.dita" toc="yes">
    <navref mapref="othermap2.ditamap"/>
    <navref mapref="othermap3.ditamap"/>
    <anchor id="a1"/>
  </topicref>
</map>
```

Figure 76: DITA map that contains an anchor

The `@id` on an `<anchor>` element can be referenced by the `@anchorref` attribute on another map's `<map>` element. For example, the map to be integrated at that spot could be defined as follows.

```
<map anchorref="map1.ditamap#a1">
  <title>This map is pulled into the MyComponent task map</title>
  <!-- ... -->
</map>
```

Figure 77: DITA map that references an anchor

8.3.1.5 <navref>

The `<navref>` element represents a pointer to another map which is preserved as a transcluding link in the result deliverable rather than resolved when the deliverable is produced. Output formats that support such linking can integrate the referenced resource when displaying the referencing map to an end user.

Usage information

For example, if a map is converted to the Eclipse help system format, the DITA element `<navref mapref="other.ditamap"/>` is converted to the Eclipse element `<link toc="other.xml"/>`. When Eclipse loads the referencing map, it will replace this link element with the contents of the file `other.xml`, provided that the file `other.xml` is available.

Note that not all output formats support such linking. In order to include another map directly without depending on the output format, use a `<topicref>` element with the `@format` attribute set to "ditamap".

The effect is similar to using a `@conref` attribute. For example, the following markup represents a literal inclusion of the map `other.ditamap`:

```
<topicref href="other.ditamap" format="ditamap"/>
```

Attributes

The following attributes are available on this element: Universal attribute group (356) and the attribute defined below.

@mapref

Specifies the URI of the map file or non-DITA resource to be referenced. It might reference a DITA map or a resource that is appropriate for your output format (such as XML TOC file for Eclipse output).

@keyref (DEPRECATED)

The `@keyref` attribute was unintentionally defined for `<navref>` in the original DITA grammar files. It is retained for backwards compatibility. The attribute will be removed in a future release, and processors are not expected to support it.

Example

In this example, the map titled "MyComponent tasks" references the maps `othermap2.ditamap` and `othermap3.ditamap`.

```
<map title="MyComponent tasks">
 <navref mapref="../com.ibm.xml.doc/othermap1.ditamap"/>
 <navref mapref="../com.ibm.xml.doc/othermap2.ditamap"/>
</map>
```

8.3.1.6 <reltable>

The `<reltable>` element is a relationship table that specifies relationships among topics, based on the familiar table model of rows (`<relrow>`), columns (`<relheader>`), and cells (`<relcell>`).

Usage information

A frequently-used type of relationship table establishes relationships between task, concept, and reference topics. Each column in a relationship table typically represents a specific role in a set of relationships; for example, the first column often contains references to tasks, while the second and third columns often reference concept and reference topics. The relationship table rows define relationships between the resources referenced in different cells of the same row; in this example, each row establishes relationships between tasks and the concept and reference topics that support the tasks. When used in this manner, relationship tables make it easy to determine where related information is missing or undefined.

Relationship tables can be used in conjunction with hierarchies and groups to manage all the related links in an information set.

When a title is associated with a relationship table, the title typically is used as an authoring convenience and is not displayed in generated publications.

Processing expectations

By default, the contents of a `<reltable>` element are not output for navigation or TOC purposes; they are used only to define relationships that can be expressed as topic-to-topic links. The `<relcell>` elements can contain `<topicref>` elements, which are then related to other `<topicref>` elements in the same row (although not necessarily in the same cell).

Within a map tree, the effective relationship table is the union of all relationship tables in the map.

Attributes

The following attributes are available on this element: Universal attribute group (356), Attributes common to many map elements (360) (without `@keyscope` or `@collection-type`, and with a narrowed definition of `@toc`, given below), and the attributes defined below. This element also uses `@type`, `@scope`, and `@format` from Link-relationship attribute group (366).

@toc

Specifies whether a topic appears in the table of contents (TOC). If the value is not specified locally, but is specified on an ancestor, the value will cascade from the closest ancestor. On this element the default value for `@toc` is "no". See Attributes common to many map elements (360) for a complete definition of `@toc`.

@title

An identifying title for this element.

Example

In this example, a relationship table is defined with three columns; one for "concept", one for "task", and one for "reference". Three cells are defined within one row. The first cell contains one concept topic: `batsonar.dita`. The second cell contains two task topics: `batcaring.dita` and `batfeeding.dita`. The third cell contains two reference topics: `batguano.dita` and `bathistory.dita`.

```
<map>
  <reltable>
    <relheader>
      <relcolspec type="concept"/>
      <relcolspec type="task"/>
      <relcolspec type="reference"/>
    </relheader>
    <relrow>
      <relcell>
        <topicref href="batsonar.dita"/>
      </relcell>
      <relcell>
        <topicref href="batcaring.dita"/>
        <topicref href="batfeeding.dita"/>
      </relcell>
      <relcell>
        <topicref href="batguano.dita"/>
        <topicref href="bathistory.dita"/>
      </relcell>
    </relrow>
  </reltable>
</map>
```

A DITA-aware tool might represent the `<reltable>` element graphically:

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type="concept"	type="task"	type="reference"
`batsonar.dita`	`batcaring.dita` `batfeeding.dita`	`batguano.dita` `bathistory.dita`

On output, links should be added to topics that are in the same row, but not in the same cell. This allows simple maintenance of parallel relationships: for example, in this case, `batcaring.dita` and `batfeeding.dita` are two tasks that require the same supporting information (concept and reference topics) but might otherwise be unrelated. When topics in the same cell are in fact related, the cell's `@collection-type` attribute can be set to family. If some cells or columns are intended solely as supporting information and should not link back to topics in other cells, you can set the `@linking` attribute on the `<relcell>` or `<relcolspec>` to "targetonly".

In this example, the related links would be as follows:

`batsonar.dita`

`batcaring.dita`, `batfeeding.dita`, `batguano.dita`, `bathistory.dita`

`batcaring.dita`

`batsonar.dita`, `batguano.dita`, `bathistory.dita`

`batfeeding.dita`

`batsonar.dita`, `batguano.dita`, `bathistory.dita`

`batguano.dita`

`batsonar.dita`, `batcaring.dita`, `batfeeding.dita`

`bathistory.dita`

`batsonar.dita`, `batcaring.dita`, `batfeeding.dita`

Although such tables can initially take some time to learn and manipulate, they are inherently an efficient way to manage these links. In particular, they increase the prospect for reuse among topics, because those topics do not contain context-specific links. A relationship table also makes it easy to see and manage patterns; for example, the fact that `batfeeding.dita` and `batcaring.dita` have the same relationships to supporting information is clear from the table, but would require some comparison and counting to determine from the list summary just before this paragraph.

8.3.1.7 <relrow>

The `<relrow>` element defines a row in the relationship table (`<reltable>`). It creates a relationship between the cells in the row, which is expressed in output as links between the topics or resources referenced in those cells.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

See reltable (244).

8.3.1.8 <relcell>

The `<relcell>` element defines a cell in the relationship table (`<reltable>`). The `<topicref>` elements that it contains are related to the `<topicref>` elements in other cells of the same row. By default, topics or resources that are referenced in the same cell are not related to each other, unless you change the `@collection-type` attribute of the `<relcell>` to indicate that they are related.

Attributes

The following attributes are available on this element: Universal attribute group (356) and Attributes common to many map elements (360) (without `@keyscope`). This element also uses `@type`, `@scope`, and `@format` from Link-relationship attribute group (366).

Example

See reltable (244).

8.3.1.9 <relheader>

The `<relheader>` element is a row in a relationship table that contains column definitions (`<relcolspec>` elements). Each table can have only one set of column definitions.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

See reltable (244).

8.3.1.10 <relcolspec>

The `<relcolspec>` element is used to define a column in a relationship table. The `<relcolspec>` element can be used to set default attribute values for the `<topicref>` elements in the column.

Usage information

You can use the `<relcolspec>` element to set default values for the attributes of the topics that are referenced in the column. For example, when you set the `@type` attribute to "concept," all `<topicref>` elements in the column that do not have a `@type` attribute specified are treated as concepts.

Beginning with DITA 1.2, you also can add `<topicref>` elements to the `<relcolspec>` element; this defines a relationship between the topics that are referenced in the `<relcolspec>` element and the topics that are referenced in the column of the relationship table. Note that this does not define a relationship between two cells in the same column; the only new relationship is between `<topicref>` targets in a `<relcell>` and `<topicref>` targets in that column's `<relcolspec>`.

Processing expectations

When values are specified for attributes of `<relcell>` or `<relrow>` elements, those values are inherited before those defined for `<relcolspec>` attributes. Values specified for attributes of `<relcolspec>` elements are inherited before those defined for the `<reltable>` element.

Also beginning with DITA 1.2, if you add a `<title>` element to the `<relcolspec>` element, the content of the `<title>` element is used as the label for the related links that are defined and generated by the column. If the `<title>` element is not present, the labels for the related links are generated in the following ways:

- If the `<relcolspec>` element contains a `<topicref>` element that references a non-DITA resource, the value of the `<topicref>` element's navigation title is used for the label.
- If the `<relcolspec>` element contains a `<topicref>` element that references a DITA resource and the `@locktitle` attribute is set to "yes," the value of the `<topicref>` element's navigation title is used for the label.
- If the `<relcolspec>` element contains a `<topicref>` element that references a DITA resource and the `@locktitle` attribute is missing or set to "no," the label is derived from the `<navtitle>` or `<title>` element specified within the topic.
- If no title is specified and no `<topicref>` is present in the `<relcolspec>`, a rendering tool might choose to generate a title for the links generated from that column.

Attributes

The following attributes are available on this element: Universal attribute group (356) and Attributes common to many map elements (360) (without `@keyscope` or `@collection-type`). This element also uses `@type`, `@scope`, and `@format` from Link-relationship attribute group (366).

Example

In this example, a relationship table is defined with three columns; one for "concept", one for "task", and one for "reference". Three cells are defined within one row. The first cell contains one concept topic: `puffins.dita`. The second cell contains two task topics: `puffinFeeding.dita` and `puffinCleaning.dita`. The third cell contains a reference topic: `puffinHistory.dita`. Setting the `@type` on each column allows (but does not require) processors to validate that the topics in each column are of the expected type.

```
<map>
 <reltable>
  <relheader>
   <relcolspec type="concept"/>
   <relcolspec type="task"/>
   <relcolspec type="reference"/>
  </relheader>
  <relrow>
   <relcell><topicref href="puffins.dita"/></relcell>
   <relcell>
     <topicref href="puffinFeeding.dita"/>
     <topicref href="puffinCleaning.dita"/>
   </relcell>
   <relcell>
     <topicref href="puffinHistory.dita"/>
   </relcell>
  </relrow>
 </reltable>
</map>
```

Example with column titles

Consider the following relationship table:

```
<reltable>
  <relheader>
    <relcolspec type="task">
      <topicref navtitle="Troubleshooting" href="tbs.dita" locktitle="yes"/>
```

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```
    </relcolspec>
    <relcolspec type="reference">
      <topicref navtitle="Messages" href="msg.dita" locktitle="yes"/>
    </relcolspec>
  </relheader>
  <relrow>
    <relcell>
      <topicref navtitle="Debugging login errors" href="debug_login.dita"/>
    </relcell>
    <relcell>
      <topicref navtitle="Login not found" href="login_error_1.dita"/>
    </relcell>
  </relrow>
  <relrow>
    <relcell>
      <topicref navtitle="Checking access controls" href="checking_access.dita"/>
    </relcell>
    <relcell>
      <topicref navtitle="Login not allowed" href="login_error_2.dita"/>
    </relcell>
  </relrow>
</reltable>
```

In addition to the relationships defined by the rows in the relationship table, the following relationships are now defined by the columns in the relationship table:

- `tbs.dita` <–> `debug_login.dita`
- `tbs.dita` <–> `checking_access.dita`
- `msg.dita` <–> `login_error_1.dita`
- `msg.dita` <–> `login_error_2.dita`

Ignoring the headers for a moment, the `<reltable>` here would ordinarily define a two-way relationship between `debug_login.dita` and `login_error1.dita`. This will typically be expressed as a link from each to the other. An application **MAY** render the link with a language-appropriate heading such as "Related reference", indicating that the target of the link is a reference topic.

The headers change this by specifying a new title. In the second column, the `<topicref>` specifies a title of "Messages", which should now be used together with the link to anything in that column. So, a generated link from `debug_login.dita` to `login_error1.dita` should be rendered together with the title of "Messages". How this is rendered together with the link is up to the application.

8.3.1.11 <ux-window>

Use the `<ux-window>` element to provide specifications for a window or viewport in which a user assistance topic or Web page can be displayed. The window or viewport can be referenced by the `<resourceid>` element associated with a topic or `<topicref>` element.

Usage information

The `<ux-window>` element can be used anywhere within a map. If more than one `<ux-window>` element in a map has the same `@name` attribute, the first window specification in document order with that `@name` attribute is used.

Attributes

The following attributes are available on this element: ID attribute group (357), Metadata attribute group (357), class (Not for use by authors) (0), and the attributes defined below.

@name (REQUIRED)

The value used to refer to this window definition.

@top

The top position of the target help window, whether relative to the calling window or to the entire display. The value of this attribute is a real number optionally followed by a unit of measure from the set of pc, pt, px, in, cm, mm, em (picas, points, pixels, inches, centimeters, millimeters, and ems respectively). The default unit is px (pixels).

@left

The left position of the target help window, whether relative to the calling window or to the entire display. The value of this attribute is a real number optionally followed by a unit of measure from the set of pc, pt, px, in, cm, mm, em (picas, points, pixels, inches, centimeters, millimeters, and ems respectively). The default unit is px (pixels).

@height

The height of the window. The value of this attribute is a real number optionally followed by a unit of measure from the set of pc, pt, px, in, cm, mm, em (picas, points, pixels, inches, centimeters, millimeters, and ems respectively). The default unit is px (pixels).

@width

The width of the window. The value of this attribute is a real number optionally followed by a unit of measure from the set of pc, pt, px, in, cm, mm, em (picas, points, pixels, inches, centimeters, millimeters, and ems respectively). The default unit is px (pixels).

@on-top

Indicates whether the initial z-order of the target help window is on top of all windows on the desktop. Allowable values are: "yes", "no", and -dita-use-conref-target. The default value is "no".

@features

A list of other features (size, position, scrollbars, etc.) of the window. Each feature name and value can not contain any blank space, and each feature name and value is separated by a comma or other delimiter character.

@relative

Indicates whether the window dimensions are relative to the calling window or the entire target display. The default value is "no". Allowable values are:

no

The window dimensions specified on this element are absolute positions (not relative to the calling window).

yes

The window dimensions specified on this element are relative to the calling window.

-dita-use-conref-target

See Using the -dita-use-conref-target value (372) for more information.

@full-screen

Indicates whether the window is initially displayed in a maximized state. Allowable values are: "yes", "no", and -dita-use-conref-target. The default value is "no".

Example

In this example, a window with a name of "csh" is defined in the map. The window name is later referenced by the `@ux-windowref` attribute on the `<resourceid>` element.

```
<map title="Widget Help">
 <topicmeta>
  <ux-window id="fg23" name="csh" top="10" left="20" height="400" width="500"
```

```
      features="status=yes,toolbar=no,menubar=no,location=no" relative="yes"
      full-screen="no" />
  </topicmeta>
  <topicref href="file_ops.dita" type="concept">
    <topicref href="saving.dita" type="task" />
    <topicref href="deleting.dita" type="task" />
    <topicref href="editing.dita" type="task">
      <topicmeta>
        <resourceid id="ab43" appname="ua"
           appid="5432" ux-context-string="idh_fileedit" ux-windowref="csh" />
      </topicmeta>
    </topicref>
 </topicref>
 </map>
```

In this example, different window specifications are defined for tablet and desktop presentation:

```
<map title="Puggles Help">
 <topicmeta>
 <ux-window id="p76" name="ux-tablet" top="1cm" left="1cm" height="4cm" width="3cm"
    features="status=no,toolbar=no,menubar=no,location=no" relative="no"
    full-screen="no" />
 <ux-window id="p80" name="ux-desktop" top="5cm" left="10cm" height="16cm" width="12cm"
    features="status=yes,toolbar=no,menubar=no,location=yes" relative="no"
    full-screen="no" />
 </topicmeta>
 <topicref href="c_puggles_intro.dita" type="concept">
  <!-- ... -->
 </topicref>
</map>
```

Related concepts

3.3.4.7 Context hooks and window metadata for user assistance (59)
Context hook information specified in the <resourceid> element in the DITA map or in a DITA topic enables processors to generate the header, map, alias and other types of support files that are required to integrate the user assistance with the application. Some user assistance topics might need to be displayed in a specific window or viewport, and this windowing metadata can be defined in the DITA map within the <ux-window> element.

8.3.2 Map group elements

The map group domain elements define, group, or reference content. Many of the map group elements are convenience elements, which means that they simply make it easier for an author to make use of existing functions.

For example, the <topichead> element allows a map to specify a heading without allowing a reference to a topic. While a <topicref> element might accomplish the same thing by creating a title and leaving off the @href attribute, the <topichead> element simply makes the intent clearer and prevents the accidental inclusion of an @href attribute.

8.3.2.1 <anchorref>

The <anchorref> element is used to reference an <anchor> element in a map. The contents of an <anchorref> element are rendered both in the original authored location and at the location of the referenced <anchor> element. The referenced <anchor> element might be defined in the current map or another map. When possible, this integration is done when displaying the map with <anchor> to an end user.

Usage information

This function of the `<anchorref>` element is similar to that provided by the `@anchorref` attribute of the `<map>` element. However, instead of attaching an entire map to an anchor point, this element allows the author to attach only the contents of a single map branch. This enables architects to reuse a branch of content without reusing the entire map.

By default, the content of the `<anchorref>` element is rendered at both the anchor target and the original location. To prevent the content from being rendered at the location of the `<anchorref>` element, set `toc="no"` on the `<anchorref>` element, and then set `toc="yes"` on each of its children so that they will not inherit the `toc="no"` setting.

Processing expectations

If the rendering platform does not support runtime integration of navigation based on the anchor point, a build system should treat the `<anchorref>` element similar to a "conref push" instruction by pushing the content to the spot that contains the `<anchor>`. Note that many `<anchorref>` elements might push content to the same point; the order in which items are pushed is left undefined, although the order within a single `<anchorref>` is preserved.

Metadata cascading takes place in the original authored context, because the branch of content defined with the `<anchorref>` remains independent from the referenced map. The `<anchorref>` content does not take on the cascading metadata at the `<anchor>` location. For example, if the map containing the `<anchorref>` element sets a local copyright, that copyright cascades to the `<anchorref>` element and its children; it is retained after the content is rendered at the target `<anchor>` element.

Specialization hierarchy

+ map/topicref mapgroup-d/anchorref

Attributes

The following attributes are available on this element: Universal attribute group (356), Link-relationship attribute group (366) (with narrowed definitions of `@href`, `@type`, and `@format`, all given below), Attributes common to many map elements (360), Topicref-element attributes group (368), `@keys`, and `@keyref`.

@href

A pointer to an `<anchor>` element in this or another DITA map. When rendered, the contents of the current element will be copied to the location of the `<anchor>`. See The href attribute (369) for supported syntax when referencing a map element.

@type

Describes the target of a reference. For the `<anchorref>` element, this value defaults to "anchor", because the element is expected to point to an `<anchor>` element in this or another map.

@format

The `@format` attribute identifies the format of the resource being referenced. For the `<anchorref>` element, this value defaults to "ditamap", because the element references a point in a map.

Example

```
<topicref href="carPrep.dita">
    <topicref href="beforePrep.dita"/>
    <anchor id="prepDetail"/>
    <topicref href="afterPrep.dita"/>
</topicref>
<!-- ... -->
<topicref href="astroTasks.dita">
    <topicref href="astroOverview.dita"/>
    <anchorref href="#prepDetail">
        <topicref href="astroChecklist.dita"/>
        <topicref href="otherPreparation.dita"/>
    </anchorref>
    <topicref href="astroConclusion.dita"/>
</topicref>
```

Figure 78: Initial map contents

```
<topicref href="carPrep.dita">
    <topicref href="beforePrep.dita"/>
    <anchor id="prepDetail"/>
    <topicref href="astroChecklist.dita"/>
    <topicref href="otherPreparation.dita"/>
    <topicref href="afterPrep.dita"/>
</topicref>
<!-- ... -->
<topicref href="astroTasks.dita">
    <topicref href="astroOverview.dita"/>
    <topicref href="astroChecklist.dita"/>
    <topicref href="otherPreparation.dita"/>
    <topicref href="astroConclusion.dita"/>
</topicref>
```

Figure 79: Effective result of evaluating the <anchorref> element

8.3.2.2 <keydef>

A key definition provides a simple way to define a key without making the definition itself a part of rendered content.

Usage information

The `<keydef>` element is a convenience element. Anything that the `<keydef>` element does can also be accomplished with a `<topicref>` element. Attributes defaulted on the `<keydef>` element ensure that key definitions do not appear in the TOC, do not add extra links, and are not rendered as topics .

Specialization hierarchy

The `<keydef>` element is specialized from `<topicref>`. It is defined in the mapgroup-domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356), Link-relationship attribute group (366) (with a narrowed definition of `@href`, given below), Attributes common to many map elements (360) (with a narrowed definition of `@processing-role`, given below), Topicref-element attributes group (368), `@keyref`, and the attributes defined below.

@keys (REQUIRED)

Defines a key and is required. Otherwise,the attribute is the same as that described in The keys attribute (370).

@href

Points to the resource that is represented by the `<topicref>`. See The href attribute (369) for detailed information on supported values and processing implications. References to DITA content cannot be below the topic level: that is, you cannot reference individual elements inside a topic. References to content other than DITA topics should use the `@format` attribute to identify the kind of resource being referenced.

@processing-role

Defines how the the default value for `@processing-role` is "resource-only". Otherwise, the definition matches the one found in Attributes common to many map elements (360).

Example

The following code sample shows several different types of key definitions:

```
<map>
  <title>Possible keys for use in the DITA specification</title>

  <keydef keys="dita-tc" scope="external" format="html"
          href="https://www.oasis-open.org/committees/tc_home.php?wg_abbrev=dita">
    <topicmeta><linktext>DITA Technical Committee</linktext></topicmeta>
  </keydef>

  <keydef keys="addressing" href="dita-addressing.dita"/>

  <keydef keys="dita-version">
    <topicmeta><linktext>2.0</linktext></topicmeta>
  </keydef>

</map>
```

1. The first `<keydef>` defines a key that links to a Web page. It contains link text; it also specifies the necessary `@scope` and `@format` attributes, so that authors do not need to include them when they reference this key.
2. The second `<keydef>` defines a key for a local DITA topic about addressing in DITA; that topic is available to resolve link text.
3. The third `<keydef>` defines a text-only key that specifies the current DITA version number.

8.3.2.3 <mapref>

A map reference is a mechanism for referencing a DITA map from a DITA map.

Usage information

The `<mapref>` element is a convenience element. It is equivalent to a `<topicref>` element with the `@format` attribute set to "ditamap".

Processing expectations

The hierarchy of the referenced map is merged into the container map at the position of the reference, and the relationship tables of the child map are added to the parent map.

Specialization hierarchy

The `<mapref>` element is specialized from `<topicref>`. It is defined in the map-group module.

Attributes

The following attributes are available on this element: Universal attribute group (356), Link-relationship attribute group (366) (with narrowed definitions of `@href` and `@format`, given below), Attributes common to many map elements (360), Topicref-element attributes group (368), `@keyref`, and `@keys`.

@format

On this element the `@format` attribute sets a default value of "ditamap", because the purpose of the element is to reference a DITA map document. Otherwise, the attribute is the same as described in Link-relationship attribute group (366).

@href

Points to the resource that is represented by the `<topicref>`. See The href attribute (369) for detailed information on supported values and processing implications. References to DITA content cannot be below the topic level: that is, you cannot reference individual elements inside a topic. References to content other than DITA topics should use the `@format` attribute to identify the kind of resource being referenced.

Example

In this example, XXX

The `map-group-elements.ditamap)` document contains references to the element-reference topics for the map group domain. It is constructed as a map in order to enable easy editing of the child topics.

```
<map>
 <title>Map group elements</title>
 <topicref keyref="mapgroup-d" >
  <topicref keyref="anchorref" />
  <topicref keyref="keydef" />
  <topicref keyref="mapref" />
  <topicref keyref="topicgroup" />
  <topicref keyref="topichead" />
 </topicref>
</map>
```

Figure 80: DITA map for map-group elements (`map-group-elements.ditamap)`

The `elements.ditamap` document references `map-group-elements.ditamap).`

```
<map>
 <title>Base elements</title>
 ...
 <topicref href="containers/map-elements.dita" >
  <mapref href="basic-map-elements.ditamap"/>
  <mapref href="map-group-elements.ditamap"/>
 </topicref>
```

```
  ...
</map>
```

Figure 81: DITA map for all element-reference topics (elements.ditamap)

```
xxx
```

Figure 82: Rendered result

8.3.2.4 <topicgroup>

A topic group is a set of topic references that share common attributes and linking relationships.

Usage information

The `<topicgroup>` element is a non-titled element. A `<navtitle>` element within the `<topicmeta>` element inside of a `<topicgroup>` has no defined purpose.

Processing expectations

When a `<topicgroup>` element has a navigation title, processors **MUST** ignore the title and **MAY** issue an error message.

Specialization hierarchy

The `<topicgroup>` element is specialized from `<topicref>`. It is defined in the map-group domain.

Attributes

The following attributes are available on this element: Universal attribute group (356) and Attributes common to many map elements (360) (except for `@locktitle`).

The `@scope`, `@format`, and `@type` attributes from Link-relationship attribute group (366) are also available.

Example

In the following code sample, the `<topicgroup>` element specifies common attributes (`@audience` and `@linking`) that are inherited by the topic references. The navigation hierachy is not affected.

```
<topicgroup audience="novice" linking="none">
  <topicref href="getting-started.dita"/>
  <topicref href="basic-concepts.dita"/>
  <topicref href="cheat-sheet-reference.dita"/>
</topicgroup>
```

8.3.2.5 <topichead>

A topic head is a title-only entry in a DITA map.

Rendering expectations

The content of the `<navtitle>` element should appear as a heading when the map is rendered as a table of content. In print contexts, it should also appear as a heading in the rendered content.

Processing expectations

Processors **SHOULD** generate a warning if a navigation title is not specified on a `<topichead>` element.

Specialization hierarchy

The `<topichead>` element is specialized from `<topicref>`. It is defined in the map-group module.

Attributes

The following attributes are available on this element: Universal attribute group (356), Attributes common to many map elements (360) (except for `@locktitle`), and `@copy-to` from Topicref-element attributes group (368). This element also uses the `@scope`, `@format`, and `@type` attributes from Link-relationship attribute group (366).

Example

In the following example, the `<topichead>` elements provide titles ("Computers" and "Books") for two groups of topics.

```
<map>
  <topichead>
    <topicmeta>
      <navtitle>Computers</navtitle>
    </topicmeta>
    <topicref href="eniac.dita"/>
    <topicref href="system360.dita"/>
    <topicref href="pdp8.dita"/>
  </topichead>
  <topichead>
    <topicmeta>
      <navtitle>Computers</navtitle>
    </topicmeta>
    <topicref href="hardback.dita"/>
    <topicref href="paperback.dita"/>
  </topichead>
</map>
```

8.3.2.6 <topicset>

The `<topicset>` element defines a complete unit of content that can be reused in other DITA maps or other `<topicset>` elements. Unlike the base `<topicref>` element, the `<topicset>` is explicitly intended to define a set of topics that are often or always used as a unit; it can be especially useful for task composition in which larger tasks are composed of smaller tasks. The `@id` attribute on a `<topicset>` is required, which ensures that the complete unit is available for reuse in other contexts.

A `<topicset>` is similar to a source file that contains nested topics, in that the combination of topics constitutes a complete self-contained unit. That unit of content can stand independently of the containing, prior, and following content within the original map context.

Specialization hierarchy

+ map/topicref mapgroup-d/topicset

Attributes

The following attributes are available on this element: Universal attribute group (356) (with a narrowed definition of `@id`, given below), Link-relationship attribute group (366) (with a narrowed definition of `@href`, given below), Attributes common to many map elements (360), Topicref-element attributes group (368), `@keys`, and `@keyref`.

@id (REQUIRED)

This ID is the target for references by to the current set of information. The ID is required in order to ensure that a `<topicset>` is defined as a reusable unit of information. See ID attribute (61) for more details.

@href

Points to the resource that is represented by the `<topicref>`. See The href attribute (369) for detailed information on supported values and processing implications. References to DITA content cannot be below the topic level: that is, you cannot reference individual elements inside a topic. References to content other than DITA topics should use the `@format` attribute to identify the kind of resource being referenced.

Example

This `<topicset>` represents a set of overview information about SQL. The information is reusable as a unit.

```
<topicset id="sqlbasics" href="sqlOverview.dita">
  <topicref href="sqlSelection.dita"/>
  <topicref href="sqlJoin.dita"/>
  <topicref href="sqlFilter.dita"/>
  <!-- ... -->
</topicset>
```

8.3.2.7 <topicsetref>

The `<topicsetref>` element references a `<topicset>` element. The referenced `<topicset>` element can be defined in the current map or in another map.

Processing expectations

When possible, applications should treat the referenced `<topicset>` as an independent unit. For example, an application that renders DITA for a dynamic navigation platform might generate a reusable navigation structure for each `<topicset>`, and each `<topicsetref>` is retained as a reference to that structure. This differs slightly from the processing of the `@conref` attribute, which results in a literal copy of the referenced content.

For situations that do not support reusing a topic set as an independent unit, such as a rendered PDF, applications **MAY** resolve the `<topicsetref>` element as for other `<topicset>` (or `<topicref>`) elements that have the `@format` attribute set to "ditamap".

As with other cases where the attribute `format="ditamap"` is specified or used as a default, the use of topic references nested inside of `<topicsetref>` is undefined.

Specialization hierarchy

+ map/topicref mapgroup-d/topicsetref

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Attributes

The following attributes are available on this element: Universal attribute group (356), Link-relationship attribute group (366) (with narrowed definitions of `@href`, `@format`, and `@type`, given below), Attributes common to many map elements (360), Topicref-element attributes group (368), `@keys`, and `@keyref`.

@href
: A pointer to the `<topicset>` represented by `<topicsetref>`. See The href attribute (369) for detailed information on syntax.

@format
: The `@format` attribute identifies the format of the resource being referenced. For the `<topicsetref>` element, this attribute defaults to "ditamap", because the element typically references a branch of a map. See The format attribute (383) for details on other supported values.

@type
: Describes the target of a reference. For the `<topicsetref>` element, this attribute defaults to "topicset". See The type attribute (381) for detailed information on other supported values and processing implications.

Example

The `sql-tutorial.ditamap` file contains a `<topicset>` element that groups together several topics that collectively comprise an overview of SQL.

```
<!-- Excerpt from sql-tutorial.ditamap -->
<topicset id="sqlbasics" href="sqlOverview.dita">
  <topicref href="sqlSelection.dita"/>
  <topicref href="sqlJoin.dita"/>
  <topicref href="sqlFilter.dita"/>
  <!-- ... -->
</topicset>
```

Figure 83: DITA map that contains a <topicset> element

Another map can include that topic set, in addition to content related to programming with JDBC.

```
<topichead navtitle="Mastering JDBC">
  <topicsetref href="sql-tutorial.ditamap#sqlbasics"/>
  <topicref href="jdbcPrepare.dita"/>
  <!-- ... -->
</topichead>
```

Figure 84: DITA map that contains a <topicsetref> element

A reader of the JDBC information will see the content integrated as a single unit.

```
<topichead navtitle="Mastering JDBC">
  <topicset id="sqlbasics" href="sqlOverview.dita">
    <topicref href="sqlSelection.dita"/>
    <topicref href="sqlJoin.dita"/>
    <topicref href="sqlFilter.dita"/>
    <!-- ... -->
  </topicset>
  <topicref href="jdbcPrepare.dita"/>
```

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```
  <!-- ... -->
</topichead>
```

Figure 85: Result of the reuse

8.4 Metadata elements

Metadata elements include information that is located within the `<topicmeta>` element (in maps) or `<prolog>` element (in topics), as well as indexing elements that can be placed in additional locations within topic content.

8.4.1 Prolog (metadata) elements

The prolog elements represent the metadata associated with a document. Most of the metadata in a topic prolog can also be authored in a DITA map, in the map's `<topicmeta>` element.

8.4.1.1 <audience>

The `<audience>` metadata element indicates, through the value of its `@type` attribute, the intended audience for a topic.

Usage information

Since a topic can have multiple audiences, you can include multiple audience elements. For each audience you specify, you can identify the high-level task they are trying to accomplish with the `@job` attribute, and the level of experience expected with the `@experiencelevel` attribute. The `<audience>` element can be used to provide a more detailed definition of values used throughout the map or topic on the `@audience` attribute.

Many of the attributes on the `<audience>` element have enumerated values, which can be restricted by using constraints or extended by using associated attributes. For instance, the `@othertype` attribute can be used to extend the audience type enumeration.

Attributes

The following attributes are available on this element: Universal attribute group (356) and the attributes defined below.

@type

Indicates the kind of person for whom the content of the topic is intended. Note that this differs from the `@type` attribute on many other DITA elements. Beginning with DITA 1.2, values in this attribute are not limited to a small number of choices; the following values were used in DITA 1.0 and DITA 1.1, and are still provided as sample values: user, purchaser, administrator, programmer, executive, services, other, and -dita-use-conref-target.

@othertype

Indicates an alternate audience type, when the type is not available in the `@type` attribute value list. This value is used as the user-provided audience when the `@type` attribute value is set to "other."

@job

Indicates the high-level task the audience for the topic is trying to accomplish. Different audiences might read the same topic in terms of different high-level tasks; for example, an administrator might read the topic while administering, while a programmer might read the same topic while customizing. Beginning with DITA 1.2, values in this attribute are not limited to a small number of choices; the following values were used in DITA 1.0 and DITA 1.1, and are still provided as sample values:

installing, customizing, administering, programming, using, maintaining, troubleshooting, evaluating, planning, migrating, other, and -dita-use-conref-target.

@otherjob

If the `@job` attribute value is "other" the value of this attribute is used to identify a kind of job other than the default ones provided by the `@job` attribute.

@experiencelevel

Indicates the level of experience the audience is assumed to possess. Different audiences might have different experience levels with respect to the same topic; for example, a topic might require general knowledge from a programmer, but expert knowledge from a user. Beginning with DITA 1.2, values in this attribute are not limited to a small number of choices; the following values were used in DITA 1.0 and DITA 1.1, and are still provided as sample values: novice, general, expert, and -dita-use-conref-target.

@name

Used to associate the `<audience>` element with values used in the `@audience` attribute.

Example

For a command reference topic for experienced programmers, the following might be an appropriate indication of that audience:

```
<audience type="programmer" job="programming" experiencelevel="expert"/>
```

8.4.1.2 <author>

The `<author>` metadata element contains the name of the person who authored the topic.

Usage information

The author is usually the person, organization, or application that created the content. This element is equivalent to the `<Creator>` element in Dublin Core.

Attributes

The following attributes are available on this element: Universal attribute group (356), Link-relationship attribute group (366) (with a narrowed definition for `@type`, given below), and `@keyref`.

@type

Describes the target of a reference. See The type attribute (381) for detailed information on supported values and processing implications. Note that this differs from the `@type` attribute on many other DITA elements. Beginning with DITA 1.2, values in this attribute are not limited to a small number of choices; the following values were used in DITA 1.0 and DITA 1.1, and are also recognized for the `<author>` element (and its specializations):

creator

The primary or original author of the content.

contributor

An additional author who is not primary.

-dita-use-conref-target

See Using the -dita-use-conref-target value (372) for more information.

Example

```
<prolog>
  <author type="creator">Jane</author>
  <author type="contributor">John</author>
</prolog>
```

8.4.1.3 <brand>

The `<brand>` element indicates the manufacturer or brand associated with the product described by the parent `<prodinfo>` element.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

```
<prodinfo>
 <prodname>Some Product</prodname>
 <vrmlist><vrm version="1"/></vrmlist>
 <brand>eServer</brand>
 <series>iSeries</series>
</prodinfo>
```

8.4.1.4 <category>

The `<category>` element represents any category by which a topic might be classified for retrieval or navigation. For example, the categories could be used to group topics in a generated navigation bar. Topics can belong to multiple categories.

Usage information

Such classifications are likely to come from an enumerated or hierarchical set.

This element is equivalent to both the `<Coverage>` element and the `<Subject>` element in Dublin Core.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

```
 <prolog>
  <metadata>
   <category>Things that are blue</category>
  </metadata>
 </prolog>
```

8.4.1.5 <component>

The `<component>` element describes the component of the product that this topic is concerned with. For example, a product might be made up of many components, each of which is installable separately. Components might also be shared by several products so that the same component is available for installation with many products.

Processing expectations

An implementation might use this identification to check cross-component dependencies when some components are installed, but not others. An implementation might use the identification to make sure that topics are hidden, removed, or flagged in some way when the component they describe isn't installed.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

```
<prodinfo>
 <prodname>BatCom</prodname>
 <vrmlist>
  <vrm version="v5r2"/>
 </vrmlist>
 <component>TCP/IP</component>
</prodinfo>
```

8.4.1.6 <copyrholder>

The `<copyrholder>` element names the copyright holder that holds legal rights to the material contained in the topic.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

```
<copyright>
  <copyryear year="2001"></copyryear>
  <copyrholder>IBM</copyrholder>
</copyright>
```

8.4.1.7 <copyright>

The `<copyright>` element specifies legal ownership of the content.

Usage information

The `<copyright>` element is used for a single copyright entry. It includes the copyright years and the copyright holder. Multiple `<copyright>` statements are allowed.

This element is equivalent to the `<Rights>` element in Dublin Core.

Attributes

The following attributes are available on this element: Universal attribute group (356) and the attribute defined below.

@type
: Indicates the legal status of the copyright holder. Note that this differs from the `@type` attribute on many other DITA elements. Beginning with DITA 1.2, values in this attribute are not limited to a small number of choices; the following values were used in DITA 1.0 and DITA 1.1, and are still provided as sample values:

primary
: The copyright holder with first claim on the copyright

secondary
: An additional copyright holder who is not primary

-dita-use-conref-target
: See Using the -dita-use-conref-target value (372) for more information.

Example

```
<prolog>
 <copyright>
  <copyryear year="2001-04-12"></copyryear>
  <copyrholder>IBM</copyrholder>
 </copyright>
 <copyright type="secondary">
  <copyryear year="2002-03-03"></copyryear>
  <copyrholder>Schweetones Publishing, Inc.</copyrholder>
 </copyright>
</prolog>
```

8.4.1.8 <copyryear>

The `<copyryear>` element contains the copyright year as specified by the `@year` attribute.

Attributes

The following attributes are available on this element: Universal attribute group (356) and the attribute defined below.

@year
: The year in YYYY format.

Example

```
<copyright>
  <copyryear year="2001"></copyryear>
  <copyrholder>IBM</copyrholder>
</copyright>
```

8.4.1.9 <created>

The `<created>` element specifies the document creation date using the `@date` attribute.

Attributes

The following attributes are available on this element: Universal attribute group (356), Date attributes group (365), and the attribute defined below.

@date (REQUIRED)

The document creation date. Enter the date as YYYY-MM-DD where YYYY is the year, MM is the month from 01 to 12, and DD is the day from 01-31. See A Summary of the International Standard Date and Time Notation for background.

Example

```
<prolog>
 <critdates>
  <created date="2001-06-12"></created>
  <revised golive="2001-08-20" modified="2001-07-01"></revised>
 </critdates>
</prolog>
```

8.4.1.10 <critdates>

The `<critdates>` element contains the critical dates in a document life cycle, such as the creation date and multiple revision dates.

Usage information

This element is equivalent to the `<Date>` element in Dublin Core.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

```
<prolog>
  <critdates>
    <created date="2001-06-12"></created>
    <revised modified="2001-08-20"></revised>
  </critdates>
</prolog>
```

8.4.1.11 <featnum>

The `<featnum>` element contains the feature number of a product in the metadata.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

```
<prodinfo>
 <prodname>BatCom</prodname>
 <vrmlist>
  <vrm version="v5r2"/>
 </vrmlist>
 <featnum>135</featnum>
 <component>TCP/IP</component>
</prodinfo>
```

8.4.1.12 <keywords>

The `<keywords>` element contains a list of terms from a controlled or uncontrolled subject vocabulary that applies to the topic or map. The keywords can be used by a search engine. The keywords are marked up using the `<indexterm>` and/or `<keyword>` elements.

Usage information

While the `<keyword>` element can be used inline, the `<keywords>` element is not an inline element. The `<keywords>` element only appears in the `<topicmeta>` or `<prolog>`, and is used to specify keywords that apply to the topic.

Processing expectations

All `<keyword>` and/or `<indexterm>` elements in the `<keywords>` element are considered part of the topic's metadata and should be reflected in the output as appropriate for the output medium.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

The following example is metadata from an installation task:

```
<prolog>
 <metadata>
  <keywords>
   <keyword>installing</keyword>
   <keyword>uninstalling</keyword>
   <keyword>prerequisites</keyword>
   <keyword>helps</keyword>
   <keyword>wizards</keyword>
  </keywords>
 </metadata>
</prolog>
```

8.4.1.13 <metadata>

The `<metadata>` section of the `<prolog>` contains information about a topic such as audience and product information. Metadata can be used by computational processes to select particular topics or to prepare search indexes or to customize navigation.

Usage information

Elements inside of `<metadata>` provide information about the content and subject of a topic; `<prolog>` elements outside of `<metadata>` provide lifecycle information for the content unit (such as the author or copyright), which are unrelated to the subject.

Beginning with DITA 1.2, the `<metadata>` element is available inside `<topicmeta>` in maps, although the contents of `<metadata>` are still available directly inside `<topicmeta>`. As with the `<prolog>`, the `<metadata>` element within `<topicmeta>` allows you to group elements that describe the content or subject of the target. The primary purpose for enabling the `<metadata>` element within maps is to allow easier reuse between topics and maps.

Attributes

The following attributes are available on this element: Universal attribute group (356) and mapkeyref (0).

Example

Metadata within a topic:

```
<prolog>
  <metadata>
    <audience type="user" job="using" experiencelevel="novice"/>
  </metadata>
</prolog>
```

Metadata within a map:

```
<topicref href="metadata.dita">
  <topicmeta>
    <metadata>
      <keywords>
        <indexterm>metadata element</indexterm>
      </keywords>
    </metadata>
  </topicmeta>
</topicref>
```

8.4.1.14 <othermeta>

The `<othermeta>` element can be used to identify properties not otherwise included in `<metadata>` and to assign name/content values to those properties.

Usage information

The `@name` attribute identifies the property and the `@content` attribute specifies the property's value.

Processing expectations

All `<othermeta>` elements are considered part of the topic's metadata and should be reflected in the output as appropriate for the output medium.

Attributes

The following attributes are available on this element: Universal attribute group (356) and the attributes defined below.

@name (REQUIRED)
: The name of the metadata property.

@content (REQUIRED)
: The value for the property named in the `@name` attribute.

@translate-content
: Indicates whether the `@content` attribute of the defined metadata property should be translated or not. Allowable values are yes, no, and -dita-use-conref-target.

Example

```
<othermeta name="ThreadWidthSystem" content="metric"/>
```

8.4.1.15 <permissions>

The `<permissions>` element in a topic's metadata specifies the level of entitlement needed to access the content.

Usage information

The `<permissions>` element indicates any preferred controls for access to content.

Attributes

The following attributes are available on this element: Universal attribute group (356) and the attribute defined below.

@view
: Defines the classifications of viewers allowed to view the document. Beginning with DITA 1.2, values in this attribute are not limited to a small number of choices; the following values were used in DITA 1.0 and DITA 1.1, and are still provided as sample values:

internal
: For internal use only.

classified
: For a certain group, only.

all
: The world.

entitled
: Special folks, only.

-dita-use-conref-target

See Using the -dita-use-conref-target value (372) for more information.

Example

```
<prolog>
  <permissions view="entitled"/>
</prolog>
```

8.4.1.16 <platform>

The `<platform>` metadata element contains a description of the operating system and/or hardware related to the product being described by the `<prodinfo>` element. The `<platform>` element can be used to provide a more detailed definition of values used throughout the map or topic on the `@platform` attribute.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

See prodinfo (269).

8.4.1.17 <prodinfo>

The `<prodinfo>` metadata element contains information about the product or products that are the subject matter of the current topic. The `<prodinfo>` element also can be used to provide a more detailed definition of values used throughout the map or topic on the `@product` attribute.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

```
<prolog>
 <metadata>
  <prodinfo>
   <prodname>Transcription Assistant</prodname>
   <vrmlist><vrm version="1" release="3" modification="1"/></vrmlist>
   <platform>Linux</platform>
   <prognum>SN-12345T</prognum>
  </prodinfo>
 </metadata>
</prolog>
```

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8.4.1.18 <prodname>

The `<prodname>` metadata element contains the name of the product that is supported by the information in this topic.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

See prodinfo (269).

8.4.1.19 <prognum>

A program number is an order number or a product tracking code

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

See prodinfo (269).

8.4.1.20 <prolog>

The prolog contains metadata about the topic, for example, author information or subject category.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

The following code sample shows a `<prolog>` element that contains common metadata items:

```
<prolog>
  <author>Paul Norman</author>
  <copyright>
    <copyryear year="1930"/>
    <copyrholder>Paul Norman</copyrholder>
  </copyright>
</prolog>
```

8.4.1.21 <publisher>

A publisher is the person, company, or organization who publishes the content.

Usage information

This element is equivalent to the `<Publisher>` element in Dublin Core.

Attributes

The following attributes are available on this element: Universal attribute group (356), Link-relationship attribute group (366), and `@keyref`.

Example

```
<prolog>
  <author>Ivan</author>
  <publisher>AJ Printing Inc.</publisher>
</prolog>
```

8.4.1.22 <resourceid>

A resource ID provides an identifier for applications that must use their own identifier scheme, such as context-sensitive help systems and databases.

Usage information

The `@appid` and `@appname` attributes are available to associate an ID with an application. Multiple `@appid` values can be associated with a single `@appname` value, and multiple `@appname` values can be associated with a single `@appid` value. Because the values for the `@appid` and `@appname` attributes work in combination to specify a specific ID for a specific application, each combination of values for the `@appid` and `@appname` attributes should be unique within the context of a single root map.

Attributes

The following attributes are available on this element: Universal attribute group (356) (with a narrowed definition of `@id`, given below) and the attributes defined below.

@appname
: A name for the external application that references the topic.

@appid
: An ID used by an application to identify the topic.

@ux-context-string
: Contains the value of a user-assistance context-string that is used to identify the topic.

@ux-source-priority
: Specifies precedence for handling `<resourceid>` definitions that exist in both a map and a topic. This attribute only is valid when used within a `<topicref>` element in a map. The allowable values are -dita-use-conref-target and the following:

topic-and-map
: Use IDs from both the topic and map.

topic-only
: Use IDs from the topic only.

map-only
: Use IDs from the map only.

map-takes-priority

Use the IDs from the map (if they exist); otherwise, use IDs from the topic.

topic-takes-priority

Use the IDs from the topic (if they exist); otherwise, use IDs from the map.

@ux-windowref

References the `@name` attribute on the `<ux-window>` element that is used to display the topic when called from a help API.

Example

In the following example, user-assistance context hooks are applied to three topics that are referenced from a DITA map. The second topic has two hooks for the same topic.

```
<map title="Widget Help">
 <topicref href="file_ops.dita" type="concept">
   <topicref href="saving.dita" type="task">
     <topicmeta>
     <resourceid appname="ua" appid="1234" ux-context-string="idh_filesave"
     ux-source-priority="topic-only" />
     </topicmeta>
   </topicref>
   <topicref href="deleting.dita" type="task">
     <topicmeta>
      <resourceid appname="ua"
           appid="2345" ux-context-string="idh_filedelete" />
      <resourceid appname="ua"
           appid="6789" ux-context-string="idh_filekill" />
     </topicmeta>
   </topicref>
   <topicref href="editing.dita" type="task">
     <topicmeta>
       <resourceid appname="ua"
            appid="5432" ux-context-string="idh_fileedit" ux-windowref="csh"  />
     </topicmeta>
   </topicref>
</topicref>
</map>
```

In the following example, a user-assistance context hook is defined in the prolog of a task topic. The context hook is made up of a context ID (value for `@appid` attribute) and a context string (value for `@ux-context-string` attribute). A user-assistance window profile also is referenced for this topic.

```
<task id="fedt">
 <title>Editing a File</title>
 <prolog>
   <resourceid appname="ua"
         appid="5432" ux-context-string="idh_fileedit" ux-windowref="csh" />
 </prolog>
 <taskbody>
  <context>After you have created a new file, you can edit it.</context>
  <steps>
   <step><cmd>Open...</cmd></step>
   <step><cmd>Edit...</cmd></step>
   <step><cmd>Save...</cmd></step>
  </steps>
 </taskbody>
</task>
```

Related concepts

3.3.4.7 Context hooks and window metadata for user assistance (59)

Context hook information specified in the `<resourceid>` element in the DITA map or in a DITA topic enables processors to generate the header, map, alias and other types of support files that are required to integrate the user assistance with the application. Some user assistance topics might need to be displayed in a specific window or viewport, and this windowing metadata can be defined in the DITA map within the `<ux-window>` element.

8.4.1.23 <revised>

Revision information is used to maintain tracking dates that are important in a development cycle, such as the date of the last modification, the original availability date, and the expiration date.

Attributes

The following attributes are available on this element: Universal attribute group (356), Date attributes group (365), and the attribute defined below.

@modified (REQUIRED)

The last modification date, entered as YYYY-MM-DD, where YYYY is the year, MM is the month from 01 to 12, and DD is the day from 01-31.

Example

In the following example, an author specifies revision information within a topic.

```
<prolog>
  <critdates>
    <created date="1999-01-01" golive="1999-02-15" expiry="9999-09-09"/>
    <revised modified="2003-03-03" golive="2002-02-03" expiry="9999-09-09"/>
 </critdates>
</prolog>
```

The same information could be specified in a map.

```
<topicmeta>
  <critdates>
    <created date="1999-01-01" golive="1999-02-15" expiry="9999-09-09"/>
    <revised modified="2003-03-03" golive="2002-02-03" expiry="9999-09-09"/>
 </critdates>
</topicmeta>
```

8.4.1.24 <series>

The `<series>` metadata element contains information about the product series that the topic supports.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

```
<prodinfo>
 <prodname>BatCom</prodname>
 <vrmlist><vrm version="5"/></vrmlist>
 <series>tSeries</series>
 <prognum>5412-SS1</prognum>
 <featnum>135</featnum>
 <component>TCP/IP</component>
</prodinfo>
```

8.4.1.25 <source>

Source information identifies a resource from which the present topic is derived, either completely or in part.

Usage information

The `<source>` element contains a description of the resource. Alternatively, the `@href` or `@keyref` attributes can be used to reference a description of the resource.

This element is equivalent to the `<Source>` element in Dublin Core.

Processing expectations

It is implementation-dependent what it means when the element has both content and an attribute-based reference to another resource.

Attributes

The following attributes are available on this element: Universal attribute group (356), Link-relationship attribute group (366) (with a narrowed definition for `@href`, given below), and `@keyref`.

@href

Provides a reference to a resource from which the present resource is derived. See The href attribute (369) for detailed information on supported values and processing implications.

Example

```
<prolog>
 <source>Somewhere, someplace</source>
</prolog>
```

8.4.1.26 <vrmlist>

The `<vrmlist>` element contains a set of `<vrm>` elements for logging the version, release, and modification information for multiple products or versions of products to which the topic applies.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

The recent versions of a hypothetical product might be logged by using the `<vrmlist>` markup:

```
<prolog>
 <metadata>
  <prodinfo>
   <prodname>Widge-o-matic</prodname>
   <vrmlist>
     <vrm version="1" release="2" modification="0"/>
```

```
      <vrm version="1" release="2" modification="1"/>
    </vrmlist>
   </prodinfo>
  </metadata>
</prolog>
```

This indicates that the topic covers Version 1, release 2, modification levels 0 and 1 (often expressed as version 1.2.0 and 1.2.1).

8.4.1.27 <vrm>

The `<vrm>` element contains information about a single product's version, modification, and release, to which the current topic applies.

Attributes

The following attributes are available on this element: Universal attribute group (356) and the attributes defined below.

@version (REQUIRED)
: Indicates the released version number of the product(s) that the document describes.

@release
: Contains the product release identifier.

@modification
: Indicates the modification level of the current version and release.

Example

The recent versions of a hypothetical product might be logged by using the `<vrmlist>` markup:

```
<prolog>
 <metadata>
  <prodinfo>
   <prodname>Widge-o-matic</prodname>
   <vrmlist>
     <vrm version="1" release="2" modification="0"/>
     <vrm version="1" release="2" modification="1"/>
   </vrmlist>
  </prodinfo>
 </metadata>
</prolog>
```

This indicates that the topic covers Version 1, release 2, modification levels 0 and 1 (often expressed as version 1.2.0 and 1.2.1).

8.4.2 Specialization elements

Several DITA elements exist either for architectural reasons or for support of specialized markup yet to be designed. Although there is little need to use these elements unless you are directed to, some of them, such as `<state>`, can be used if your content makes use of these semantic distinctions. For example, a discussion of signals on a gate of an integrated logic circuit might use the `<state>` element to represent either on or off conditions of that gate.

8.4.2.1 <data>

Data is a generic component that represents metadata within a topic or map. Complex metadata is represented by nested data structures.

Usage information

XDITA

`<data>`

HDITA

`<meta>` inside `<head>`

MDITA (extended profile)

There is no specific syntax for data in MDITA core profile. In MDITA extended profile, data is represented by any variables declared in a YAML front matter header. The front matter must be the first block in the file and must be set between triple- dashed lines.

The primary purpose of the data element is as a specialization base. Because it can nest, it can be used to create complex metadata structures. Since it is available in both block and inline contexts, the data element can specify properties for most element types.

A metadata property specified using a data element usually applies to the structure that contains the data element.

When located in `<prolog>` and `<metadata>` elements, the property applies to the topic as a whole. When located in the `<topicmeta>` element, the property applies to the referenced topic. The `<data-about>` element can be used to identify the subject of the property with an explicit reference.

CAUTION: By default, processors do not render the content of the data element. Use the data element only for properties; do not use it to embed text as part of the content flow.

CAUTION: By default, processors do not render the content of the data element. Use the data element only for properties; do not use it to embed text as part of the content flow.

Rendering expectations

By default, processors **SHOULD** treat a data element as unknown metadata; the contents of the data element **SHOULD NOT** be rendered.

Processors that recognize a particular data element **MAY** make use of it to trigger specialized rendering.

Attributes

The following attributes are available on this element: Data-element attributes group (365), Link-relationship attribute group (366), Universal attribute group (356), and `@keyref`.

Examples

The following code sample shows how the `<data>` element can be used to provide metdata. Rendering tools that recognize this metadata can automatically apply highlighting to the code.

```
<codeblock>
  <data name="codestyle" value="javascript"/>
  <!-- JavaScript code block -->
</codeblock>
```

Figure 86: Using the @name attribute on unspecialized <data> elements

The following code sample shows how nested `<data>` elements can provide complex inventory metadata for a part that is described in the topic.

```
<topic id="sample">
  <title>How to purchase items from the warehouse</title>
  <prolog>
    <data name="inventory">
      <data name="aisle" value="4"/>
      <data name="bin" value="13"/>
      <data name="restock" value="weekly"/>
    </data>
  </prolog>
  <body>
    <!-- ... -->
  </body>
</topic>
```

Figure 87: Nesting <data> elements for complex metadata

The following code sample contains specializations of the `<data>` element: `<change-item>`, `<change-completed>`, and `<change-summary>`. These specialized elements each provide a default for `@name` inside the grammar files, so that processors can work with the data without authors having to specify the attribute.

```
<topic id="data">
  <title><xmlelement>data</xmlelement></title>
  <prolog>
    <change-historylist>
      <change-item>
        <change-completed>2017-08-20</change-completed>
        <change-summary>Refactored topic to use new template</change-summary>
      </change-item>
      <change-item>
        <change-completed>2018-06-06</change-completed>
        <change-summary>Created new examples</change-summary>
      </change-item>
    </change-historylist>
  </prolog>
  <body>
    <!-- ... -->
  </body>
</topic>
```

Figure 88: Specializing <data> for structured metadata

8.4.2.2 <data-about>

The `<data-about>` element identifies the subject of a property when the subject isn't associated with the context in which the property is specified. The property itself is expressed by the `<data>` element.

Usage information

The `<data-about>` element handles exception cases where a property must be expressed somewhere other than inside the actual subject of the property. The `<data-about>` element is particularly useful as a basis for specialization in combination with the `<data>` element.

Important: Do not use the `<data-about>` element to identify the object of a property. The `@href` attribute of the `<data>` element serves that purpose.

Important: Do not use the `<data-about>` element to identify the object of a property. The `@href` attribute of the `<data>` element serves that purpose.

Attributes

The following attributes are available on this element: Universal attribute group (356) and Link-relationship attribute group (366).

Example

The full properties of a cited book can be maintained conveniently in the `<prolog>`:

```
<topic id="questions">
    <title>Questions and answers</title>
    <prolog>
        <data-about href="urn:isbn:0156983508" scope="external">
            <data name="title">The World Doesn't End</data>
            <data name="author">
                <data name="firstname">Charles</data>
                <data name="lastname">Simic</data>
            </data>
            <data name="published" datatype="year">1989</data>
            <!-- ... -->
        </data-about>
        <!-- ... -->
    </prolog>
    <body>
        <!-- ... -->
       <lq href="urn:isbn:0156983508">In a forest of question marks ...
       </lq>
       <!-- ... -->
    </body>
</topic>
```

8.4.2.3 <foreign>

The `<foreign>` element allows the introduction of non-DITA content, for example, MathML, SVG, or Rich Text Format (RTF).

Usage information

The `<foreign>` element or a specialization can contain more than one type of non-DITA content or a mix of DITA and non-DITA content. Specialization of the `<foreign>` element generally is implemented as a domain, but architects looking for more control over the content can implement foreign vocabularies as structural specializations.

If alternate content is desired, specialize the `<desc>` element to contain it. This specialization of `<desc>` should be used within the element specialized from `<foreign>`. Such alternate content must of course be valid wherever the `<foreign>` specialization is valid.

Processing expectations

Processors should attempt to display `<foreign>` content unless otherwise instructed. If the processor cannot render the content, it **MAY** issue a warning.

The enabler of the foreign vocabulary must provide the processing and override the base processing for `<foreign>`.

- If `<foreign>` contains more than one alternative content element, they should all be processed. In the case of `<desc>` they should be concatenated in a similar way to `<section>`, but with no title (analogous to `<div>` in HTML).
- If no `<desc>`, `<object>`, or `<image>` element is found within an instance of the `<foreign>` element, the base processing can emit a warning about the absence of processable content.
- The base processing for `<object>` might emit the content of `<foreign>` as a file at the location specified by the `@data` attribute of the `<object>` element. The `<object>` element should have a data attribute or a `<foreign>` sub-element but not both. In the event that an `<object>` element contains both a data attribute and an `<foreign>` sub-element the processing system should ignore one of them.

SVG Example within a <p> element

```
<p>... as in the formula
  <svg>
    <svg:svg width="100%" height="100%" version="1.1"
xmlns="http://www.w3.org/2000/svg">

<ellipse cx="300" cy="150" rx="200" ry="80"
style="fill:rgb(200,100,50);
stroke:rgb(0,0,100);stroke-width:2"/>

    </svg:svg>
  </svg>.
</p>
```

MathML Example within an <object> element

```
<p>... as in the formula
<object>
  <desc>4 + x</desc>
  <mathml>
    <m:math display="block">
      <m:mrow>
        <m:mo>sum</m:mo>
        <m:mn>4</m:mn>
        <m:mo>+</m:mo>
        <m:mi>x</m:mi>
      </m:mrow>
    </m:math>
  </mathml>
 </object>.
</p>
```

Attributes

The following attributes are available on this element: Universal attribute group (356).

8.4.2.4 <index-base>

The `<index-base>` element allows indexing extensions to be added by specializing this element.

Usage information

The `<index-base>` element can only exist as a child of an `<indexterm>` element. This characteristic makes it the appropriate element to specialize to add indexing extensions. For example, the `<index-`

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see>, <index-see-also>, and <index-sort-as> elements only make sense as children of <indexterm> and so are specializations of <index-base>. Those elements are all part of the indexing domain.

Processing expectations

On its own, <index-base> has no meaning. Processors should ignore this element and its content if encountered in its unspecialized form.

Attributes

The following attributes are available on this element: Universal attribute group (356) and @keyref.

Example

This element is not intended to be used in source files.

The <index-see-also> element is specialized from <index-base>; see index-see-also (303) for an example of how <index-base> can be used with specialization.

8.4.2.5 <itemgroup>

The <itemgroup> element can be used to sub-divide or organize elements that occur inside a list item, definition, or parameter definition.

Usage information

The <itemgroup> element is particularly useful as a basis for specialization, where it can be used to group content within specialized list items or definitions. For example, in the OASIS task specialization, many elements within the <step> element are specialized from <itemgroup>.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

```
<li>Second point of a list.
 <itemgroup>related discourse</itemgroup>
</li>
```

8.4.2.6 <no-topic-nesting>

The <no-topic-nesting> element is a placeholder in the DITA architecture.

Usage information

It is not actually used by the default DITA document types; it is for use only when creating a validly customized document type where the information designer wants to eliminate the ability to nest topics. It is not intended for use by authors.

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Processing expectations

The `<no-topic-nesting>` element has no associated output processing.

Attributes

The following attribute is available on this element: class (Not for use by authors) (0).

Example

This element is not intended to be used in source files.

8.4.2.7 <state>

The `<state>` element specifies a name/value pair whenever it is necessary to represent a named state that has a variable value.

Usage information

The element is primarily intended for use in specializations to represent specific states (like logic circuit states, chemical reaction states, airplane instrumentation states, and so forth).

Attributes

The following attributes are available on this element: Universal attribute group (356) and the attributes defined below.

@name (REQUIRED)
: The name of the property whose state is being described.

@value (REQUIRED)
: The state of the property identified by the `@name` attribute.

Example

```
<step><cmd>Verify the presence of  an "on" or high condition at the input gate
(ie,  <state name="inflag" value="high"/>)</cmd></step>
```

8.4.2.8 <unknown>

The `<unknown>` element is an open extension that allows information architects to incorporate xml fragments that do not necessarily fit into an existing DITA use case.

Processing expectations

Processors should ignore this element unless otherwise instructed.

Attributes

The following attributes are available on this element: Universal attribute group (356).

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Example

This example features a specialized `<unknown>` element that includes other non-DITA content. If this specialization is imported to a DTD or schema, the DTD or schema will need to handle declaring the new elements or any namespaces.

```
<body>
  <my-unknown class="+ topic/unknown mything/my-unknown ">
    <thing value="4"/>
    <otherthing value="16"/>
  </my-unknown>
</body>
```

8.5 Domain elements

General purpose domains are not specific to any type of information, such as the hazard statement domain that provides elements for describing hazardous situations.

8.5.1 DITAVAL-reference domain element

The DITAVAL reference domain is used to reference a DITAVAL file that contains conditions that apply only to a subset of a DITA map. It also can be used to replicate a subset of a DITA map for multiple audiences.

8.5.1.1 <ditavalref>

The `<ditavalref>` element references a DITAVAL document that specifies filter conditions that can be used to process a map or map branch. Other DITAVAL-reference domain elements can be used to imply multiple copies of the map branch that contains them and so apply a different set of conditions to each copy.

When a `<ditavalref>` element is included in a map, the conditions in the referenced DITAVAL document are used to filter the elements in the branch. The branch includes the parent element that contains the `<ditavalref>` element, any child elements, and all resources that are referenced by the parent element or its children. While there is no technical restriction that forces `<ditavalref>` to appear before peer topic references, placing them first is considered a best practice and all examples in the specification will use this convention.

In the simple case, a map can use `<ditavalref>` as follows:

```
<map>
  <topicref href="sampleBranch.dita" audience="admin">
    <topicmeta>
      <navtitle>Navigation title for branch</navtitle>
    </topicmeta>
    <ditavalref href="conditions.ditaval"/>
    <topicref href="insideBranch.dita" platform="win linux mac"/>
  </topicref>
  <!-- Other branches not affected by conditions.ditaval -->
</map>
```

The filtering conditions specified in the `conditions.ditaval` file apply to the following:

- The `<topicref>` element that references `sampleBranch.dita` and all child elements: `<topicmeta>`, `<navtitle>`, and `<topicref>` elements
- The `sampleBranch.dita` topic
- The `insideBranch.dita` topic

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When more than one `<ditavalref>` element is specified in the same branch at the same level, the effective result is one copy of the branch for each `<ditavalref>` element. If the example above contains a reference to `otherConditions.ditaval` as a peer to the existing `<ditavalref>` element, the rendered version of this map would reflect two copies of "Sample branch", each reflecting the conditions that are specified in the corresponding DITAVAL document. One copy is created using the conditions in `conditions.ditaval`, while the other copy uses the conditions from `otherConditions.ditaval`. Map authors can use specific elements from the DITAVAL reference domain to indicate how resources are renamed, or processors can recover from naming collisions by using an alternate naming scheme. See Limitations (283) below for more information.

If DITAVAL conditions are specified at multiple levels within a single branch, "exclude" conditions that are specified at a higher level take precedence. In the following branch, assume alternate rules are specified for the condition `audience="novice"`, with the value set to "exclude" in `highLevel.ditaval` and "include" in `lowLevel.ditaval`. In that case, the "exclude" condition specified in `highLevel.ditaval` takes precedence and so applies to the entire branch. This is true regardless of how the "exclude" condition is specified within `highLevel.ditaval`. That is, there might be a specific rule for `audience="novice"`; alternatively, the `@audience` attribute might be set to "exclude" by default, with no specific condition specified for the value `audience="novice"`.

```
<topicref href="ancestor.dita">
  <ditavalref href="highLevel.ditaval"/>
  <topicref href="descendent.dita">
    <ditavalref href="lowLevel.ditaval"/>
    <!-- Other topicrefs -->
  </topicref>
</topicref>
```

If a `<ditavalref>` element is used that does not specify the `@href` attribute, the element is still processed but no additional filtering is applied. This can be used to create an unfiltered copy of a map branch alongside other filtered copies; other aspects of the `<ditavalref>` (such as any specified key scope or modified resource name) will still be applied to the branch.

Limitations

The following limitations apply when using the `<ditavalref>` element; these limitations cannot be enforced in a DTD or other XML grammar files.

When the use of the `<ditavalref>` element results in multiple copies of a branch, resource names within that branch can be controlled with sub-elements of the effective `<ditavalref>`. For situations where resource names are relevant, it is an error condition for multiple `<ditavalref>` elements to result in conflicting resource names for different content. For example, the following map fragment would result in two distinct copies of the `c.dita` topic with the same file name:

```
<topicref href="c.dita">
  <ditavalref href="one.ditaval"/>
  <ditavalref href="two.ditaval"/>
</topicref>
```

Processors **MAY** recover by using an alternate naming scheme for the conflicting copies.

Specialization hierarchy

The `<ditavalref>` element is specialized from topicref (241). It is defined in the DITAVALref domain module.

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Attributes

The following attributes are available on this element: Universal attribute group (356) (except for `@conkeyref`, which is removed for all elements in this domain) and the attributes defined below.

@href
: Provides a reference to a DITAVAL document. If the `@href` attribute is unspecified, this `<ditavalref>` will not result in any new filtering behavior, but other aspects of the element are still evaluated. See The href attribute (369) for general information on the format and processing implications of the `@href` attribute.

@format
: Format of the target document, which **MUST** be a DITAVAL document. The default value for this element is "ditaval". See The format attribute (383) for more information.

@processing-role
: The processing role defaults to "resource-only" for DITAVAL documents, which are only used for processing and do not contain content. There is no other valid value for this attribute on this element.

Example

See Examples of branch filtering (108) for several examples of the `<ditavalref>` element.

8.5.1.2 <ditavalmeta>

The `<ditavalmeta>` element defines metadata that is associated with a DITAVAL document used for one branch of a map.

Use the `<ditavalmeta>` to specify the prefixes and suffixes that processors use to construct effective resource names and key scope names within the map branch. The `<ditavalmeta>` element also can contain other information, such as navigation title, that might be useful for map architects but is not rendered in the output.

Specialization hierarchy

The `<ditavalmeta>` element is specialized from topicmeta (241). It is defined in the DITAVALref domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356) (except for `@conkeyref`, which is removed for all elements in this domain).

Example

See Examples of branch filtering (108) for several examples of the `<ditavalref>` element.

8.5.1.3 <dvrResourcePrefix>

The `<dvrResourcePrefix>` element specifies the prefix to use when constructing the effective file names of the resources that are referenced from within the map branch that is implied by the ancestor `<ditavalref>` element.

For map branches that are implied by `<ditavalref>` elements, the value of the `<dvrResourcePrefix>` element contributes to the effective file names of resources that are referenced within the branch. The effective resource file name starts with the value of the `<dvrResourcePrefix>` element. If `@copy-to` is specified on a topic reference where `<dvrResourcePrefix>` or `<dvrResourceSuffix>` based renaming is in effect, the prefixes or suffixes are applied to the resource name inside the `@copy-to` attribute.

Some resources are not eligible for renaming, such as those marked with `scope="external"`. Rules for which resources are eligible for renaming, and what names are allowed as valid resource names, are the same as those for the `@copy-to` attribute defined in Topicref-element attributes group (368).

Specialization hierarchy

The `<dvrResourcePrefix>` element is specialized from data (276). It is defined in the DITAVALref domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356) (except for `@conkeyref`, which is removed for all elements in this domain) and the attribute defined below.

@name

The name of the metadata item. For this element the default value is "dvrResourcePrefix".

Example

If the `<dvrResourcePrefix>` is specified in the following way:

```
<topicref href="branch-01.dita">
  <ditavalref href="condition-01.ditaval">
    <ditavalmeta>
      <dvrResourcePrefix>cond01-</dvrResourcePrefix>
    </ditavalmeta>
  </ditavalref>
  <topicref href="topics/subtopic-01.dita"/>
</topicref>
```

Then the effective file name of the resource `subtopic-01.dita` is `cond01-subtopic-01.dita`, as though the `@copy-to` attribute had been specified with that value on the `<topicref>` element that references `subtopic-01.dita`. Similarly, the effective file name of resource `branch-01.dita` is `cond01-branch-01.dita`.

8.5.1.4 <dvrResourceSuffix>

The `<dvrResourceSuffix>` element specifies the suffix to use when constructing the effective file names of resources that are referenced from within the map branch that is implied by the ancestor `<ditavalref>` element.

For map branches that are implied by `<ditavalref>` elements, the value of the `<dvrResourceSuffix>` element contributes to the effective file names of the resources that are referenced within the branch. The base part of the effective resource file name ends with the value of the `<dvrResourceSuffix>` element. The base part of the resource file name consists of the portion of the file name after any directory information, and before any period followed by the file extension. For example, in the original file name `task/install.dita`, the base portion of the file name is "install". If `@copy-to` is specified on a topic reference where `<dvrResourcePrefix>` or `<dvrResourceSuffix>` based renaming is in effect, the prefixes or suffixes are applied to the resource name inside the `@copy-to` attribute.

Some resources are not eligible for renaming, such as those marked with `scope="external"`. Rules for which resources are eligible for renaming, and what names are allowed as valid resource names, are the same as those for the `@copy-to` attribute defined in Topicref-element attributes group (368), with one exception. Where `@copy-to` and `<dvrResourcePrefix>` might include path information, path information is not valid in `<dvrResourceSuffix>`.

Specialization hierarchy

The `<dvrResourceSuffix>` element is specialized from data (276). It is defined in the DITAVALref domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356) (except for `@conkeyref`, which is removed for all elements in this domain) and the attribute defined below.

@name

The name of the metadata item. For this element the default value is "dvrResourceSuffix".

Example

If the `<dvrResourceSuffix>` is specified in the following way:

```
<topicref href="branch-01.dita">
  <ditavalref href="condition-01.ditaval">
    <ditavalmeta>
      <dvrResourceSuffix>-cond01</dvrResourceSuffix>
    </ditavalmeta>
  </ditavalref>
  <topicref href="topics/subtopic-01.dita"/>
</topicref>
```

Then the effective file name of resource `topics/subtopic-01.dita` is `topics/subtopic-01-cond01.dita`, as though the `@copy-to` attribute had been specified with that value on the `<topicref>` to `topics/subtopic-01.dita`. Similarly, the effective file name of resource `branch-01.dita` is `branch-01-cond01.dita`.

8.5.1.5 <dvrKeyscopePrefix>

The `<dvrKeyscopePrefix>` element specifies the prefix to use when constructing the effective key scope names for the map branch that is implied by the ancestor `<ditavalref>` element.

For map branches that are implied by `<ditavalref>` elements, the value of the `<dvrKeyscopePrefix>` element contributes to the effective key scope names of the branch. The effective key scope names start with the value of the `<dvrKeyscopePrefix>` element. Note that if the branch as authored does not specify a `@keyscope` value, specifying `<dvrKeyscopePrefix>` (without also specifying `<dvrKeyscopeSuffix>`) results in the branch establishing a key scope whose name is the value of the `<dvrKeyscopePrefix>` element. The full key scope names also will reflect the value of a `<dvrKeyscopeSuffix>` element if one is specified, regardless of whether the branch as authored specifies a `@keyscope` value.

Specialization hierarchy

The `<dvrKeyscopePrefix>` element is specialized from data (276). It is defined in the DITAVALref domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356) (except for `@conkeyref`, which is removed for all elements in this domain) and the attribute defined below.

@name

The name of the metadata item. For this element the default value is "dvrKeyscopePrefix".

Example

If the `<dvrKeyscopePrefix>` is specified in the following way:

```
<topicref keys="branch-01"
    href="branch-01.dita"
    keyscope="branch-01"
  >
  <ditavalref href="condition-01.ditaval">
    <ditavalmeta>
      <dvrKeyscopePrefix>cond01-</dvrKeyscopePrefix>
    </ditavalmeta>
  </ditavalref>
  <topicref href="topics/subtopic-01.dita"/>
</topicref>
```

Then the effective key scope name for the branch "branch-01" is "cond01-branch-01".

8.5.1.6 <dvrKeyscopeSuffix>

The `<dvrKeyscopeSuffix>` element specifies the suffix to use when constructing the effective key scope names for the map branch that is implied by the ancestor `<ditavalref>` element.

For map branches that are implied by `<ditavalref>` elements, the value of the `<dvrKeyscopeSuffix>` element contributes to the effective key scope names of the branch. The effective key scope names end with the value of the `<dvrKeyscopeSuffix>` element. Note that if the branch as authored does not specify a `@keyscope` value, specifying `<dvrKeyscopeSuffix>` (without also specifying `<dvrKeyscopePrefix>`) results in the branch establishing a key scope whose name is the value of the `<dvrKeyscopeSuffix>` element. The full key scope names also will reflect the value of a `<dvrKeyscopePrefix>` element if one is specified, regardless of whether the branch as authored specifies a `@keyscope` value.

Specialization hierarchy

The `<dvrKeyscopeSuffix>` element is specialized from data (276). It is defined in the DITAVALref domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356) (except for `@conkeyref`, which is removed for all elements in this domain) and the attribute defined below.

@name
The name of the metadata item. For this element the default value is "dvrKeyscopeSuffix".

Example

If the `<dvrKeyscopeSuffix>` is specified in the following way:

```
<topicref keys="branch-01"
    href="branch-01.dita"
    keyscope="branch-01"
  >
  <ditavalref href="condition-01.ditaval">
    <ditavalmeta>
      <dvrKeyscopeSuffix>-cond01</dvrKeyscopeSuffix>
    </ditavalmeta>
  </ditavalref>
  <topicref href="topics/subtopic-01.dita"/>
</topicref>
```

Then the effective key scope name for the branch "branch-01" is "branch-01-cond01".

8.5.2 Hazard-statement domain elements

The hazard statement domain contains the `<hazardstatement>` element, which can be used to provide information about product safety hazards. The domain can be included in any topic type or map. Hazard statements are used to inform readers about potential hazards, consequences, and avoidance strategies.

8.5.2.1 <consequence>

The `<consequence>` element specifies the consequence of failing to avoid a hazard, for example, "Contact may cause burn."

Specialization hierarchy

The `<consequence>` element is specialized from `<li>`. It is defined in the hazard-statement domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

```
<hazardstatement type="warning">
  <messagepanel>
    <typeofhazard>Hot surfaces inside.</typeofhazard>
    <consequence>Contact may cause burn.</consequence>
    <howtoavoid>Wear protective gear before servicing internal parts.</howtoavoid>
  </messagepanel>
  <hazardsymbol href="hotsurface.png"/>
</hazardstatement>
```

8.5.2.2 <hazardstatement>

The `<hazardstatement>` element contains hazard warning information. It is based on the regulations of ANSI Z535 and ISO 3864. It enables the author to select the type of hazard, add information about the specific hazard and how to avoid it, and add one or more safety symbols.

Specialization hierarchy

The `<consequence>` element is specialized from `<li>`. It is defined in the hazard-statement domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356) and spectitle (0), and the attributes defined below.

@type

Describes the level of hazard. Safety hazard level definitions correspond to the same values in the ANSI Z535 and the ISO 3864 standards. Note that this differs from the `@type` attribute on many other DITA elements. See The type attribute (381) for detailed information on supported values and processing implications. Available values are note, tip, fastpath, restriction, important, remember, attention, caution, notice, danger, warning, other, and -dita-use-conref-target.

@othertype

Indicates an alternate note type, when the type is not available in the `@type` attribute value list. This value is used as the user-provided note title when the `@type` attribute value is set to "other."

Example: Danger statement

The following code sample indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

```
<hazardstatement type="danger">
  <messagepanel>
    <typeofhazard>Rotating blade.</typeofhazard>
    <consequence>Moving parts can crush and cut.</consequence>
    <howtoavoid>Follow lockout procedure before servicing.</howtoavoid>
  </messagepanel>
  <hazardsymbol href="rotatingblade.png"/>
</hazardstatement>
```

Example: Warning statement

The following code sample indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

```
<hazardstatement type="warning">
  <messagepanel>
    <typeofhazard>Hot surfaces inside.</typeofhazard>
    <consequence>Contact might cause burn.</consequence>
    <howtoavoid>Wear protective gear before servicing internal parts.</howtoavoid>
  </messagepanel>
  <hazardsymbol href="hotsurface.png"/>
</hazardstatement>
```

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Example: Caution statement

The following code sample indicates a potentially hazardous situation which, if not avoided, might result in minor or moderate injury.

```
<hazardstatement type="caution">
  <messagepanel>
    <typeofhazard>Lifting Hazard.</typeofhazard>
    <consequence>Might result in injury.</consequence>
    <howtoavoid>See safety manual for lifting instructions.</howtoavoid>
  </messagepanel>
  <hazardsymbol href="heavy.png"/>
</hazardstatement>
```

Notice statement

The following code sample indicates a potential situation which, if not avoided, might result in property damage or in an undesirable result or state.

```
<hazardstatement type="notice">
  <messagepanel>
    <typeofhazard>Battery low</typeofhazard>
    <howtoavoid>Push and hold for charge state test.</howtoavoid>
  </messagepanel>
  <hazardsymbol href="general.png"/>
</hazardstatement>
```

8.5.2.3 <hazardsymbol>

The `<hazardsymbol>` element specifies a graphic. The graphic might represent a hazard, a hazardous situation, a result of not avoiding a hazard, or any combination of these messages.

Processing expectations

If the `@height` attribute is specified on the `<hazardsymbol>` element, processors **SHOULD** scale the image to the specified size. If a `@height` attribute is specified and no width value is specified, the width **SHOULD** be scaled by the same factor as the height. If both a height value and width value are specified, implementations **MAY** ignore one of the two values when they are unable to scale to each direction using different factors.

If the `@width` attribute is specified on the `<hazardsymbol>` element, processors **SHOULD** scale the image to the specified size. If a `@width` attribute is specified and no height value is specified, the height **SHOULD** be scaled by the same factor as the width. If both a height value and width value are specified, implementations **MAY** ignore one of the two values when they are unable to scale to each direction using different factors.

Specialization hierarchy

The `<hazardsymbol>` element is specialized from `<image>`. It is defined in the hazard-statement domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356), `@keyref`, and the attributes defined below.

@href
: Provides a reference to the image. See The href attribute (369) for detailed information on supported values and processing implications.

@scope
: Identifies the closeness of the relationship between the current document and the target resource. Allowable values are local, peer, external, and -dita-use-conref-target. See The scope attribute (384) for more information on values.

@height
: Indicates the vertical dimension for the resulting display. The value of this attribute is a real number (expressed in decimal notation) optionally followed by a unit of measure from the set of pc, pt, px, in, cm, mm, em (picas, points, pixels, inches, centimeters, millimeters, and ems respectively). The default unit is px (pixels). Possible values include: "5", "5in", and "10.5cm".

@width
: Indicates the horizontal dimension for the resulting display. The value of this attribute is a real number (expressed in decimal notation) optionally followed by a unit of measure from the set of pc, pt, px, in, cm, mm, em (picas, points, pixels, inches, centimeters, millimeters, and ems respectively). The default unit is px (pixels). Possible values include: "5", "5in", and "10.5cm".

@align
: Controls the horizontal alignment of an image when placement is specified as "break". Common values include left, right, and center.

@scale
: Specifies a percentage as an unsigned integer by which to scale the image in the absence of any specified image height or width; a value of 100 implies that the image should be presented at its intrinsic size. If a value has been specified for the `@height` or `@width` attribute (or both), the `@scale` attribute is ignored.

  It is an error if the value of this attribute is not an unsigned integer. In this case, the implementation might give an error message and might recover by ignoring this attribute.

@scalefit
: Allows an image to be scaled up or down to fit within available space. Allowable values are yes, no, and -dita-use-conref-target. If, for a given image, any one of `@height`, `@width`, or `@scale` is specified, those attributes determine the graphic size, and any setting of `@scalefit` is ignored. If none of those attributes are specified and `scalefit="yes"`, then the image is scaled (the same factor in both dimensions) so that the graphic will just fit within the available height or width (whichever is more constraining).

  The available width would be the prevailing column (or table cell) width - that is, the width a paragraph of text would have if the graphic were a paragraph instead. The available height is implementation dependent, but if feasible, it is suggested to be the page (or table cell) height or some other reasonable value.

@placement
: Indicates whether an image is displayed inline or on a separate line. The default value is inline. Allowable values are: inline, break, or and -dita-use-conref-target.

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Example

```
<hazardstatement type="danger">
  <messagepanel>
    <typeofhazard>Rotating blade.</typeofhazard>
    <consequence>Moving parts can crush and cut.</consequence>
    <howtoavoid>Follow lockout procedure before servicing.</howtoavoid>
  </messagepanel>
  <hazardsymbol href="rotatingblade.png"/>
</hazardstatement>
```

8.5.2.4 <howtoavoid>

The `<howtoavoid>` element contains information about how a user can avoid a hazard, for example, "Do not use solvents to clean the drum surface."

Specialization hierarchy

The `<howtoavoid>` element is specialized from `<li>`. It is defined in the hazard-statement domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

```
<hazardstatement type="notice">
  <messagepanel>
    <typeofhazard>Machinery Damage</typeofhazard>
    <howtoavoid>
         <sl>
           <sli>Do NOT use solvents to clean the drum surface</sli>
           <sli>Read manual for proper drum cleaning procedure</sli>
         </sl>
    </howtoavoid>
  </messagepanel>
  <hazardsymbol href="readmanual.png"/>
  <hazardsymbol href="agressivesolvent.png"/>
</hazardstatement>
```

8.5.2.5 <messagepanel>

The `<messagepanel>` element contains the textual information that is displayed on the hazard statement. This information identifies the hazard, specifies how to avoid the hazard, and states the probable consequences of failing to avoid the hazard.

Specialization hierarchy

The `<messagepanel>` element is specialized from `<ul>`. It is defined in the hazard-statement domain module.

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Attributes

The following attributes are available on this element: Universal attribute group (356), compact (0), and spectitle (0).

Example

```
<hazardstatement type="caution">
  <messagepanel>
    <typeofhazard>Lifting Hazard.</typeofhazard>
    <consequence>May result in injury.</consequence>
    <howtoavoid>See safety manual for lifting instructions.</howtoavoid>
  </messagepanel>
  <hazardsymbol href="heavy.png"/>
</hazardstatement>
```

8.5.2.6 <typeofhazard>

The `<typeofhazard>` element contains a description of the type of hazard, for example, "Hot surfaces inside."

Specialization hierarchy

The `<typeofhazard>` element is specialized from `<li>`. It is defined in the hazard-statement domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

```
<hazardstatement type="caution">
  <messagepanel>
    <typeofhazard>Lifting Hazard.</typeofhazard>
    <consequence>May result in injury.</consequence>
    <howtoavoid>See safety manual for lifting instructions.</howtoavoid>
  </messagepanel>
  <hazardsymbol href="heavy.png"/>
</hazardstatement>
```

8.5.3 Highlighting domain elements

The highlighting elements are used to highlight text with styles (such as bold, italic, and monospace). Never use these elements when a semantically specific element is available. These elements are not intended for use by specializers, and are intended solely for use by authors when no semantically appropriate element is available and a formatting effect is required.

8.5.3.1 <b>

Bold text is used to draw a reader's attention to a phrase without otherwise adding meaning to the content.

Specialization hierarchy

The `<b>` element is specialized from `<ph>`. It is defined in the highlighting-domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

The following code sample shows bold highlighting used to draw a reader's attention to a phrase:

```
<p>Use the bold tag <b>for visual emphasis only</b>; do not use it if another phrase-level
element better signifies the reason for the emphasis.</p>
```

8.5.3.2 <i>

Italic text is used to emphasize the key points in printed text, or when quoting a speaker, a way to show which words the speaker stressed.

Specialization hierarchy

The `<i>` element is specialized from `<ph>`. It is defined in the highlighting-domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

The following code sample shows italic highlighting that is used to emphasize the importance of unplugging the unit before using the screwdriver:

```
<p>Unplug the unit <i>before</i> placing the metal screwdriver
against the terminal screw.</p>
```

8.5.3.3 <line-through>

The `<line-through>` element indicates text that is rendered with a line struck through the content. This element is designed to enable authors to indicate a deletion or revision for rhetorical purpose; it is not intended to be used for indicating revisions.

Usage information

This element is part of the highlighting domain. Use this element only when a more semantically appropriate element is not available.

Rendering expectations

Although rendering is left up to implementations, processors typically apply render the contents of the `<line-through>` element with a line struck through..

Specialization hierarchy

The `<line-through>` element is specialized from `<ph>`. It is defined in the highlighting-domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

```
<p>Line-through: DITA technology can be
      <line-through>maddening</line-through>a challenge to implement.</p>
```

8.5.3.4 <overline>

The `<overline>` element indicates content that is rendered with a line above it.

Usage information

This element is part of the highlighting domain. Use this element only when a more semantically appropriate element is not available.

Specialization hierarchy

The `<overline>` element is specialized from `<ph>`. It is defined in the highlighting-domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

```
<p>Overline: <overline><i>x</i></overline> is the
average value of<i>x<sub>i</sub></i></p>
```

8.5.3.5 <sub>

A subscript is text that is printed below the line. It is frequently used in chemical and mathematical formulas.

Specialization hierarchy

The `<sub>` element is specialized from `<ph>`. It is defined in the highlighting-domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

The following code sample shows how the `<sub>` element is used in a chemical formula:

```
<note>When cleaning, be sure to dilute the baking soda (NaHCO<sub>3</sub>) with water
(H<sub>2</sub>O) before mixing in the vinegar (CH<sub>3</sub>COOH).</note>
```

8.5.3.6 <sup>

A superscript is text that is printed above the line. It is frequently used in chemical and mathematical formulas.

Specialization hierarchy

The `<sup>` element is specialized from `<ph>`. It is defined in the highlighting-domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

The following code sample shows a `<sup>` element used to ensure proper formatting of the exponent in the number ten to the power of ten:

```
<p>The power produced by the electrohydraulic dam was 10<sup>5</sup> more than
the older electric plant.</p>
```

8.5.3.7 <tt>

The `<tt>` (teletype) element is typically used to apply monospaced highlighting to the content of the element.

Usage information

This element is part of the highlighting domain. Use this element only when a more semantically appropriate element is not available. For example, for specific items such as inline code fragments, use the `<codeph>` element.

Specialization hierarchy

The `<tt>` element is specialized from `<ph>`. It is defined in the highlighting-domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

```
<p>Make sure that the screen displays <tt>File successfully created</tt> before
proceeding to the next stage of the task.</p>
```

While the previous example demonstrates a potential use of `<tt>`, it might be more properly encoded using `<systemoutput>`.

8.5.3.8 <u>

An underline, also called an underscore, is a line immediately below a portion of text.

Specialization hierarchy

The `<u>` element is specialized from `<ph>`. It is defined in the highlighting-domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

The following code sample shows underlining used to provide emphasis in a marketing blurb, without giving any extra meaning to the underlined phrase:

```
<p>Using our patented <u>SuperFast BitSpeed Technology</u>, our product
will answer all of your questions only a few nanoseconds after you ask!</p>
```

8.5.4 Indexing-group domain elements

The indexing domain provides elements for use with indexing. The elements allow authors to define "See" and "See also" references, and to override the default sort order for a term.

Indexing domain elements typically work with the `<indexterm>` and `<index-base>` elements; `<index-base>` is grouped with elements that are typically useful only in specialization contexts.

Related reference

8.8.4.2.4 index-base (279)
The `<index-base>` element allows indexing extensions to be added by specializing this element.

8.5.4.1 <indexterm>

The content of an `<indexterm>` element is used to produce an index entry in a generated index. You can nest `<indexterm>` elements to create multi-level indexes. The content is not output as part of the topic content, only as part of an index.

Usage information

An `<indexterm>` element without the `@start` or `@end` attribute specified is interpreted as a point reference that contributes the number of the current page to an index entry; the content of the index entry is the content of the `<indexterm>` element. All `<indexterm>` elements with the same content are "merged" to form a single index entry in the resulting index, and all contributed page numbers are included in that index entry.

In the case of nested `<indexterm>` elements, each `<indexterm>` with no `<indexterm>` children (the "leaves") contributes a page number to the generated index; the ancestral `<indexterm>` elements for each leaf `<indexterm>` provide the higher levels for the multilevel entry.

An `<indexterm>` that occurs in a topic `<prolog>` is interpreted as a point reference to the title of the topic. Likewise, in a DITA map, an `<indexterm>` that occurs in `<topicmeta>` inside of a `<topicref>` is interpreted as a point reference to the title of the referenced topic.

Note: The `<index-see>` and `<index-see-also>` elements are domain specializations of the `<index-base>` element, and are discussed in detail with the indexing domain.

Note: The `<index-see>` and `<index-see-also>` elements are domain specializations of the `<index-base>` element, and are discussed in detail with the indexing domain.

The `@start` and `@end` attribute on `<indexterm>` can be used in cases where one wants to index an extended discussion that might continue over a number of pages. The start of a range is indicated by an `<indexterm>` with a `@start` attribute. The end of a range is indicated with an `<indexterm>` with an `@end` attribute whose value matches that of the `@start` attribute on the start-of-range `<indexterm>`. Such markup contributes to the generated index a page range covering all pages in the index range.

Index range indications can occur in the `<topicmeta>` of a `<topicref>` at the map level, in the prolog of a topic, or in the body of a topic, and are interpreted as follows (see Figure 91: Index ranges (300) for samples):

- In a map, the start range points to the start of the topic title of the topic being referenced by its containing `<topicref>`. The end range points to the end of the final child contained by the topic being referenced by its containing `<topicref>`, or to the end of the final topic referenced by the current map (whichever comes first). When a start and end range occur in the same `<topicmeta>`, the range applies to the containing `<topicref>` and its children.
- In the prolog of a topic, the start range points to the start of the containing topic's title. The range ends with a matching index range end in the same prolog, regardless of whether the end range is specified. The range applies to the containing topic and all its children including child relationships defined in a map.
- In the body of a topic, the range starts where the start `<indexterm>` occurs and ends at the matching index range end indication within the same body, or at the end of the body, whichever comes first. Such an index range does not span sub-topics of the topic.

Processing expectations

It is an error if an `<indexterm>` containing no `<indexterm>` children contains both an `<index-see>` and an `<index-see-also>`. (Note: `<index-see>` and `<index-see-also>` elements within `<indexterm>` elements that do contain `<indexterm>` children are ignored.) In the case of this error condition, an implementation **MAY** give an error message, and might recover by treating all such `<index-see>` elements as `<index-see-also>` elements.

The `@start` and `@end` attributes are defined as CDATA, although it is a best practice that the values should not contain any whitespace characters (such as a space or tab) or control characters. Matching of `@start` and `@end` attributes is done as a character-by-character comparison with all characters significant and no case folding occurring. The `@start` and `@end` attributes are ignored if they occur on an `<indexterm>` element that has child `<indexterm>` elements.

The end-of-range `<indexterm>` should have no content of its own; if it contains content, that content is ignored. There is no reason for the end-of-range `<indexterm>` to have any `<indexterm>` ancestors;

however, an implementation should be able to handle an end-of-range `<indexterm>` that is nested within one or more `<indexterm>` elements.

When index ranges with the same identifier overlap, the widest range applies, and end ranges are matched with start ranges by last-in-first-out. In other words, the ranges are interpreted as nested rather than overlapping with the highest-level container taking precedence over narrower contained ranges.

As defined above, there is no such thing as an index range start that isn't terminated by either a matching end or some maximum scope. There can, however, be unmatched index range end indications; these are ignored.

Attributes

The following attributes are available on this element: Universal attribute group (356), `@keyref`, and the attributes defined below.

@start

Specifies that an index entry is positioned at the beginning of a range. The value matches the `@end` attribute on another `<indexterm>`.

@end

Specifies that an index entry is positioned at the end of a range; value matches the `@start` attribute on another `<indexterm>`.

Example

- The following `<indexterm>` is a point reference to a specific paragraph within a topic:

```
<p><indexterm>databases</indexterm>Databases are used to ...</p>
```

- The following `<indexterm>` is a point reference to the start of the title of the concept:

```
<concept id="db">
  <title>About databases</title>
  <prolog>
    <metadata>
      <keywords><indexterm>databases</indexterm></keywords>
    </metadata>
  </prolog>
  <body><!-- content... --></body>
</concept>
```

- The following `<indexterm>` is a point reference to the start of the title of `aboutdatabases.dita`:

```
<topicref href="aboutdatabases.dita">
  <topicmeta>
    <keywords><indexterm>databases</indexterm></keywords>
  </topicmeta>
  <!-- other topicref elements -->
</topicref>
```

Figure 89: Single point index terms

The following sample represents three levels of index markup:

```
<indexterm>cheese
  <indexterm>sheeps milk
    <indexterm>pecorino</indexterm>
  </indexterm>
  <indexterm>goats milk
```

```
    <indexterm>chevre</indexterm>
  </indexterm>
</indexterm>
```

The previous sample is equivalent to the following sample:

```
<indexterm>cheese
  <indexterm>sheeps milk
    <indexterm>pecorino</indexterm>
  </indexterm>
</indexterm>
<indexterm>cheese
  <indexterm>goats milk
    <indexterm>chevre</indexterm>
  </indexterm>
</indexterm>
```

In each case, a generated index would include something like the this:

- cheese
  - goats milk
    - chevre 14
  - sheeps milk
    - pecorino 14

Figure 90: Nested index terms

A simple index range will look something like this:

```
<indexterm start="cheese">Cheese</indexterm>
<!-- ... additional content -->
<indexterm end="cheese"/>
```

The previous combination of terms will generate a top-level index term for "Cheese" that covers a series of pages, such as:

- Cheese 18-24

Specifying a range for nested terms is similar. In this sample, the range is specified for the tertiary index entry "pecorino":

```
<indexterm>cheese
  <indexterm>sheeps milk
    <indexterm start="level-3-pecorino">pecorino</indexterm>
  </indexterm>
</indexterm>
 <!-- ... additional content ... -->
<indexterm end="level-3-pecorino"/>
```

The generated index for that range would look something like this:

- cheese
  - sheeps milk
    - pecorino 18-24

There are three locations that can declare a range - the body of a topic, the prolog of a topic, and a map.

- In the following example, the range begins at the start of the second paragraph, and continues to the last paragraph. If the matching end range was not included, the range would end at the end of the body element.

```
<topic id="accounting">
  <title>Accounting regulations</title>
  <body>
    <p>Be ethical in your accounting.</p>
    <p><indexterm start="acctrules">Rules</indexterm>Remember to do all of the
following: ...</p>
    <!-- ...pages worth of rules... -->
    <p><indexterm end="acctrules"/>Failure to comply will get you audited.</p>
  </body>
  <!-- Potential sub-topics -->
</topic>
```

- In the following example, the range begins with the start of the topic's title, and covers the entire topic and any sub-topics. The range ends within the same prolog, regardless of whether `<indexterm end="acct"/>` is specified in the prolog.

```
<topic id="accounting">
  <title>Accounting regulations</title>
  <prolog>
    <metadata>
      <keywords><indexterm start="acct">Accounting</indexterm></keywords>
    </metadata>
  </prolog>
  <!-- Body and sub-topics -->
</topic>
```

- Now assume that the topic in the previous sample is named `acct.dita`. Ranges defined in a prolog cover sub-topics, including those nested based on a map; in the following example, this means that the range covers all of `acct.dita`, as well as `procedures.dita` and `forms.dita`:

```
<topicref href="acct.dita">
  <topicref href="procedures.dita"/>
  <topicref href="forms.dita"/>
</topicref>
```

- In the final example, the range is specified in a map. The index range for "Accounting" begins with the start of the first topic title in `acct.dita`, and covers that file as well as any sub-topics. The index range for "Government forms" begins with the start of the first topic title in `acct.dita`, and continues until the end of the last element in the file `taxfiling.dita`. If the end range for "govt" was not specified, the range would continue to the end of the map.

```
<topicref href="acct.dita">
  <topicmeta>
    <keywords>
      <indexterm start="acct">Accounting</indexterm>
      <indexterm end="acct"/>
      <indexterm start="govt">Government forms</indexterm>
    </keywords>
  </topicmeta>
  <!-- Nested topicref elements -->
</topicref>
<topicref href="taxfiling.dita">
  <topicmeta>
    <keywords>
      <indexterm end="govt"/>
    </keywords>
  </topicmeta>
</topicref>
```

Figure 91: Index ranges

```
<p>Einstein's most famous equation
E=mc<sup>2</sup><indexterm>E=mc<sup>2</sup></indexterm>
expresses the relationship between mass and energy.</p>
```

All the elements in the highlighting domain are specializations of `<ph>`.

Figure 92: Index term with <ph> or <ph> specializations

8.5.4.2 <index-see>

An `<index-see>` element within an `<indexterm>` element redirects the reader to another index entry that the reader should reference instead of the current one.

Usage information

The `<index-see>` and `<index-see-also>` elements allow a form of redirection to another index entry within the generated index. The `<index-see>` element refers to an index entry that the reader should use *instead of* the current one, whereas the `<index-see-also>` element refers to an index entry that the reader should use *in addition to* the current one.

There can be multiple `<index-see>` elements for a single index entry.

Processing expectations

Processors should ignore `<index-see>` and `<index-see-also>` elements if their parent `<indexterm>` element contains any `<indexterm>` children.

Because an `<index-see>` indicates a redirection to use instead of the current entry, it is an error if, for any `<index-see>`, there is also an `<index-see-also>` or an `<indexterm>` for the same index entry (that is, another entry with an identical sort key). For example, if an `<indexterm>` element with the content "Memory stick" also includes `<index-see>USB drive</index-see>`, it is an error if there is also an `<indexterm>` with the contents "Memory stick". This is to prevent index entries that are both a redirect and a page reference, such as:

* Memory stick 42, 106
* See USB drive

An implementation **MAY** give an error message when it encounters this condition, and **MAY** recover from this error condition by treating the `<index-see>` as an `<index-see-also>`.

Specialization hierarchy

The `<index-see>` element is specialized from `<index-base>`. It is defined in the indexing domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356) and `@keyref`.

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Example

The following example illustrates the use of an `<index-see>` redirection element within an `<indexterm>`:

```
<indexterm>Carassius auratus
   <index-see>Goldfish</index-see>
</indexterm>
```

This will typically generate an index entry without a page reference:

- Carassius auratus, *see* Goldfish

The following example illustrates the use of an `<index-see>` redirection element to a more complex (multilevel) `<indexterm>`:

```
<indexterm>Feeding goldfish
   <index-see>Goldfish <indexterm>feeding</indexterm></index-see>
</indexterm>
```

This is part of the indexing markup that might generate index entries such as:

- Feeding goldfish
  – *see* Goldfish feeding
- Goldfish
  – feeding, 56
  – flushing, 128, 345

The following example illustrates using a specialization of `<ph>` within `<index-see>`:

```
<indexterm>Einstein's mass and energy equation
  <index-see>E=mc<sup>2</sup></index-see>
</indexterm>
```

8.5.4.3 <index-see-also>

An `<index-see-also>` element within an `<indexterm>` redirects the reader to another index entry that the reader should reference in addition to the current one.

Usage information

The `<index-see>` and `<index-see-also>` elements allow a form of redirection to another index entry within the generated index. The `<index-see>` element refers to an index entry that the reader should use *instead of* the current one, whereas the `<index-see-also>` element refers to an index entry that the reader should use *in addition to* the current one.

In addition to its "see also" redirection, an `<index-see-also>` functions as a pointwise index term, thereby typically generating a page reference as well as the "see also" indication.

It is not an error for there to be multiple `<index-see-also>` elements for a single index entry.

Specialization hierarchy

The `<index-see-also>` element is specialized from `<index-base>`. It is defined in the indexing domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356) and `@keyref`.

Example

The following example illustrates the use of an `<index-see-also>` redirection element within an `<indexterm>`:

```
<indexterm>Carp
   <index-see-also>Goldfish</index-see-also>
</indexterm>
```

This will typically generate a page reference to "Carp" and a redirection:

- Carp, 56
  - *see also* Goldfish

The following example illustrates the use of an `<index-see-also>` redirection element to a more complex (multilevel) `<indexterm>`:

```
<indexterm>Feeding
   <index-see-also>Goldfish <indexterm>feeding</indexterm></index-see-also>
</indexterm>
```

This is part of the indexing markup that might generate index entries such as:

- Feeding, 348
  - *see also* Goldfish feeding
- Goldfish
  - feeding, 56
  - flushing, 128, 345

The following example illustrates using a specialization of `<ph>` within `<index-see-also>`:

```
<indexterm>µ = E<sub>0</sub>/V<sup>2</sup>
  <index-see-also>E=mc<sup>2</sup></index-see-also>
</indexterm>
```

8.5.4.4 <index-sort-as>

The `<index-sort-as>` element specifies a sort phrase under which an index entry would be sorted.

Usage information

This element gives an author the flexibility to sort an index entry in an index differently from how its text normally would be sorted. The common use for this is to disregard insignificant leading text, such as punctuation or words like "the" or "a". For example, the author mighgt want `<data>` to be sorted under the letter D rather than the left angle bracket (<). An author might want to include such an entry under both the punctuation heading and the letter D, in which case there can be two index entry directives differentiated only by the sort order.

Certain languages have special sort order needs. For example, Japanese index entries might be written partially or wholly in kanji, but need to be sorted in phonetic order according to its hiragana/katakana rendition. There is no reliable automated way to map written to phonetic text: for kanji text, there can be multiple phonetic possibilities depending on the context. The only way to correctly sort Japanese index entries is to keep the phonetic counterparts with the written forms. The phonetic text would be presented as the sort order text for indexing purposes.

The `<index-sort-as>` element's content is logically augmented by the textual content of its parent `<indexterm>` element to produce the effective sort phrase (in other words, the textual content acts as a secondary sort field), so two `<indexterm>` elements with different content but the same `<index-sort-as>` value would never merge into a single index entry.

An `<index-sort-as>` element provides sort phrase information for the `<indexterm>` that is its parent; therefore, in a multiple level `<indexterm>`, the `<index-sort-as>` only affects the level in which it occurs.

Processing expectations

When an `<index-sort-as>` element is specified, processors that sort the containing index term **MUST** construct the effective sort phrase by prepending the content of the `<index-sort-as>` element to the textual content of its parent `<indexterm>` element. This ensures that two index entries with the same `<index-sort-as>` element but different base sort phrases will sort in the appropriate order, and will not merge into a single index entry.

It is an error if there is more than one `<index-sort-as>` child for a given `<indexterm>`. An implementation might give an error message, and might recover from this error condition by ignoring all but the last `<index-sort-as>`.

When located within the `<indexterm>` element, the `<sort-as>` element is equivalent to `<index-sort-as>`. It is an error for an `<indexterm>` element to directly contain both `<sort-as>` and `<index-sort-as>` elements.

Specialization hierarchy

The `<index-sort-as>` element is specialized from `<index-base>`. It is defined in the indexing domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356) and `@keyref`.

This is an example of an index entry for `<data>` that will be sorted as "data":

```
<indexterm>&lt;data&gt;<index-sort-as>data</index-sort-as></indexterm>
```

Related concepts

5.5.8 Sorting (126)
Processors can be configured to sort elements. Typical processing includes sorting glossary entries, lists of parameters or reference entries in custom navigation structures, and tables based on the contents of cells in specific columns or rows.

8.5.5 Multimedia domain elements

The multimedia elements are used to reference audio or video content. The elements in this domain are modeled on the HTML5 `<audio>` and `<video>` elements.

The following table illustrates how the multimedia domain elements can be mapped to HTML5 elements and attributes

DITA markup	HTML5 markup
`<video>`	`<video>`
`<audio>`	`<audio>`
`<desc>`	`@title`
`@data` or `@datakeyref`	`@src`
`<media-autoplay>`	`@autoplay`
`<media-controls>`	`@controls`
`<media-loop>`	`@loop`
`<media-muted>`	`@muted`
`<video-poster>`	`@poster`
`<media-source>`	`<source>`
`<media-track>`	`<track>`
`@value` or `@keyref` on `<media-source>` and `<media-track>`	`@src` on `<source>` and `<track>`
`@type` on `<media-track>`	`@kind` on `<track>`
`@xml:lang` on `@media-track`	`@srclang` on `<track>`
`<fallback>`	Other markup directly within `<audo>` or `<video>`

8.5.5.1 <audio>

Audio objects reference sound content.

Usage information

Audio objects are modeled on the HTML5 `<audio>` element.

Audio objects can be referenced by `@data`, `@datakeyref`, and nested media-source elements. Nested media-source elements enable extensive configuration of how the audio object is presented.

Rendering expectations

When an audio object cannot be rendered in a meaningful way, processors **SHOULD** present the contents of the `<fallback>` element, if it is present.

Processing expectations

Behaviours such as auto-playing, looping, and muting are determined by child elements. When not specified, the behavior depends on the user agent.

Specialization hierarchy

The `<audio>` element is specialized from `<object>`. It is defined in the multimedia-domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356) and the attributes defined below.

@data

Specifies the absolute or relative URI of the audio object. If this attribute is specified, `@type` also should be specified.

@datakeyref

Provides a key reference to the audio object. When specified and the key is resolvable, the key-provided URI is used. A key that has no associated resource, only link text, is considered to be unresolved. If `@data` is specified, it is used as a fallback when the key cannot be resolved to a resource.

@type

Indicates the MIME type for the audio object. Setting this attribute enables processors to avoid loading unsuppported objects. Note that this differs from the `@type` attribute on many other DITA elements; it specifies a MIME type rather than a content type. If `@type` is not specified, the effective type value for the key named by the `@datakeyref` attribute is used as the value for this attribute.

@tabindex

Positions the audio object in tabbing order.

Examples

In the following code sample, an audio object is referenced using direct addressing. The `@type` attribute specifies the MIME type of the object.

```
<audio data="message.mp3" type="audio/mp3"/>
```

The audio object also could be addressed using a key reference; in this version, both the URI and the MIME type come from the key definition:

```
<audio datakeyref="message"/>
```

Figure 93: A simple audio object

In the following code sample, `<media-source>` elements are used to specify the different audio formats that are available.

```
<audio>
  <media-source value="message.mp3" type="audio/mp3"/>
  <media-source value="message.wav" type="audio/wav"/>
</audio>
```

Figure 94: An audio object with multiple formats

The following code sample specifies an audio object and defines multiple presentational details; it also provides fallback behavior for when the audio cannot be rendered.

```
<audio>
  <desc>A sound file narrating the execution of this procedure.</desc>
  <fallback>The audio track walking through this procedure is not available.</fallback>

  <!--
    When the following elements are used, they have a default value of "true";
    setting value="true" and not specifying @value have the same effect.
```

```
     To disable any of these settings, specify value="false". -->

   <media-controls value="true"/>
   <media-autoplay/>
   <media-loop value="false"/>
   <media-muted value="false"/>


   <!-- Multiple formats, with URI and MIME type referenced using a key -->
   <media-source keyref="walkthrough-mp3"/>
   <media-source keyref="walkthrough-wav"/>

</audio>
```

Figure 95: Complex example of an audio object

8.5.5.2 <media-autoplay>

Autoplay settings control whether referenced media plays automatically.

Usage information

Autoplay settings are modeled on the `@autoplay` attribute on HTML5 media elements. If autoplay settings are not present, the default behavior is determined by the user agent that is used to present the media.

Specialization hierarchy

The `<media-autoplay>` element is specialized from `<param>`. It is defined in the multimedia-domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356) and the attributes defined below.

@value

Specifies whether the media object automatically plays when the topic is displayed. The following values are recognized:

true

Default. Auto-playing is enabled.

false

Autoplay is disabled.

-dita-use-conref-target

See Using the -dita-use-conref-target value (372) for more information.

@name

The value is fixed to "autoplay".

Example

See audio (306) and video (313).

8.5.5.3 <media-controls>

Media control settings specify whether user-interface components are presented to control the playback of the referenced media

Usage information

Media control settings are modeled on the `@controls` attribute on HTML5 media elements. If media control settings are not present, the default behavior is determined by the user agent that is used to present the media.

Specialization hierarchy

The `<media-controls>` element is specialized from `<param>`. It is defined in the multimedia-domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356) and the attributes defined below.

@value

Specifies whether the presentation of the media object includes user interface controls. The following values are recognized:

true

Default. Controls are presented.

false

Controls are not presented.

-dita-use-conref-target

See Using the -dita-use-conref-target value (372) for more information.

@name

The value is fixed to "controls".

Example

See audio (306) and video (313).

8.5.5.4 <media-loop>

Media loop settings control whether the referenced media restarts automatically when it has completed playing.

Usage information

Media loop settings are modeled on the `@loop` attribute on HTML5 media elements. If media loop settings are not present, the default behavior is determined by the user agent that is used to present the media.

Specialization hierarchy

The `<media-loop>` element is specialized from `<object>`. It is defined in the multimedia-domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356) and the attributes defined below.

@value
Specifies whether the media object loops when played. The following values are recognized:

true
Default. Looped playback is enabled.

false
Looped playback is disabled

-dita-use-conref-target
See Using the -dita-use-conref-target value (372) for more information.

@name
The value is fixed to "loop".

Example

See audio (306) and video (313).

8.5.5.5 <media-muted>

Media mute settings control whether the referenced media plays with or without sound.

Usage information

Media mute settings are modeled on the `@muted` attribute on HTML5 media elements. If media mute settings are not present, the default behavior is determined by the user agent that is used to present the media.

Specialization hierarchy

The `<media-muted>` element is specialized from `<param>`. It is defined in the multimedia-domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356) and the attributes defined below.

@value
Specifies whether the media object is muted. The following values are recognized:

true
Default. Playback is muted.

false

Playback is not muted.

-dita-use-conref-target

See Using the -dita-use-conref-target value (372) for more information.

@name

The value is fixed to "muted".

Example

See audio (306) and video (313).

8.5.5.6 <media-source>

The media source specifies the location of a representation of the referenced media.

Usage information

The media source is modeled on the `<source>` element used in HTML5 media elements.

Specialization hierarchy

The `<media-source>` element is specialized from `<param>`. It is defined in the multimedia-domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356) and the attributes defined below.

@value

Specifies the URL of the media resource.

@keyref

A key reference to the media resource. If both `@keyref` and `@value` are specified, the resource referenced by `@keyref` takes precedence unless the key cannot be resolved, in which case the resource specified by `@value` is used as a fallback.

@type

Specifies the MIME type of the resource specified by `@value`.

@name

The value is fixed to "source".

@valuetype

The value is fixed to "ref".

Example

See audio (306) and video (313).

8.5.5.7 <media-track>

Media track settings specify the location of supplemental text-based data for the referenced media, for example, subtitles or descriptions.

Usage information

The media track settings are modeled on the `<track>` element used in HTML5 media elements. They refer to track resources that use Web Video Text Track Format (WebVTT).

Specialization hierarchy

The `<media-track>` element is specialized from `<param>`. It is defined in the multimedia-domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356) and the attributes defined below.

@value
: Specifies the URI of the track resource.

@keyref
: A key reference to the track resource. If both `@keyref` and `@value` are specified, the resource referenced by `@keyref` takes precedence unless the key cannot be resolved, in which case the resource specified by `@value` is used as a fallback.

@type
: Specifies the usage for the track resource. This attribute is modeled on the `@kind` attribute on the HTML5 `<track>` element, as described by the *W3C HTML5 specification*. The values for this attribute are derived from the HTML5 standard:

captions
: Transcription or translation of the dialogue, sound effects, relevant musical cues, and other relevant audio information. This is intended for use when the soundtrack is unavailable (for example, because it is muted or because the user is hard-of-hearing). This information is rendered over the video and labeled as appropriate for hard-of-hearing users.

chapters
: Chapter titles, which are intended to be used for navigating the media resource. The chapter titles are rendered as an interactive list in the interface for the user agent.

descriptions
: Textual descriptions of the video component of the media resource. This is intended for audio synthesis when the visual component is unavailable (for example, because the user is interacting with the application without a screen or because the user is blind). Descriptions are synthesized as separate audio tracks.

metadata
: Tracks intended for use from script. This metadata is not displayed by the user agent.

subtitles
: Transcription or translation of the dialogue, suitable for when the sound is available but not understood (for example, because the user does not understand the language of the soundtrack). Subtitles are rendered over the video.

-dita-use-conref-target

See Using the -dita-use-conref-target value (372) for more information.

@name

The value is fixed to "track".

@valuetype

The value is fixed to "ref".

Example

See audio (306) and video (313).

8.5.5.8 <video>

Video objects reference moving visual media.

Usage information

Video objects are modeled on the HTML5 `<video>` element.

Video objects can be referenced by `@data`, `@datakeyref`, and nested media-source elements. Nested media-source elements enable extensive configuration of how the video object is presented.

Rendering expectations

The video object typically is rendered in the main flow of the content.

Processors **SHOULD** scale the object when values are provided for the `@height` and `@width` attributes. The following expectations apply:

- If a height value is specified and no width value is specified, processors **SHOULD** scale the width by the same factor as the height.
- If a width value is specified and no height value is specified, processors **SHOULD** scale the height by the same factor as the width.
- If both a height value and width value are specified, implementations **MAY** ignore one of the two values when they are unable to scale to each direction using different factors.

When a video object cannot be rendered in a meaningful way, processors **SHOULD** present the contents of the `<fallback>` element, if it is present.

Specialization hierarchy

The `<video>` element is specialized from `<object>`. It is defined in the multimedia-domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356) and the attributes defined below.

@data

Specifies the absolute or relative URI of the audio object. If this attribute is specified, `@type` also should be specified.

@datakeyref

Provides a key reference to the audio object. When specified and the key is resolvable, the key-provided URI is used. A key that has no associated resource, only link text, is considered to be unresolved. If `@data` is specified, it is used as a fallback when the key cannot be resolved to a resource.

@type

Indicates the MIME type for the audio object. Setting this attribute enables processors to avoid loading unsuppported objects. Note that this differs from the `@type` attribute on many other DITA elements; it specifies a MIME type rather than a content type. If `@type` is not specified, the effective type value for the key named by the `@datakeyref` attribute is used as the value for this attribute.

@height

Indicates the vertical dimension for the resulting display. The value of this attribute is a real number (expressed in decimal notation) optionally followed by a unit of measure from the set of pc, pt, px, in, cm, mm, em (picas, points, pixels, inches, centimeters, millimeters, and ems respectively). The default unit is px (pixels). Possible values include: "5", "5in", and "10.5cm".

@width

Indicates the horizontal dimension for the resulting display. The value of this attribute is a real number (expressed in decimal notation) optionally followed by a unit of measure from the set of pc, pt, px, in, cm, mm, em (picas, points, pixels, inches, centimeters, millimeters, and ems respectively). The default unit is px (pixels). Possible values include: "5", "5in", and "10.5cm".

@tabindex

Position the video in tabbing order.

Examples

In the following code sample, a video object is referenced using direct addressing. The `@type` attribute specifies the MIME type of the object.

```
<video data="video.mp4" type="video/mp4"/>
```

The video object also could be addressed using a key reference; in this version, both the URI and the MIME type come from the key definition.

```
<video datakeyref="video"/>
```

Figure 96: A simple video object

In the following code sample, `<media-source>` elements are used to specify the different video formats that are available.

```
<video>
  <media-source value="video.mp4" type="video/mp4"/>
  <media-source value="video.ogg" type="video/ogg"/>
  <media-source value="video.webm" type="video/webm"/>
</video>
```

Figure 97: A video object with multiple formats

The following code sample defines multiple presentational details for a video that is available in multiple formats. The video is referenced using key reference and a fallback image is provided for use when the video cannot be displayed.

```
<video width="400px" height="300px">
  <desc>A video illustrating this procedure.</desc>
  <fallback>
    <image href="video-not-available.png">
      <alt>This video cannot be displayed.</alt>
    </image>
  </fallback>

  <!-- Reference the poster using a key -->
  <video-poster keyref="video-poster"/>

  <!--
    When the following elements are used, they have a default value of "true";
    setting value="true" and not specifying @value have the same effect.
    To turn any of these settings off, specify value="false".
  -->
  <media-controls value="true"/>
  <media-autoplay/>
  <media-loop value="false"/>
  <media-muted value="false"/>

  <!-- Multiple formats, referenced via key. The key definition
       specifies both the URI and the MIME type -->
  <media-source keyref="video-mp4"/>
  <media-source keyref="video-ogg"/>
  <media-source keyref="video-webm"/>

  <!-- Subtitle tracks in English, French and German.
       Each key definition provides a URI and specifies the type value "subtitles". -->
  <media-track xml:lang="en" keyref="video-subtitles-en"/>
  <media-track xml:lang="fr" keyref="video-subtitles-fr"/>
  <media-track xml:lang="de" keyref="video-subtitles-de"/>
</video>
```

Figure 98: Complex example of a video object, with multiple formats and multi-lingual subtitles

8.5.5.9 <video-poster>

Video poster settings control the image that is rendered before video playback begins.

Usage information

The video poster settings are modeled on the `@poster` attribute on the HTML5 `<video>` element. If video poster settings are not present, the default behavior is determined by the user agent that is used to present the media.

Specialization hierarchy

The `<video-poster>` element is specialized from `<param>`. It is defined in the multimedia-domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356) and the attributes defined below.

@value
: Specifies the URL of the image.

@keyref
: Provides a key reference to the image. If both `@keyref` and `@value` are specified, the image referenced by `@keyref` takes precedence unless the key cannot be resolved, in which case the resource specified by `@value` is used as a fallback.

@type
: Specifies the MIME type of the resource specified by `@value`.

@name
: The value is fixed to "poster".

@valuetype
: The value is fixed to "ref".

Example

See `<video>` for examples of this element.

8.5.6 Utilities domainelements

The utilities domain elements represent common features of a language that might not necessarily be semantic, such as image maps.

8.5.6.1 <area>

The `<area>` element describes a linkable area within an `<imagemap>`. It allows the author to specify a shape within the image, the coordinates of that shape, and a link target for the area.

Specialization hierarchy

The `<area>` element is specialized from `<figgroup>`. It in defined in the utilities-domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

```
<area>
 <shape>rect</shape>
 <coords>54,1,117,60</coords>
 <xref href="d1-s2.dita"></xref>
</area>
```

A more complete example is located in the description for imagemap (318).

8.5.6.2 <coords>

The `<coords>` element specifies the coordinates of a linkable region in an `<imagemap>`.

Usage information

This element contains text data representing coordinate data for image maps. Pixels are the recommended units for describing coordinates. The syntax of the coordinate data depends on the shape described by the coordinates, and is based on the image map definition in HTML. It uses the following data for the appropriate shapes:

rect

left-x, top-y, right-x, bottom-y

circle

center-x, center-y, radius

poly

x1, y1, x2, y2, ..., xN, yN. To close the polygon, ensure that the first x and y coordinate pair and the last are the same.

Specialization hierarchy

The `<coords>` element is specialized from `<ph>`. It in defined in the utilities-domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356) (with a narrowed definition of `@translate`, given below), and `@keyref`.

@translate

Indicates whether the content of the element should be translated. The default value is "no". Setting to `@translate` "yes" will override the default. The DITA architectural specification contains a list of each OASIS DITA element and its common processing default for the translate value; because this element uses an actual default, it will always be treated as `translate="no"` unless overridden as described. Available values are:

no

The content of this element is not translateable.

yes

The content of this element is translateable.

-dita-use-conref-target

See Using the -dita-use-conref-target value (372) for more information.

Example

```
<area>
 <shape>rect</shape>
 <coords>54,1,117,60</coords>
 <xref href="d1-s2.dita"></xref>
</area>
```

8.5.6.3 <imagemap>

The `<imagemap>` element supports the basic functionality of the HTML "client-side" image map markup. `<imagemap>` allows you to designate a linkable area or region over an image, allowing a link in that region to display another topic.

Usage information

An HTML client-side image map binds an image to the navigation structure (the "map") by means of an ID association from the map to the image. In contrast, the DITA version of `<imagemap>` markup simply includes the target image as the first required element in the markup, followed by a sequence of `<area>` elements that represent the links associated with the contained image.

The `<xref>` content within `<area>` contains the intended alternative text or hover text for that image map area.

An `<imagemap>` structure can be output either to a standard HTML image map or to alternative forms of navigation (such as table-based image maps). When output as PDF, the minimal form would be to represent at least the image; advanced PDF output processors should provide equivalent region-oriented hyperlinks.

Specialization hierarchy

The `<imagemap>` element is specialized from `<fig>`. It in defined in the utilities-domain module.

Attributes

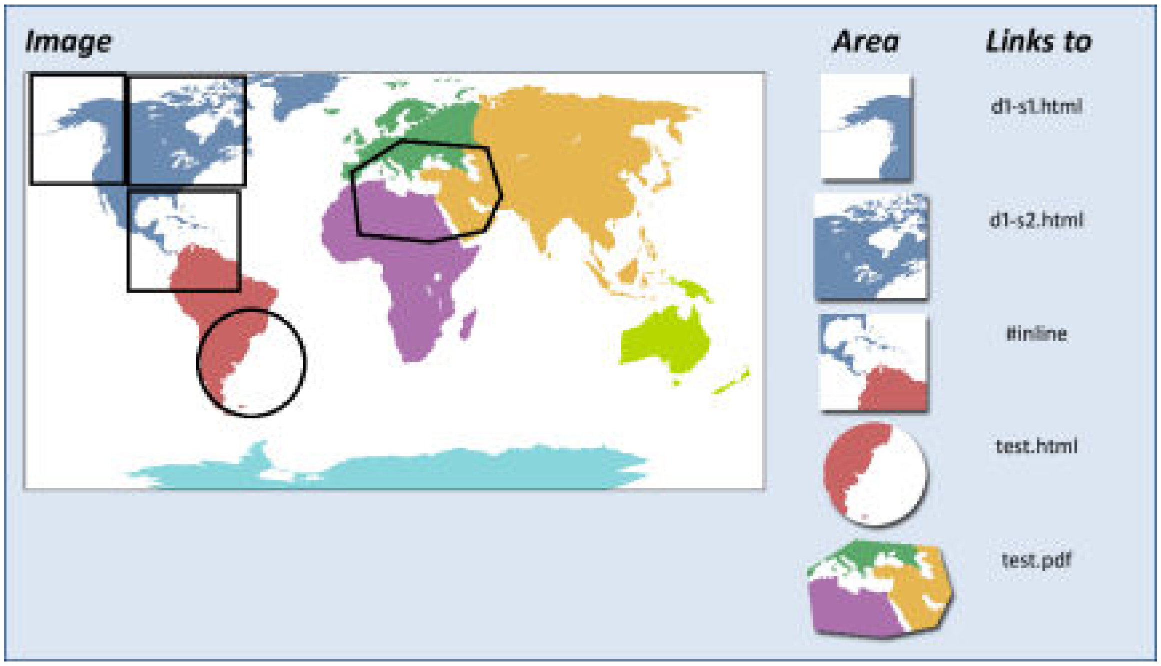
The following attributes are available on this element: Universal attribute group (356), Display attribute group (365), and spectitle (0).

Example

A simple `<imagemap>` looks like this (note that the rendering will depend on how this markup is supported for particular output formats):

```
<imagemap>
 <image href="imagemapworld.jpg">
   <alt>Map of the world showing 5 areas</alt>
 </image>
 <area><shape>rect</shape><coords>2,0,53,59</coords>
  <xref href="d1-s1.dita">Section 1 alternative text</xref>
 </area>
 <area><shape>rect</shape><coords>54,1,117,60</coords>
  <xref href="d1-s2.dita"><!-- Pull title from d1-s2.dita --></xref>
 </area>
 <area><shape>rect</shape><coords>54,62,114,116</coords>
  <xref href="#inline" type="topic">Alternative text for this rectangle</xref>
 </area>
 <area><shape>circle</shape><coords>120,154,29</coords>
  <xref format="html" href="test.html">Link to a test html file</xref>
 </area>
 <area><shape>poly</shape>
  <coords>246,39,200,35,173,52,177,86,215,90,245,84,254,65</coords>
  <xref format="pdf" href="test.pdf">Link to a test PDF file</xref>
 </area>
</imagemap>
```

The areas defined correspond to this graphic image with the areas visible:



The values for use in the `<shape>` and `<coords>` elements follow the guidelines defined for image maps in HTML 4.1, Client-side image maps: the MAP and AREA elements

8.5.6.4 <shape>

The `<shape>` element defines the shape of a linkable area in an `<imagemap>`.

Usage information

The `<shape>` element supports these values:

rect
: Define a rectangular region. If you leave the `<shape>` element blank, a rectangular shape is assumed.

circle
: Define a circular region.

poly
: Define a polygonal region.

default
: Indicates the entire diagram.

Specialization hierarchy

The `<shape>` element is specialized from `<keyword>`. It in defined in the utilities-domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356) (with a narrowed definition of `@translate`, given below), and `@keyref`.

@translate

Indicates whether the content of the element should be translated. The default value is "no". Setting to `@translate` "yes" will override the default. The DITA architectural specification contains a list of each OASIS DITA element and its common processing default for the translate value; because this element uses an actual default, it will always be treated as `translate="no"` unless overridden as described. Available values are:

no

The content of this element is not translateable.

yes

The content of this element is translateable.

-dita-use-conref-target

See Using the -dita-use-conref-target value (372) for more information.

Example

```
<area>
 <shape>rect</shape>
 <coords>54,1,117,60</coords>
 <xref href="d1-s2.dita"></xref>
</area>
```

8.5.6.5 <sort-as>

For elements that are sorted, the `<sort-as>` element provides text that is combined with the base sort phrase to construct the effective sort phrase. The text can be specified in the content of the `<sort-as>` element or in the `@value` attribute on the `<sort-as>` element. The `<sort-as>` element is useful for elements where the base sort phrase is inadequate or non-existent, for example, a glossary entry for a Japanese Kanji phrase.

Usage information

The `<sort-as>` element can contain `<text>` and `<keyword>` elements in order to enable content referencing. If a `<keyword>` element is used within `<sort-as>`, the `@keyref` attribute can be used to set the sort phrase. If a `<keyword>` uses `@keyref` and would otherwise also act as a navigation link, the link aspect of the `@keyref` attribute is ignored.

Some elements in the base DITA vocabulary are natural candidates for sorting, including topics, definition list entries, and rows in tables and simple tables. Authors are likely to include `<sort-as>` elements in the following locations:

- For topics, the `<sort-as>` element can be included directly in `<title>`, `<searchtitle>`, or `<navtitle>` when the different forms of title need different effective sort phrases. If the effective sort phrase is common to all the titles for a topic, the `<sort-as>` element can be included as a direct child of the topic prolog anywhere `<data>` is allowed.
- For glossary entry topics, the `<sort-as>` element can be included directly in `<glossterm>` or as a direct child of `<prolog>`.
- For topic references, the `<sort-as>` element can be included directly in the `<navtitle>` or `<title>` element within `<topicmeta>` or as a child of `<topicmeta>`.
- For definition list items, include the `<sort-as>` element in the `<dt>` element.

Processing expectations

As a specialization of <data>, the <sort-as> element is allowed in any context where <data> is allowed. However, the presence of <sort-as> within an element does not, by itself, indicate that the containing element should be sorted. Processors can choose to sort any DITA elements for any reason. Likewise, processors are not required to sort any elements. See Sorting (126) for more information on sorting.

Processors **SHOULD** expect to encounter <sort-as> elements in the above locations. Processors that sort **SHOULD** use the following precedence rules:

- A <sort-as> element that is specified in a title takes precedence over a <sort-as> element that is specified as a child of the topic prolog.
- Except for instances in the topic prolog, processors only apply <sort-as> elements that are either a direct child of the element to be sorted or a direct child of the title- or label-defining element of the element to be sorted.
- When an element contains multiple, direct-child, <sort-as> elements, the first direct-child <sort-as> element in document order takes precedence.
- When located within the <indexterm> element, the <sort-as> element is equivalent to <index-sort-as>. It is an error for an <indexterm> element to directly contain both <sort-as> and <index-sort-as> elements.
- Sort phrases are determined after filtering and content reference resolution occur.

When a <sort-as> element is specified, processors that sort the containing element **MUST** construct the effective sort phrase by prepending the content of the <sort-as> element to the base sort phrase. This ensures that two items with the same <sort-as> element but different base sort phrases will sort in the appropriate order.

For example, if a processor uses the content of the <title> element as the base sort phrase, and the title of a topic is "24 Hour Support Hotline" and the value of the <sort-as> element is "twenty-four hour", then the effective sort phrase would be "twenty-four hour24 Hour Support Hotline".

Specialization hierarchy

The <sort-as> element is specialized from <data>. It in defined in the utilities-domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356) and the attributes defined below.

@name
: Names the metadata item that the element represents. The default value is "sort-as". Specializations of <sort-as> can set the default value of the @name attribute to reflect the tag name of the specialized element.

@value
: The value of the metadata item. When the <sort-as> element has content and the @value attribute is specified, the @value attribute takes precedence. If the @value attribute is not specified and the <sort-as> element does not contain content, then the <sort-as> element has no effect.

Example

The following examples illustrate how a glossary entry for the Chinese ideographic character for "big" might specify an effective sort phrase of "dada" (the Pin-Yin transliteration for Mandarin):

```
<glossentry id="gloss-dada">
  <glossterm><sort-as value="dada"/>&#x5927;&#x5927;</glossterm>
    <glossdef>Literally "big big".</glossdef>
</glossentry>
```

Figure 99: The <sort-as> element located within <glossterm>

```
<glossentry id="gloss-dada">
  <glossterm>&#x5927;&#x5927;</glossterm>
  <prolog>
    <sort-as>dada</sort-as>
  </prolog>
    <glossdef>Literally "big big".</glossdef>
</glossentry>
```

Figure 100: The <sort-as> element within <prolog>

Related concepts

5.5.8 Sorting (126)
Processors can be configured to sort elements. Typical processing includes sorting glossary entries, lists of parameters or reference entries in custom navigation structures, and tables based on the contents of cells in specific columns or rows.

8.6 Classification elements

Classification elements support managing metadata. Those in the subject scheme map are used to define controlled values and to bind the controlled values to DITA attributes as enumerations. Those declared in the classification domain are used in other maps to classify content according to the scheme.

8.6.1 Subject scheme elements

Subject scheme maps are used to define sets of controlled values and taxonomic subjects; bind controlled values to attributes; and specify relationships among taxonomic subjects.

8.6.1.1 <attributedef>

The `<attributedef>` element specifies the attribute that is bound to a set of controlled values. This binding restricts the permissible values for the attribute to those that are contained in the set of controlled values. An attribute definition is ... An attribute This element binds an attribute to a set of controlled values. The binding restricts the permissible values for the attribute to those that are contained in the set of controlled values.

Specialization hierarchy

The `<attributedef>` element is specialized from data (276). It is defined in the topic module.

Attributes

The following attributes are available on this element: ID attribute group (357), `@status` and `@base` from Metadata attribute group (357), outputclass (0), class (Not for use by authors) (0), and the attributes defined below.

@name (REQUIRED)

Defines an attribute that will take a set of enumerated values.

@translate

Indicates whether the content of the element should be translated. The default value is "no". Setting to `@translate` "yes" will override the default. The DITA architectural specification contains a list of each OASIS DITA element and its common processing default for the translate value; because this element uses an actual default, it will always be treated as `translate="no"` unless overridden as described. Available values are:

no

The content of this element is not translateable.

yes

The content of this element is translateable.

-dita-use-conref-target

See Using the -dita-use-conref-target value (372) for more information.

Example

In this example, enumerations are specified for the `@platform` and `@otherprops` attributes. Note that the enumeration identifies a category of values; the values within the category are valid, while the category itself is not a valid value. For example, in the code sample here, the `@platform` attribute is associated with the enumeration for the category "os"; all values within the "os" category are thus valid on the `@platform` attribute, while the value "os" itself is not.

```
<subjectScheme>
  <!-- Pull in a scheme that defines unix OS values -->
  <schemeref href="unixOS.ditamap"/>
  <!-- Define new OS values that are merged with those in the unixOS scheme -->
  <subjectdef keys="operating-systems">
    <subjectdef keys="linux"/>
    <subjectdef keys="windows"/>
    <subjectdef keys="zOS"/>
  </subjectdef>
  <!-- Define application values -->
  <subjectdef keys="applications">
    <subjectdef keys="apache-server" href="subject/apache.dita"/>
    <subjectdef keys="my-sql"      href="subject/sql.dita"/>
  </subjectdef>

  <!-- Define an enumeration of the platform attribute, equal to
       each value in the OS subject. This makes the following values
       valid for the platform attribute: linux, windows, zOS -->
  <enumerationdef>
    <attributedef name="platform"/>
    <subjectdef keyref="os"/>
  </enumerationdef>
  <!-- Define an enumeration of the otherprops attribute, equal to
       each value in the application subjects.
       This makes the following values valid for the otherprops attribute:
       apache-server, my-sql -->
  <enumerationdef>
    <attributedef name="otherprops"/>
    <subjectdef keyref="applications"/>
  </enumerationdef>
</subjectScheme>
```

8.6.1.2 <defaultSubject>

The `<defaultSubject>` element is used within an attribute enumeration to set the default value for the attribute in cases where no value is specified for the attribute. The default subject must be one of the controlled values that are bound to the attribute.

Specialization hierarchy

This he `<defaultSubject>` element is specialized from topicref (241). It is defined in the map module.

Attributes

The following attributes are available on this element: Universal attribute group (356), Link-relationship attribute group (366) (with a narrowed definition of `@href`, given below), Topicref-element attributes group (368), `@keys`, and `@keyref`. This element also uses `@processing-role`, `@locktitle`, and `@toc` from Attributes common to many map elements (360).

@href

Points to the resource that is represented by the `<topicref>`. See The href attribute (369) for detailed information on supported values and processing implications. References to DITA content cannot be below the topic level: that is, you cannot reference individual elements inside a topic. References to content other than DITA topics should use the `@format` attribute to identify the kind of resource being referenced.

Example

The following example declares that each of the four defined "os" values is valid within the `@platform` attribute; if no value is specified, the default is "linux".

```
<subjectScheme>
  <subjectdef keys="os">
    <subjectdef keys="linux"/>
    <subjectdef keys="mswin"/>
    <subjectdef keys="zos"/>
    <subjectdef keys="macos"/>
  </subjectdef>
  <enumerationdef>
    <attributedef name="platform"/>
    <defaultSubject keyref="linux"/>
    <subjectdef keyref="os"/>
  </enumerationdef>
</subjectScheme>
```

8.6.1.3 <elementdef>

The `<elementdef>` element identifies an element to which an attribute is bound. If the `<enumerationdef>` element does not contain an `<elementdef>` element, the enumeration is bound to the attribute in all elements.

Specialization hierarchy

The `<elementdef>` element is specialized from data (276). It is defined in the topic module.

Attributes

The following attributes are available on this element: ID attribute group (357), `@status` and `@base` from Metadata attribute group (357), outputclass (0), class (Not for use by authors) (0), and the attributes defined below.

@name (REQUIRED)

Defines the element for which an attribute enumeration is defined.

@translate

Indicates whether the content of the element should be translated. The default value is "no". Setting to `@translate` "yes" will override the default. The DITA architectural specification contains a list of each OASIS DITA element and its common processing default for the translate value; because this element uses an actual default, it will always be treated as `translate="no"` unless overridden as described. Available values are:

no

The content of this element is not translateable.

yes

The content of this element is translateable.

-dita-use-conref-target

See Using the -dita-use-conref-target value (372) for more information.

Example

In this example, the `@value` attribute for the `<lomDifficulty>` element is bound to a specified set of values. Processors should limit the values for the `@value` attribute on the `<lomDifficulty>` element to the following set of values: easy, medium, or difficult. Other elements that have a `@value` attribute are not affected.

```
<subjectScheme>
  <subjectdef keys="difficulty">
    <subjectdef keys="easy"/>
    <subjectdef keys="medium"/>
    <subjectdef keys="difficult"/>
  </subjectdef>
  <!-- ... -->
  <enumerationdef>
    <elementdef name="lomDifficulty"/>
    <attributedef name="value"/>
    <subjectdef keyref="difficulty"/>
  </enumerationdef>
</subjectScheme>
```

8.6.1.4 <enumerationdef>

The `<enumerationdef>` element identifies one attribute and one or more categories that contain the controlled values for the enumeration. The `@type` attribute has a default value of "keys".

Usage information

When the `<enumerationdef>` element contains both an `<attributedef>` and an `<elementdef>` element, the enumeration applies to the specified attribute **only** on the specified element. The enumeration does not apply to the attribute on other elements. For example, when the `<enumerationdef>` element contains both `<attributedef name="value"/>` and `<elementdef`

name="lomDifficulty"/>, only the @value attribute on the <lomDifficulty> element is limited to the specified enumeration. The possible values for the @value attribute on other elements are not affected.

When the <enumerationdef> element contain an <attributedef> element but no <elementdef> element, the controlled set of values bound to the attribute apply to all elements. For example, when <enumerationdef> contains only <attributedef name="value"/>, the @value attribute is limited to the specified enumeration for all elements.

When the <enumerationdef> element is empty, no value is valid for the attribute.

Whether an attribute takes a single value or multiple values from the enumeration is part of the structural definition of the element. An attribute that is defined as CDATA can take multiple values, while an attribute defined as NMTOKEN can take only one.

Specialization hierarchy

The <enumerationdef> element is specialized from topicref (241). It is defined in the map module.

Attributes

The following attributes are available on this element: ID attribute group (357), @status and @base from Metadata attribute group (357), outputclass (0), and class (Not for use by authors) (0).

Example

In this example, enumerations are specified for the @platform and @otherprops attributes. Note that the enumeration identifies a category of values; the values within the category are valid, while the category itself is not a valid value. For example, in the code sample here, the @platform attribute is associated with the enumeration for the category "os"; all values within the "os" category are thus valid on the @platform attribute, while the value "os" itself is not.

```
<subjectScheme>
  <!-- Pull in a scheme that defines unix OS values -->
  <schemeref href="unixOS.ditamap"/>
  <!-- Define new OS values that are merged with those in the unixOS scheme -->
  <subjectdef keys="operating-systems">
    <subjectdef keys="linux"/>
    <subjectdef keys="windows"/>
    <subjectdef keys="zOS"/>
  </subjectdef>
  <!-- Define application values -->
  <subjectdef keys="applications">
    <subjectdef keys="apache-server" href="subject/apache.dita"/>
    <subjectdef keys="my-sql"      href="subject/sql.dita"/>
  </subjectdef>

  <!-- Define an enumeration of the platform attribute, equal to
       each value in the OS subject. This makes the following values
       valid for the platform attribute: linux, windows, zOS -->
  <enumerationdef>
    <attributedef name="platform"/>
    <subjectdef keyref="os"/>
  </enumerationdef>
  <!-- Define an enumeration of the otherprops attribute, equal to
       each value in the application subjects.
       This makes the following values valid for the otherprops attribute:
       apache-server, my-sql -->
  <enumerationdef>
    <attributedef name="otherprops"/>
    <subjectdef keyref="applications"/>
```

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```
  </enumerationdef>
</subjectScheme>
```

8.6.1.5 <hasInstance>

The `<hasInstance>` element specifies that the contained subjects have an INSTANCE-OF relationship with the container subject. In an INSTANCE-OF hierarchy, the child subject is a specific entity or object and the parent subject is a type, kind, or class of entity or object.

Specialization hierarchy

The `<hasInstance>` element is specialized from topicref (241). It is defined in the map module.

Attributes

The following attributes are available on this element: Universal attribute group (356), Link-relationship attribute group (366) (with a narrowed definition of `@href`, given below), `@processing-role` from Attributes common to many map elements (360), `@navtitle` from Topicref-element attributes group (368), `@keys`, and `@keyref`.

@href

Points to the resource that is represented by the `<topicref>`. See The href attribute (369) for detailed information on supported values and processing implications. References to DITA content cannot be below the topic level: that is, you cannot reference individual elements inside a topic. References to content other than DITA topics should use the `@format` attribute to identify the kind of resource being referenced.

Example

This example specifies that New York City, Reykjavik, and Moscow are each specific instances of a city.

```
<subjectScheme>
  <hasInstance>
    <subjectdef keys="city">
      <subjectdef keys="nyc"/>
      <subjectdef keys="reykjavik"/>
      <subjectdef keys="moscow"/>
    </subjectdef>
  </hasInstance>
</subjectScheme>
```

8.6.1.6 <hasKind>

The `<hasKind>` element specifies that the contained hierarchy expresses KIND-OF relationships between subjects.

In a KIND-OF hierarchy, the child subject is a particular variety of the parent subject. A KIND-OF hierarchy is sometimes known as an IS-A, generic, or subsumption hierarchy.

Specialization hierarchy

The `<hasKind>` element is specialized from topicref (241). It is defined in the map module.

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Attributes

The following attributes are available on this element: Universal attribute group (356), Link-relationship attribute group (366) (with a narrowed definition of `@href`, given below), `@processing-role` from Attributes common to many map elements (360), `@navtitle` from Topicref-element attributes group (368), `@keys`, and `@keyref`.

@href

Points to the resource that is represented by the `<topicref>`. See The href attribute (369) for detailed information on supported values and processing implications. References to DITA content cannot be below the topic level: that is, you cannot reference individual elements inside a topic. References to content other than DITA topics should use the `@format` attribute to identify the kind of resource being referenced.

Example

This example specifies that cities, towns, and villages are each a kind of settlement. Additionally, big-city, medium-city, and small-city are each a kind of city.

```
<subjectScheme>
  <hasKind>
    <subjectdef keys="settlement">
      <subjectdef keys="city">
        <subjectdef keys="big-city"/>
        <subjectdef keys="medium-city"/>
        <subjectdef keys="small-city"/>
      </subjectdef>
      <subjectdef keys="town"/>
      <subjectdef keys="village" navtitle="Village"/>
    </subjectdef>
  </hasKind>
</subjectScheme>
```

8.6.1.7 <hasNarrower>

For subjects within the `<hasNarrower>` element, the container subject is more general than each of the contained subjects. That is, this element makes the default hierarchical relationship explicit, although the way in which a relationship is narrower is not specified.

Specialization hierarchy

The `<hasNarrower>` element is specialized from topicref (241). It is defined in the map module.

Attributes

The following attributes are available on this element: Universal attribute group (356), Link-relationship attribute group (366) (with a narrowed definition of `@href`, given below), `@processing-role` from Attributes common to many map elements (360), `@navtitle` from Topicref-element attributes group (368), `@keys`, and `@keyref`.

@href

Points to the resource that is represented by the `<topicref>`. See The href attribute (369) for detailed information on supported values and processing implications. References to DITA content cannot be below the topic level: that is, you cannot reference individual elements inside a topic.

References to content other than DITA topics should use the `@format` attribute to identify the kind of resource being referenced.

Example

This example specifies that Planting Roses is a narrower subject category than Horticulture, although it is part of the Horticulture subject area.

```
<subjectScheme>
  <hasNarrower>
    <subjectdef keys="horticulture">
      <subjectdef keys="planting-roses"/>
    </subjectdef>
  </hasNarrower>
</subjectScheme>
```

8.6.1.8 <hasPart>

The `<hasPart>` element specifies that the contained hierarchy expresses PART-OF relationships between subjects.

Specialization hierarchy

The `<hasPart>` element is specialized from topicref (241). It is defined in the map module.

Attributes

The following attributes are available on this element: Universal attribute group (356), Link-relationship attribute group (366) (with a narrowed definition of `@href`, given below), `@processing-role` from Attributes common to many map elements (360), `@navtitle` from Topicref-element attributes group (368), `@keys`, and `@keyref`.

@href

Points to the resource that is represented by the `<topicref>`. See The href attribute (369) for detailed information on supported values and processing implications. References to DITA content cannot be below the topic level: that is, you cannot reference individual elements inside a topic. References to content other than DITA topics should use the `@format` attribute to identify the kind of resource being referenced.

Example

This example specifies that a tire and a horn are each a part of a car.

```
<subjectScheme>
  <hasPart>
    <subjectdef keys="car">
      <subjectdef keys="tire"/>
      <subjectdef keys="horn"/>
    </subjectdef>
  </hasPart>
</subjectScheme>
```

8.6.1.9 <hasRelated>

The `<hasRelated>` element identifies an associative relationship between the container subject and each of the contained subjects.

Specialization hierarchy

The `<hasRelated>` element is specialized from topicref (241). It is defined in the map module.

Attributes

The following attributes are available on this element: Universal attribute group (356), Link-relationship attribute group (366) (with a narrowed definition of `@href`, given below), processing-role from Attributes common to many map elements (360), navtitle from Topicref-element attributes group (368), `@keys`, and `@keyref`.

@href

Points to the resource that is represented by the `<topicref>`. See The href attribute (369) for detailed information on supported values and processing implications. References to DITA content cannot be below the topic level: that is, you cannot reference individual elements inside a topic. References to content other than DITA topics should use the `@format` attribute to identify the kind of resource being referenced.

Example

This example specifies that myProgram runs on Linux and Windows.

```
<subjectScheme>
  <subjectdef keys="myProgram">
    <hasRelated keys="platforms">
      <subjectdef keys="linux">
      <subjectdef keys="windows"/>
    </hasRelated>
  </subjectdef>
</subjectScheme>
```

8.6.1.10 <relatedSubjects>

The `<relatedSubjects>` element establishes associative relationships between each child subject and every other child subject (unless the association is restricted by the `@linking` attribute of the subjects).

Usage information

The content provider can identify the relationship by specifying a `@keys` attribute, label the relationship by specifying a `<navtitle>` element, and provide a consensus definition of the relationship including by referencing a topic. If the relationship has an identifying key, the content provider can use the `@keyref` attribute to specify the same relationship for different subjects.

Processing expectations

For filtering and flagging, processors need only inspect the subordinate hierarchies under category subjects that are bound to attributes. Filtering and flagging processors do not have to understand specific types of relationships. Explicit relationships are useful primarily for information viewers with advanced capabilities.

Specialization hierarchy

The `<relatedSubjects>` element is specialized from topicref (241). It is defined in the map module.

Attributes

The following attributes are available on this element: Universal attribute group (356), Link-relationship attribute group (366) (with a narrowed definition of `@href`, given below), `@keys`, and `@keyref`. This element also uses `@processing-role`, `@collection-type`, and a narrowed definition of `@linking` (given below) from Attributes common to many map elements (360).

@href

Points to the resource that is represented by the `<topicref>`. See The href attribute (369) for detailed information on supported values and processing implications. References to DITA content cannot be below the topic level: that is, you cannot reference individual elements inside a topic. References to content other than DITA topics should use the `@format` attribute to identify the kind of resource being referenced.

@linking

On this element, the `@linking` attribute has a default value of "normal". Otherwise, the attribute is the same as defined in Attributes common to many map elements (360).

Example

The following scheme establishes that the Linux, the Apache Web Server, and the MySQL Database are related:

```
<subjectScheme>
  <!-- ... -->
  <relatedSubjects>
    <subjectdef keys="linux">
    <subjectdef keys="apache-web-server"/>
    <subjectdef keys="my-sql"/>
  </relatedSubjects>
  <!-- ... -->
</subjectScheme>
```

8.6.1.11 <schemeref>

A `<schemeref>` element references another subject scheme map. Typically, the referenced subject scheme defines a base set of controlled values; the referencing map then extends the base set of controlled values. The values specified in the subject scheme maps are merged; the result is equivalent to specifying all of the values in a single map.

Specialization hierarchy

The `<schemeref>` element is specialized from topicref (241). It is defined in the map module.

Attributes

The following attributes are available on this element: Universal attribute group (356), Link-relationship attribute group (366) (with narrowed definitions of `@href`, `@format`, and `@type`, given below), `@keys`, and `@keyref`.

@href

Points to the resource that is represented by the `<topicref>`. See The href attribute (369) for detailed information on supported values and processing implications. References to DITA content cannot be below the topic level: that is, you cannot reference individual elements inside a topic. References to content other than DITA topics should use the `@format` attribute to identify the kind of resource being referenced.

@format

On this element the `@format` attribute sets a default value of "ditamap", because the purpose of the element is to reference a DITA map document. Otherwise, the attribute is the same as described in Link-relationship attribute group (366).

@type

Describes the target of a reference. For the `<schemeref>` element, this value defaults to "scheme", because the element is expected to point to another subject scheme.

See subjectScheme (338).

8.6.1.12 <subjectdef>

The `<subjectdef>` element defines a subject. A subject can be used for either taxonomic classification or as a controlled value.

Usage information

The `<subjectdef>` can use a `<navtitle>` element to supply a label for the subject; the `@href` attribute can be used to reference a topic that captures the consensus definition for the subject. To use the `<navtitle>` as a subject label, set the `@locktitle` attribute on the `<subjectdef>` element to "yes".

Processing expectations

As with normal `<topicref>` processing, when the `<subjectdef>` element specifies a `<navtitle>` and refers to a topic, processors should use the actual topic title in place of the `<navtitle>`.

Specialization hierarchy

The `<subjectdef>` element is specialized from topicref (241). It is defined in the map module.

Attributes

The following attributes are available on this element: Universal attribute group (356), Topicref-element attributes group (368), Link-relationship attribute group (366) (with a narrowed definition of `@href`, given below), `@keys`, and `@keyref`. This element also uses `@processing-role`, `@toc`, `@collection-type`, `@linking`, and `@locktitle` from Attributes common to many map elements (360).

@href

Points to the resource that is represented by the `<topicref>`. See The href attribute (369) for detailed information on supported values and processing implications. References to DITA content cannot be below the topic level: that is, you cannot reference individual elements inside a topic. References to content other than DITA topics should use the `@format` attribute to identify the kind of resource being referenced.

Example

```
<subjectScheme>
  <!-- Pull in a scheme that defines unix OS values -->
  <schemeref href="unixOS.ditamap"/>
  <!-- Define new OS values that are merged with those in the unixOS scheme -->
  <subjectdef keys="operating-systems">
    <subjectdef keys="linux"/>
    <subjectdef keys="windows"/>
    <subjectdef keys="zOS"/>
  </subjectdef>
  <!-- Define application values -->
  <subjectdef keys="applications">
    <subjectdef keys="apache-server" href="subject/apache.dita"/>
    <subjectdef keys="my-sql"      href="subject/sql.dita"/>
  </subjectdef>

  <!-- Define an enumeration of the platform attribute, equal to
       each value in the OS subject. This makes the following values
       valid for the platform attribute: linux, windows, zOS -->
  <enumerationdef>
    <attributedef name="platform"/>
    <subjectdef keyref="os"/>
  </enumerationdef>
  <!-- Define an enumeration of the otherprops attribute, equal to
       each value in the application subjects.
       This makes the following values valid for the otherprops attribute:
       apache-server, my-sql -->
  <enumerationdef>
    <attributedef name="otherprops"/>
    <subjectdef keyref="applications"/>
  </enumerationdef>
</subjectScheme>
```

8.6.1.13 <subjectHead>

The `<subjectHead>` element provides a heading for a group of subjects, for use if the scheme is displayed. For instance, a scheme might be displayed to let a user select subjects as part of faceted browsing. The `<subjectHead>` element itself does not reference a file and cannot be referenced as a key, so it does not define any controlled values.

Specialization hierarchy

The `<subjectHead>` element is specialized from topicref (241). It is defined in the map module.

Attributes

The following attributes are available on this element: Universal attribute group (356). This element also uses `@processing-role`, `@toc`, and narrowed definitions of `@collection-type` and `@linking` from Attributes common to many map elements (360).

@collection-type

Collection types describe how links relate to each other. The processing default is "unordered", although no default is specified in the DTD or Schema. Allowable values for `@collection-type` on this element are:

unordered

Indicates that the order of the child topics is not significant.

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sequence

Indicates that the order of the child topics is significant; output processors will typically link between them in order.

-dita-use-conref-target

See Using the -dita-use-conref-target value (372) for more information.

@linking

Defines some specific linking characteristics of subject topics. "normal" is the only valid value, and is specified as the default in the DTD, XSD Schema, and RELAX NG implementations. When attribute values cascade, this causes a linking value of "normal" to cascade to the subjects.

Example

In this example the “Server setup” label doesn't classify content but, when selected, is equivalent to the union of its child subjects. That is, the heading covers content about planning for any application, installing for any application, any task for web servers, or any task for database servers.

```
<subjectScheme toc="yes" search="no">
  <!-- ... -->
  <subjectHead>
    <subjectHeadMeta>
      <navtitle>Server setup</navtitle>
    </subjectHeadMeta>
    <subjectdef href="planningTaskType.dita"/>
    <subjectdef href="installingTaskType.dita"/>
    <subjectdef href="webServerApp.dita"/>
    <subjectdef href="databaseApp.dita"/>
  </subjectHead>
  <!-- ... -->
</subjectScheme>
```

8.6.1.14 <subjectHeadMeta>

The `<subjectHeadMeta>` element allows a navigation title and short description to be associated with a subject heading.

Specialization hierarchy

The `<subjectHeadMeta>` element is specialized from topicmeta (241). It is defined in the map module.

Attributes

The following attributes are available on this element: Universal attribute group (356) and the attribute defined below.

@lockmeta

Determines whether the metadata that is specified in the map supplements or overrides the metadata that is specified in the topic. When the `@lockmeta` attribute is set to "yes", the topic metadata is overriden. Allowable values are "yes", "no", and Using the -dita-use-conref-target value (372).

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Example

In this example the “Server setup” label doesn't classify content but, when selected, is equivalent to the union of its child subjects. That is, the heading covers content about planning for any application, installing for any application, any task for web servers, or any task for database servers.

```
<subjectScheme toc="yes" search="no">
  <!-- ... -->
  <subjectHead>
    <subjectHeadMeta>
      <navtitle>Server setup</navtitle>
    </subjectHeadMeta>
    <subjectdef href="planningTaskType.dita"/>
    <subjectdef href="installingTaskType.dita"/>
    <subjectdef href="webServerApp.dita"/>
    <subjectdef href="databaseApp.dita"/>
  </subjectHead>
  <!-- ... -->
</subjectScheme>
```

8.6.1.15 <subjectRel>

The `<subjectRel>` element contains a set of subjects that are related in some manner. Each group of subjects is contained in a `<subjectRole>` element; the associations between different columns in the same row are evaluated in the same way as those in a `<relrow>` (from which `<subjectRel>` is specialized) but define relationships between the subjects instead of links between topic documents.

Specialization hierarchy

The `<subjectRel>` element is specialized from relrow (246). It is defined in the map module.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

For a complete example in the context of the `<subjectRelTable>`, see Example (336).

8.6.1.16 <subjectRelTable>

The `<subjectRelTable>` element is a specialized relationship table which establishes relationships between the subjects in different columns of the same row.

Usage information

This element provides an efficient way to author non-hierarchical relationships between subjects. Tools (such as search tools) that use subject relationships to find related content might use these associative relationships in a similar way to the hierarchical relationships.

Specialization hierarchy

The `<subjectRel>` element is specialized from reltable (244). It is defined in the map module.

Attributes

The following attributes are available on this element: Universal attribute group (356) and Attributes common to many map elements (360) (with a narrowed definition of `@toc`, given below). This element also uses `@type`, `@scope`, and `@format` from Link-relationship attribute group (366).

@toc

Specifies whether a topic appears in the table of contents (TOC). If the value is not specified locally, but is specified on an ancestor, the value will cascade from the closest ancestor. On this element the default value for `@toc` is "no". See Attributes common to many map elements (360) for a complete definition of `@toc`.

Example

The subject relationship table in this example establishes relationships between operating systems and applications. Based on the `<subjectRole>` element, subjects in the first column are operating systems which are the environment for an application, while subjects in the second column are applications that run in that environment. For a user interested in content about the operating system, content about the applications might also be relevant.

```
<subjectScheme>
  <hasKind>
    <subjectdef keys="operatingSystem">
        <subjectdef keys="linuxOS"/>
        <subjectdef keys="windowsOS"/>
    </subjectdef>
    <subjectdef keys="application">
        <subjectdef keys="IDE">
            <subjectdef keys="eclipseIDE"/>
            <subjectdef keys="visualStudioIDE"/>
        </subjectdef>
        <subjectdef keys="webBrowser">
            <subjectdef keys="firefoxBrowser"/>
            <subjectdef keys="ieBrowser"/>
        </subjectdef>
    </subjectdef>
  </hasKind>
  <!-- ... -->
  <subjectRelTable>
    <subjectRelHeader>
      <subjectRole>
        <subjectdef keyref="operatingSystem">
          <hasRelated keyref="environmentFor">
            <subjectdef keyref="application"/>
          </hasRelated>
        </subjectdef>
      </subjectRole>
      <subjectRole>
        <subjectdef keyref="application"/>
      </subjectRole>
    </subjectRelHeader>
    <subjectRel>
      <subjectRole>
        <subjectdef keyref="linuxOS"/>
        <subjectdef keyref="windowsOS"/>
      </subjectRole>
      <subjectRole>
        <subjectdef keyref="eclipseIDE"/>
        <subjectdef keyref="firefoxBrowser"/>
      </subjectRole>
    </subjectRel>
    <subjectRel>
      <subjectRole>
        <subjectdef keyref="windowsOS"/>
      </subjectRole>
      <subjectRole>
```

```
        <subjectdef keyref="ieBrowser"/>
        <subjectdef keyref="visualStudioIDE"/>
      </subjectRole>
    </subjectRel>
  </subjectRelTable>
</subjectScheme>
```

A table view of the `<subjectRelTable>` might look like this; each `<subjectRel>` represents a single row, and each `<subjectRole>` represents a cell.

Table 10: <subjectRelTable> as a table

`<subjectdef keyref="operatingSystem"> <hasRelated keyref="environmentFor"> <subjectdef keyref="application"/> </hasRelated> </subjectdef>`	***`<subjectdef keyref="application"/>`***
`<subjectdef keyref="linuxOS"/>` `<subjectdef keyref="windowsOS"/>`	`<subjectdef keyref="eclipseIDE"/>` `<subjectdef keyref="firefoxBrowser"/>`
`<subjectdef keyref="windowsOS"/>`	`<subjectdef keyref="ieBrowser"/>` `<subjectdef keyref="visualStudioIDE"/>`

8.6.1.17 <subjectRelHeader>

The `<subjectRelHeader>` element specifies the roles played by subjects in associations.

Usage information

You use the `<subjectRelHeader>` element to supply a header row for a subject relationship table when you want to identify the roles played by the subjects in each column. Each cell in the header row identifies a subject topic that defines a role. When specializing the `<subjectRelTable>` element, you can accomplish the same purpose by specializing the cells within the rows to enforce the roles.

Specialization hierarchy

The `<subjectRelHeader>` element is specialized from relrow (246). It is defined in the map module.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

For a complete example in the context of the `<subjectRelTable>`, see Example (336).

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8.6.1.18 <subjectRole>

The `<subjectRole>` element, when used within a `<subjectRel>` element, contains a set of subjects that are related to other subjects in the same row of the current `<subjectRelTable>`.

Usage information

By default, no relationship is defined between multiple subjects in the same `<subjectRole>` element. When used within the `<subjectRelHeader>`, the `<subjectRole>` element defines the category of subject or relationship provided by that column.

Specialization hierarchy

The `<subjectRole>` element is specialized from relcell (246). It is defined in the map module.

Attributes

The following attributes are available on this element: Universal attribute group (356) and Topicref-element attributes group (368). This element also uses `@scope`, `@format`, and `@type` from Link-relationship attribute group (366).

Example

For a complete example in the context of the `<subjectRelTable>`, see Example (336).

8.6.1.19 <subjectScheme>

The `<subjectScheme>` element is a specialization of `<map>`; it defines taxonomic subjects and controlled values.

Specialization hierarchy

The `<subjectScheme>` element is specialized from map (239). It is defined in the map module.

Attributes

The following attributes are available on this element: Universal attribute group (356) (with a narrowed definition of `@id`, given below), Attributes common to many map elements (360) (with narrowed definitions of `@processing-role` and `@toc`, given below), Architectural attribute group (360), and the attributes defined below. This element also uses `@type`, `@scope`, and `@format` from Link-relationship attribute group (366).

@id

Allows an ID to be specified for the map. Note that maps do not require IDs (unlike topics), and the map ID is not included in references to elements within a map. This attribute is defined with the XML Data Type ID.

@anchorref

Identifies a location within another map document where this map will be anchored. Resolution of the map is deferred until the final step in the delivery of any rendered content. For example, `anchorref="map1.ditamap#a1"` allows the map with `@anchorref` to be pulled into the location of the anchor point "a1" inside `map1.ditamap` when `map1.ditamap` is rendered for delivery.

@processing-role

Defines how the the default value for `@processing-role` is "resource-only". Otherwise, the definition matches the one found in Attributes common to many map elements (360).

@toc

For this element, the default value for `@toc` is "no". Otherwise, the definition matches the one found in Attributes common to many map elements (360).

Example

```
<subjectScheme>
  <!-- Pull in a scheme that defines unix OS values -->
  <schemeref href="unixOS.ditamap"/>
  <!-- Define new OS values that are merged with those in the unixOS scheme -->
  <subjectdef keys="operating-systems">
    <subjectdef keys="linux"/>
    <subjectdef keys="windows"/>
    <subjectdef keys="zOS"/>
  </subjectdef>
  <!-- Define application values -->
  <subjectdef keys="applications">
    <subjectdef keys="apache-server" href="subject/apache.dita"/>
    <subjectdef keys="my-sql"      href="subject/sql.dita"/>
  </subjectdef>

  <!-- Define an enumeration of the platform attribute, equal to
       each value in the OS subject. This makes the following values
       valid for the platform attribute: linux, windows, zOS -->
  <enumerationdef>
    <attributedef name="platform"/>
    <subjectdef keyref="os"/>
  </enumerationdef>
  <!-- Define an enumeration of the otherprops attribute, equal to
       each value in the application subjects.
       This makes the following values valid for the otherprops attribute:
       apache-server, my-sql -->
  <enumerationdef>
    <attributedef name="otherprops"/>
    <subjectdef keyref="applications"/>
  </enumerationdef>
</subjectScheme>
```

8.6.2 Classification domain elements

The classification domain elements are used to identify the subject matter of content that is referenced in a map.

8.6.2.1 <subjectCell>

The `<subjectCell>` element contains subjects that are associated with topics in the first column of the current row in the `<topicSubjectTable>`. The subjects themselves have no defined relationship across columns, other than the fact that they apply to the same content.

Specialization hierarchy

The `<subjectCell>` element is specialized from relcell (246). It is defined in the classification-domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356) and Attributes common to many map elements (360). This element also uses `@scope`, `@format`, and `@type` from Link-relationship attribute group (366).

Example

For a complete example in the context of the `<topicSubjectTable>`, see Example (345).

8.6.2.2 <subjectref>

The `<subjectref>` element identifies a subject with which to classify the content.

Specialization hierarchy

The `<subjectref>` element is specialized from topicref (241). It is defined in the classification-domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356), Link-relationship attribute group (366) (with a narrowed definition of `@href`, given below), `@navtitle` and `@query` from Topicref-element attributes group (368), `@keyref`, and `@keys`. This element also uses `@collection-type`, `@linking`, and narrowed definitions of `@processing-role` and `@toc` (given below), from Attributes common to many map elements (360).

@href

Points to the resource that is represented by the `<topicref>`. See The href attribute (369) for detailed information on supported values and processing implications. References to DITA content cannot be below the topic level: that is, you cannot reference individual elements inside a topic. References to content other than DITA topics should use the `@format` attribute to identify the kind of resource being referenced.

@processing-role

Defines how the the default value for `@processing-role` is "resource-only". Otherwise, the definition matches the one found in Attributes common to many map elements (360).

@toc

Specifies whether a topic appears in the table of contents (TOC). If the value is not specified locally, but is specified on an ancestor, the value will cascade from the closest ancestor. On this element the default value for `@toc` is "no". See Attributes common to many map elements (360) for a complete definition of `@toc`.

Example

In the following example, the map is classified as covering the Linux subject, and `developing-web-applications.dita` is classified as covering the Web and development subjects. These subjects (and their keys) are defined externally in a subject scheme map; in order to reference the subject directly without the subject scheme map, the `@href` attribute would be used in place of `@keyref`.

```
<map>
  <title>Working with Linux</title>
  <topicsubject keyref="linux"/>
  <!-- ... -->
  <topicref href="developing-web-applications.dita">
    <topicsubject>
      <subjectref keyref="web"/>
      <subjectref keyref="development"/>
    </topicsubject>
    <!-- ... -->
  </topicref>
  <!-- ... -->
</map>
```

8.6.2.3 <topicapply>

The <topicapply> element identifies subjects that qualify the content for filtering or flagging but not retrieval. The <topicapply> element can identify a single subject. Additional subjects can be specified by nested <subjectref> elements.

Specialization hierarchy

The <topicapply> element is specialized from topicref (241). It is defined in the classification-domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356), Link-relationship attribute group (366) (with a narrowed definition of @href, given below), @keyref, and @keys. This element also uses @collection-type, @linking, and narrowed definitions of @processing-role and @toc (given below), from Attributes common to many map elements (360).

@href

Points to the resource that is represented by the <topicref>. See The href attribute (369) for detailed information on supported values and processing implications. References to DITA content cannot be below the topic level: that is, you cannot reference individual elements inside a topic. References to content other than DITA topics should use the @format attribute to identify the kind of resource being referenced.

@processing-role

Defines how the the default value for @processing-role is "resource-only". Otherwise, the definition matches the one found in Attributes common to many map elements (360).

@toc

Specifies whether a topic appears in the table of contents (TOC). If the value is not specified locally, but is specified on an ancestor, the value will cascade from the closest ancestor. On this element the default value for @toc is "no". See Attributes common to many map elements (360) for a complete definition of @toc.

Example

The map content should be retrieved for Apache Tomcat and hidden as irrelevant for operating systems other than RedHat or SuSE.

```
<map>
  <title>Installing Apache Tomcat on RedHat or SuSE Linux</title>
  <topicsubject href="../controlledValues/tomcatServer.dita"/>
  <topicapply>
    <subjectref href="../controlledValues/redhatLinux.dita"/>
```

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```
    <subjectref href="../controlledValues/suseLinux.dita"/>
  </topicapply>
  <!-- ... -->
</map>
```

8.6.2.4 <topicCell>

The `<topicCell>` element contains topics that will be associated with subjects in each following column of the current row in the `<topicSubjectTable>`.

Specialization hierarchy

The `<topicCell>` element is specialized from relcell (246). It is defined in the classification-domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356) and Attributes common to many map elements (360). This element also uses `@scope`, `@format`, and `@type` from Link-relationship attribute group (366).

Example

For a complete example in the context of the `<topicSubjectTable>`, see Example (345).

8.6.2.5 <topicsubject>

The `<topicsubject>` element identifies the subjects that are covered by a topic or map.

Usage information

To identify a primary subject, refer to the subject with the `<topicsubject>` element itself. Secondary subjects can be specified by nested `<subjectref>` elements.

Specialization hierarchy

The `<topicsubject>` element is specialized from topicref (241). It is defined in the classification-domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356), Link-relationship attribute group (366) (with a narrowed definition of `@href`, given below), `@query` from Topicref-element attributes group (368), `@keyref`, and `@keys`. This element also uses narrowed definitions of `@processing-role` and `@toc` (given below) from Attributes common to many map elements (360).

@href

Points to the resource that is represented by the `<topicref>`. See The href attribute (369) for detailed information on supported values and processing implications. References to DITA content cannot be below the topic level: that is, you cannot reference individual elements inside a topic.

References to content other than DITA topics should use the `@format` attribute to identify the kind of resource being referenced.

@processing-role

Defines how the the default value for `@processing-role` is "resource-only". Otherwise, the definition matches the one found in Attributes common to many map elements (360).

@toc

Specifies whether a topic appears in the table of contents (TOC). If the value is not specified locally, but is specified on an ancestor, the value will cascade from the closest ancestor. On this element the default value for `@toc` is "no". See Attributes common to many map elements (360) for a complete definition of `@toc`.

Example

In the following example, the map is classified as covering the Linux subject, and `developing-web-applications.dita` is classified as covering the Web and development subjects. These subjects (and their keys) are defined externally in a subject scheme map; in order to reference the subject directly without the subject scheme map, the `@href` attribute would be used in place of `@keyref`.

```
<map>
  <title>Working with Linux</title>
  <topicsubject keyref="linux"/>
  <!-- ... -->
  <topicref href="developing-web-applications.dita">
    <topicsubject>
      <subjectref keyref="web"/>
      <subjectref keyref="development"/>
    </topicsubject>
    <!-- ... -->
  </topicref>
  <!-- ... -->
</map>
```

8.6.2.6 <topicSubjectHeader>

The `<topicSubjectHeader>` element represents a header row in the topic subject table.

Usage information

Use the `<topicSubjectHeader>` element to supply a header row for a topic subject table when you want to classify topics with subjects from different categories, apractice also known as facet classification. Each cell in the header row identifies the subject for a different category. As a best practice, the subjects in the same column within the classification rows must appear in the category in the subject scheme. For instance, if the cell within the header row specifies the Operating System category, the subjects in the column must be kinds of operating systems.

Specialization hierarchy

The `<topicSubjectHeader>` element is specialized from relrow (246). It is defined in the classification-domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

For a complete example in the context of the `<topicSubjectTable>`, see Example (345).

8.6.2.7 <topicSubjectRow>

The `<topicSubjectRow>` represents a single row of a topic subject table. It contains topic references in the first column and subject references in each following column.

Specialization hierarchy

The `<topicSubjectRow>` element is specialized from relrow (246). It is defined in the classification-domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356).

Example

For a complete example in the context of the `<topicSubjectTable>`, see Example (345).

8.6.2.8 <topicSubjectTable>

The `<topicSubjectTable>` element is a specialized relationship table that associates topics with subjects. Search tools might use these classifications to retrieve content that is relative to a specific subject or combination of subjects.

Usage information

In a `<topicSubjectTable>`, the first column is reserved for references to content. Subsequent columns are reserved for subjects that classify the content; each column supplies the subjects for the category that is identified in the header. The table resembles a traditional relationship table in which the first column identifies the source and the other columns identify the targets, but the relationship reflects the subjects covered by the content rather than linking between documents.

In a `<reltable>`, topics in any given column establish relationships with topics in every other cell of the same row. In a `<topicSubjectTable>`, topics in the first column are related to all of the subjects in the row, but no relationship is implied between subjects in different columns of the same row. (Relationships between subjects are defined in the `<subjectRelTable>` in the subject scheme map.)

Specialization hierarchy

The `<topicSubjectTable>` element is specialized from reltable (244). It is defined in the classification-domain module.

Attributes

The following attributes are available on this element: Universal attribute group (356) and Attributes common to many map elements (360) (with a narrowed definition of `@toc`, given below). This element also uses `@type`, `@scope`, and `@format` from Link-relationship attribute group (366).

@toc

Specifies whether a topic appears in the table of contents (TOC). If the value is not specified locally, but is specified on an ancestor, the value will cascade from the closest ancestor. On this element the default value for `@toc` is "no". See Attributes common to many map elements (360) for a complete definition of `@toc`.

Example

The topic subject table below associates topics with goals for retrieval and with operating systems for filtering. The subjects are defined in a separate subject scheme map.

```
<subjectScheme>
    <hasKind>
        <subjectdef href="goalType.dita" keys="goal">
            <subjectdef href="performanceGoal.dita" keys="performance"/>
            <subjectdef href="reliabilityGoal.dita" keys="reliability"/>
        </subjectdef>
        <subjectdef href="operatingSystem.dita" keys="os">
            <subjectdef href="linuxOS.dita" keys="linux"/>
            <subjectdef href="unixOS.dita" keys="unix"/>
            <subjectdef href="windowsOS.dita" keys="windows"/>
        </subjectdef>
    </hasKind>
</subjectScheme>
```

Figure 101: Subject scheme map

The following `<topicSubjectTable>` classifies several topics according to subjects defined in the previous map. As with any `<topicSubjectTable>`, the first column is used to specify topics. In this specific example, the second column is used to specify a goal, based on the "goal" subject in the header. The third column is used to specify an operating system. Based on those definitions, the following classifications are made by this table:

- The topics `configure-cron-for-efficiency.dita` and `allocating-raw-storage.dita` are each classified by the goal of "performance"; they also are classified by the operating systems "linux" and "unix".
- The topics `analyze-web-logs.dita` and `detect-denial-of-service-attacks.dita` are each classified by the goal of "reliability"; they also are classified by the operating systems "linux", "unix", and "windows".
- No relationship is defined between subjects in the table, meaning that this table does not define any relationship between the goal of "performance" and the operating systems "linux" or "unix".

```
<map>
<!-- ... -->
<topicSubjectTable>
  <topicSubjectHeader>
    <topicCell type="task"/>
    <subjectCell>
      <topicsubject keyref="goal"/>
    </subjectCell>
    <subjectCell>
      <topicapply keyref="os"/>
    </subjectCell>
  </topicSubjectHeader>
  <topicSubjectRow>
    <topicCell>
      <topicref href="configure-cron-for-efficiency.dita"/>
      <topicref href="allocating-raw-storage.dita"/>
    </topicCell>
    <subjectCell>
      <topicsubject keyref="performance"/>
    </subjectCell>
    <subjectCell>
```

```
      <topicapply keyref="linux"/>
      <topicapply keyref="unix"/>
    </subjectCell>
  </topicSubjectRow>
  <topicSubjectRow>
    <topicCell>
      <topicref href="analyze-web-logs.dita"/>
      <topicref href="detect-denial-of-service-attacks.dita"/>
    </topicCell>
    <subjectCell>
      <topicsubject keyref="reliability"/>
    </subjectCell>
    <subjectCell>
      <topicapply keyref="linux"/>
      <topicapply keyref="unix"/>
      <topicapply keyref="windows"/>
    </subjectCell>
  </topicSubjectRow>
  <!-- ... -->
</topicSubjectTable>
</map>
```

A table view of this `<topicSubjectTable>` might look as follows. This is only one of many possible views; to aid in understanding the example, the content topics in the first column are displayed using only their file names, and related subjects are displayed using only their `@keyref` attribute value.

task	goal	os

`configure-cron-for-efficiency.dita`
 	
`allocating-raw-storage.dita`
	performance	linux
		unix

`analyze-web-logs.dita`
 	
`detect-denial-of-service-attacks.dita`
	reliability	linux
		unix
		windows

Figure 102: Topic subject table

8.7 Other elements

8.7.1 Legacy conversion elements

Conversion elements exist primarily to aid in the conversion of content to DITA.

8.7.1.1 <required-cleanup>

A `<required-cleanup>` element is used as a placeholder for migrated elements that cannot be appropriately tagged without manual intervention.

Usage information

As the element name implies, the intent for authors is to clean up the contained material and eventually remove the `<required-cleanup>` element. Authors should not insert this element into documents.

Processing expectations

Processors must strip this element from output by default. The content of `<required-cleanup>` is not considered to be verified data.

Processor options might be provided to allow a draft view of migrated content in context.

Attributes

The following attributes are available on this element: Universal attribute group (356) (with a modified definition of `@translate`, given below), and the attributes defined below.

@remap
: Provides information about the origins of the content of the `<required-cleanup>` element. This provides authors context for determining how the migrated content should be tagged.

@translate
: Indicates whether the content of the element should be translated or not. The default value for this element is "no"; setting to "yes" will override the default. The -dita-use-conref-target value is also available. The DITA architectural specification contains a list of each OASIS DITA element and its common processing default for the translate value; because this element uses an actual default, it will always be treated as `translate="no"` unless overridden as described.

Example

Presuming an original HTML document had contained some content within a `<center>` tag (for which there is no clear migrational equivalent in DITA), the following might be the result that is valid within an XML editor, but which requires an author to decide how to better tag or revise this original content:

```
<section>
  <title>Some section title</title>
  <required-cleanup remap="center">Some original content migrated
  from a &lt;center> tag.</required-cleanup>
</section>
```

8.7.2 DITAVAL elements

A conditional processing profile (DITAVAL file) is used to identify which values are to be used for conditional processing during a particular output, build, or some other purpose. The profile should have an extension of `.ditaval`.

The DITAVAL format has several elements: `<val>`, the root element, can contain a `<style-conflict>` element followed by `<prop>` or `<revprop>` elements; the `<prop>` and `<revprop>` elements can contain `<startflag>` and `<endflag>` elements; and the `<startflag>` and `<endflag>` elements can contain `<alt-text>` elements.

Notes on ditaval messages

Conditional processing code should provide a report of any attribute values encountered in content that do not have an action associated with them.

Note on ditaval flagging of images

If an image in DITA content becomes flagged using a background color, the color should be represented as a thick border. If a foreground color is expressed, it should be represented as a thin border.

Related concepts

3.3.4.2.1 Conditional processing attributes (46)
The metadata attributes specify properties of the content that can be used to determine how the content should be processed. Specialized metadata attributes can be defined to enable specific business-processing needs, such as semantic processing and data mining.

5.5.3 Conditional processing (profiling) (97)
Conditional processing, also known as profiling, is the filtering or flagging of information based on processing-time criteria.

5.5.3.1 Conditional processing values and groups (97)
Conditional processing attributes classify elements with metadata. The metadata is specified using space-delimited string values or grouped values.

8.7.2.1 <alt-text>

The `<alt-text>` element provides alternate text for an image used for flagging.

Rendering expectations

When no alternate text is specified for a revision flag, the default alternate text for `<revprop>` start of change is a localized translation of "Start of change", and the default alternate text for `<revprop>` end of change is a localized translation of "End of change".

Attributes

This element does not define any attributes.

Example

See val (354).

8.7.2.2 <endflag>

The `<endflag>` element provides information (optional image reference and alternate text) that identifies the end of flagged content.

Usage information

If an image is specified, the specified image will be used to flag the end of the content, with the `<alt-text>` contents as alternative text. If `<alt-text>` is specified without an image, that text will be used to flag the content instead of an image. If no image and no `<alt-text>` are specified, then this element has no defined purpose.

Attributes

The following attribute is available on this element:

@imageref

Provides a URI reference to the image file, using the same syntax as the `@href` attribute. See The href attribute (369) for information on supported values and processing implications.

Example

See val (354).

8.7.2.3 <prop>

The `<prop>` element identifies an attribute, and usually values in the attribute, to take an action on. The identified attribute is a conditional-processing attribute (either `@props` or a specialization of `@props`, such as `@audience`, `@deliveryTarget`, `@platform`, `@product`, or `@otherprops`).

A `<prop>` element can do one of the following:

- A `<prop>` element with no `@att` attribute specified sets a default action for every `<prop>` element. It is an error to use more than one `<prop>` element with no attribute in a single document. Recovery from this error is implementation dependent; in such cases processors **MAY** provide an error or warning message.
- A `<prop>` element with an `@att` attribute but no `@val` attribute sets a default action for that specific attribute or attribute group. For each specific attribute, it is an error to use more than one `<prop>` element with that attribute and no value in a single document. Recovery from this error is implementation dependent; in such cases processors **MAY** provide an error or warning message.
- A `<prop>` element with an `@att` attribute and a `@val` attribute sets an action for that value within that attribute or attribute group. It is an error to use more than one `<prop>` element with the same attribute and value. Recovery from this error is implementation dependent; in such cases processors **MAY** provide an error or warning message.

Attributes

The following attributes are available on this element:

@att

The attribute to be acted upon. If using a literal attribute name, it is `@props` or a specialization of `@props` (such as `@audience`, `@deliveryTarget`, `@platform`, `@product`, or `@otherprops`). Otherwise, the value is the name of a group within one of those attributes, with the group name specified using the generalized attribute syntax. If the `@att` attribute is absent, then the `<prop>` element declares a default behavior for any conditional processing attribute.

@val

Specified the value to be acted upon. If the `@val` attribute is absent, then the `<prop>` element declares a default behavior for any value in the specified attribute.

@action (REQUIRED)

Specifies the action to be taken. Allowable values are:

include

Include the content in output. This is the default behavior unless otherwise set.

exclude

Exclude the content from output (if all values in the particular attribute are excluded).

passthrough

Include the content in output, and preserve the attribute value as part of the output stream for further processing by a runtime engine, for example runtime filtering based on individual user settings. The value should be preserved in whatever syntax is required by the target runtime.

Values that are not explicitly passed through should be removed from the output stream, even though the content is still included.

flag

Include and flag the content on output (if the content has not been excluded).

@color

If flag has been set, the color to use to flag text. Colors can be entered by name or code. Processors **SHOULD** support the color names listed under the heading "<color>" in http://www.w3.org/TR/2006/REC-xsl11-20061205/#datatype and for the 6 digit hex code form (#rrggbb, case insensitive). If flag has not been set, this attribute is ignored.

@backcolor

If flag has been set, the color to use as background for flagged text. Colors can be entered by name or code. Processor support is recommended for the color names listed under the heading "<color>" in http://www.w3.org/TR/2006/REC-xsl11-20061205/#datatype and for the 6 digit hex code form (#rrggbb, case insensitive). If flag has not been set, this attribute is ignored.

@style

If flag has been set, the text styles to use for flagged text. This attribute can contain multiple space-delimited tokens. The following tokens **SHOULD** be processed by all DITAVAL processors:

- underline
- double-underline
- italics
- overline
- bold

In addition, processors might support other proprietary tokens for different types of styling. Such tokens **SHOULD** have a processor-specific prefix to identify them as proprietary. If a processor encounters an unsupported style token, it **MAY** issue a warning, and **MAY** render content flagged with such a style token using some default formatting.

If flag has not been set, this attribute is ignored.

Example

See the example in the <val> description.

8.7.2.4 <revprop>

Identifies a value in the `@rev` attribute that should be flagged in some manner. Unlike the conditional processing attributes, which can be used for both filtering and flagging, the `@rev` attribute only can be used for flagging.

Usage information

It is an error to include more than one `<revprop>` element with the same `@val` attribute setting. Recovery from this error is implementation dependent; in such cases processors **MAY** provide an error or warning message.

The `@rev` attribute identifies when a particular section of a document was added or modified. The attribute is not considered a filtering attribute because this is not sufficient to be used for full version control, such as single-sourcing multiple product variants based on version level – it only represents one aspect of the revision level.

Rendering expectations

When no alternate text is specified for a revision flag, the default alternate text for `<revprop>` start of change is a localized translation of "Start of change", and the default alternate text for `<revprop>` end of change is a localized translation of "End of change".

Attributes

The following attributes are available on this element:

@val

The value to be acted upon. If the `@val` attribute is absent, then the `<revprop>` element declares a default behavior for any value in the `@rev` attribute.

@action (REQUIRED)

The action to be taken. Allowable values are:

include

Include the content in output without flags. This is the default behavior unless otherwise set.

passthrough

Include the content in output, and preserve the attribute value as part of the output stream for further processing by a runtime engine, for example runtime filtering based on individual user settings. The value should be preserved in whatever syntax is required by the target runtime. Values that are not explicitly passed through should be removed from the output stream, even though the content is still included.

flag

Include and flag the content on output (if the content has not been excluded).

@changebar

When flag has been set, specify a changebar color, style, or character, according to the changebar support of the target output format. If flag has not been set, this attribute is ignored.

@color

If flag has been set, the color to use to flag text. Colors can be entered by name or code. Processors **SHOULD** support the color names listed under the heading "<color>" in http://www.w3.org/TR/2006/REC-xsl11-20061205/#datatype and for the 6 digit hex code form (#rrggbb, case insensitive). If flag has not been set, this attribute is ignored.

@backcolor

If flag has been set, the color to use as background for flagged text. Colors can be entered by name or code. Processor support is recommended for the color names listed under the heading "<color>" in http://www.w3.org/TR/2006/REC-xsl11-20061205/#datatype and for the 6 digit hex code form (#rrggbb, case insensitive). If flag has not been set, this attribute is ignored.

@style

If flag has been set, the text styles to use for flagged text. This attribute can contain multiple space-delimited tokens. The following tokens **SHOULD** be processed by all DITAVAL processors:

- underline
- double-underline

- italics
- overline
- bold

In addition, processors might support other proprietary tokens for different types of styling. Such tokens **SHOULD** have a processor-specific prefix to identify them as proprietary. If a processor encounters an unsupported style token, it **MAY** issue a warning, and **MAY** render content flagged with such a style token using some default formatting.

If flag has not been set, this attribute is ignored.

Example

See val (354).

Related concepts

5.5.3.3 Flagging (100)
Flagging is the application of text, images, or styling during rendering. This can highlight the fact that content applies to a specific audience or operating system, for example; it also can draw a reader's attention to content that has been marked as being revised.

8.7.2.5 <startflag>

The `<startflag>` provides information (optional image reference and alternate text) that identifies the beginning of flagged content.

Usage information

If an image is specified, the specified image will be used to flag the beginning of the content, with the `<alt-text>` contents as alternative text. If `<alt-text>` is specified without an image, that text will be used to flag the content instead of an image. If no image and no `<alt-text>` are specified, then this element has no defined purpose.

Attributes

The following attribute is available on this element:

@imageref
Provides a URI reference to the image file, using the same syntax as the `@href` attribute. See The href attribute (369) for information on supported values and processing implications.

Example

See val (354).

8.7.2.6 <style-conflict>

The `<style-conflict>` element declares behavior to be used when one or more flagging methods collide on a single content element.

Usage information

In case of conflicts between flagging methods at different levels (for example, a section is flagged green and a paragraph within the section is flagged red), the most deeply nested flagging method applies.

Rendering expectations

In case of conflicts between flagging methods on the same element (for example, a single element is being flagged with both green and red color), it is recommended that the conflicts be resolved as follows:

<startflag>
: Add all flags that apply.

<endflag>
: Add all flags that apply.

color
: Follow the `<style-conflict>` `@foreground-conflict-color` setting, or use an output-appropriate default color if no conflict color is set.

backcolor
: Follow the `<style-conflict>` `@background-conflict-color` setting, or use an output-appropriate default color if no conflict color is set.

style
: Add all font styles that apply. If two different kinds of underline are used, default to the heaviest (double underline) and use the `@foreground-conflict-color`.

changebar
: Add all change bars that apply.

Attributes

The following attributes are available on this element:

@foreground-conflict-color
: The color to be used when more than one flagging color applies to a single content element.

@background-conflict-color
: The color to be used when more than one flagging background color applies to a single content element.

Example

See val (354).

8.7.2.7 <val>

The `<val>` element is the root element of a DITAVAL file.

Usage information

For information about processing DITAVAL files, including how to filter or flag elements with multiple property attributes or multiple properties within a single attribute, see Conditional processing (profiling) (97).

Attributes

This element does not define any attributes.

Example

```
<val>
   <style-conflict background-conflict-color="red"/>
   <prop action="include" att="audience" val="everybody"/>
   <prop action="flag" att="product" val="YourProd" backcolor="purple"/>
   <prop action="flag" att="product" backcolor="blue"
         color="yellow" style="underline" val="MyProd">
      <startflag imageref="startflag.jpg">
        <alt-text>This is the start of my product info</alt-text>
      </startflag>
      <endflag imageref="endflag.jpg">
        <alt-text>This is the end of my product info</alt-text>
      </endflag>
   </prop>
   <revprop action="flag" val="1.2"/>
</val>
```

This sample DITAVAL file performs the following actions:

- Elements with `audience="everybody"` are included without change.
- Elements with `product="YourProd"` get a background color of purple.
- Elements with `product="MyProd"` get the following actions:
  - The image `startflag.jpg` is placed at the start of the element.
  - The image `endflag.jpg` is placed at the end of the element.
  - The element gets a background color of blue.
  - The text in the element appears in yellow; the text is underlined.
- Elements marked with are flagged with the default revision flags, which are implementation dependent.
- When there are conflicts, for example, if an element is marked with `product="MyProd YourProd"`, it will be flagged with a background color of red.

Figure 103: Sample DITAVAL file

```
<val>
   <prop action="exclude"/>
   <prop action="include" att="audience" val="everybody"/>
   <prop action="include" att="audience" val="novice"/>
   <prop action="include" att="product" val="productA"/>
   <prop action="include" att="product" val="productB"/>
</val>
```

This simple DITAVAL file performs the following actions:

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- The first `<prop>` element does not specify an attribute, which sets a default action of "exclude" for every prop value. This means that, by default, any property value not otherwise defined in this file evaluates to "exclude". Note that this same behavior can be limited to a single attribute; the following `<prop>` element sets a default action of "exclude" for all properties specified on the `@platform` attribute: `<prop action="exclude" att="platform"/>`
- The second and third `<prop>` elements set an action of "include" for two values on the `@audience` attribute. All other values on the `@audience` attribute still evaluate to "exclude".
- The fourth and fifth `<prop>` elements set an action of "include" for two values on the `@product` attribute. All other values on the `@product` attribute still evaluate to "exclude".

Figure 104: DITAVAL file that overrides the default "include" action

```
<val>
   <prop action="exclude" att="product" val="appserver"/>
   <prop action="include" att="product" val="mySERVER"/>
   <prop action="include" att="database" val="dbFIRST"/>
   <prop action="include" att="database" val="dbSECOND"/>
   <prop action="exclude" att="database" val="newDB"/>
</val>
```

Assume that "database" and "appserver" are used as group names within the `@product` attribute. In that case, the sample DITAVAL above performs the following actions:

- The first `<prop>` element excludes the value "appserver" when used within the `@product` attribute. It also sets a default of "exclude" for values within any appserver() group inside of the `@product` attribute.
- The second `<prop>` element sets "mySERVER" to include; this applies whether "mySERVER" appears alone in the `@product` attribute (`product="mySERVER"`) or inside of any group (`product="appserver(mySERVER)"` or `product="otherGroup(mySERVER)"`).
- The third and fourth `<prop>` elements set the database values "dbFIRST" and "dbSECOND" to include. If those values appear inside of a "database" group, they are explicitly set to "include". If they appear elsewhere in a conditional attribute (such as `product="dbFIRST"` or `platform="dbSECOND"`), this rule does not apply.
- The final `<prop>` element sets the database value "newDB" to exclude. If that value appears inside of a database group, it is explicitly set to "exclude". If it appears in any other group or attribute, this rule does not apply.

Remember that with groups, if all values inside of a single group evaluate to "exclude", that is equivalent to an entire attribute evaluating to "exclude", which results in the removal of the content. Using the above sample DITAVAL:

- `<p product="appserver">` is filtered out, because this value is excluded.
- `<p product="appserver(A B)">` is filtered out, because there is no explicit rule for A or B, and values in the "appserver" group inside of `@product` default to exclude.
- `<p product="appserver(A B mySERVER)">` is included, because `product="mySERVER"` evaluates to "include", which means the entire group evaluates to "include".
- `<p product="newDB">` is included, because no rule in the DITAVAL applies, so the "newDB" token defaults to "include".
- `<p product="database(newDB)">` is filtered out, because the token "newDB" is excluded when found in the database group.
- `<p product="database(dbFIRST dbSECOND newDB)">` is included, because both "dbFIRST" and "dbSECOND" are included, so the group evaluates to include.
- `<p product="database(newDB) appserver(mySERVER)">` is filtered out, because the token "newDB" is excluded when found in the database group. The entire "database" group on this paragraph evaluates to "exclude", so the element is excluded, regardless of how the "appserver" group evaluates.

Note: If two groups with the same name exist on different attributes, each group will evaluate the same way. For example, rules for the database group in this sample would evaluate the same whether the group is used within `@product` or `@platform`. See Conditional processing (profiling) (97) for suggestions on how to handle similar groups on different attributes.

Note: If two groups with the same name exist on different attributes, each group will evaluate the same way. For example, rules for the database group in this sample would evaluate the same whether the group is used within `@product` or `@platform`. See Conditional processing (profiling) (97) for suggestions on how to handle similar groups on different attributes.

Figure 105: DITAVAL with conditions for groups

Related concepts

5.5.3.2 Filtering (99)
At processing time, a conditional processing profile can be used to specify profiling attribute values that determine whether an element with those values is included or excluded.

5.5.3.3 Flagging (100)
Flagging is the application of text, images, or styling during rendering. This can highlight the fact that content applies to a specific audience or operating system, for example; it also can draw a reader's attention to content that has been marked as being revised.

5.5.3.5 Examples of conditional processing (101)
This section provides examples that illustrate the ways that conditional processing attributes can be set and used.

8.8 Attributes

This section collects commonly used attributes, with common definitions. If an element uses a different definition, or narrows the scope of, an otherwise common attribute, it will be called out in the topic that defines the element.

8.8.1 Universal attribute group

The universal attribute group defines a set of common attributes available on most DITA elements. The universal attribute group includes all attributes from the metadata, ID, localization, and debug attribute groups, plus the `@class` attribute.

@outputclass

Names a role that the element is playing. The role must be consistent with the basic semantic and expectations for the element. In particular, the `@outputclass` attribute can be used for styling during output processing; HTML output will typically preserve `@outputclass` for CSS processing.

***@class** (Not for use by authors)*

This attribute is not for use by authors. If an editor displays `@class` attribute values, do not edit them. The `@class` attribute supports specialization. Its predefined values allow DITA tools to work correctly with ranges of related content. In a generalized DITA document the `@class` attribute value in the generalized instance might differ from the default value for the `@class` attribute for the element as given in the DTD or schema. See class attribute rules and syntax (133) for more information. This attribute is specified on every element except for the `<dita>` container element. It is always specified with a default value, which varies for each element.

8.8.1.1 ID attribute group

The ID attribute group includes attributes that enable the naming and referencing of elements in topics and maps.

@id
: An anchor point. This ID is the target for references by `@href` and `@conref` attributes and for external applications that refer to DITA content. This attribute is defined with the XML data type NMTOKEN, except where noted for specific elements within the language reference. See ID attribute (61) in the Architectural Specification for more details.

@conref
: This attribute is used to reference an ID on content that can be reused. See The conref attribute (371) for examples and details about the syntax.

@conrefend
: The `@conrefend` attribute is used when reusing a range of elements through `@conref`. The syntax is the same as for the `@conref` attribute; see The conrefend attribute (377) for examples.

@conaction
: This attribute enables users to push content into a new location. Allowable values are mark, pushafter, pushbefore, pushreplace, and -dita-use-conref-target. See The conaction attribute (373) for examples and details about the syntax.

@conkeyref
: Allows the conref feature to operate using a key instead of a URI. See The conkeyref attribute (381) for more details about the syntax and behaviors.

8.8.1.2 Metadata attribute group

The metadata attribute group includes common metadata attributes, several of which support conditional processing (filtering and flagging) or the creation of new attribute domain specializations.

@props
: Root attribute from which new metadata attributes can be specialized. This is a property attribute which supports conditional processing for filtering or flagging. If no value is specified, but the attribute is specified on an ancestor within a map or within the related-links section, the value will cascade from the closest ancestor.

@base
: A generic attribute that has no specific purpose. It is intended to act as a base for specialized attributes that have a simple value syntax like the conditional processing attributes (one or more alphanumeric values separated by whitespace), but is not itself a filtering or flagging attribute.

The `@props` and `@base` attributes each take a space-delimited set of values. However, when acting as a container for generalized attributes, the attribute values will be more complex; see Attribute generalization (142) for more details.

The attributes `@audience`, `@deliveryTarget`, `@platform`, `@product`, and `@otherprops` are specialized from the `@props` attribute. They are defined in independent attribute extension domains, and integrated by default into all OASIS-provided document-type shells. If any of these domains is not integrated into a given document-type shell, the relevant attribute(s) will not be available.

@audience
: Indicates the intended audience for the element. If no value is specified, but the attribute is specified on an ancestor within a map or within the related-links section, the value will cascade from the closest ancestor.

@platform

Indicates operating system and hardware. If no value is specified, but the attribute is specified on an ancestor within a map or within the related-links section, the value will cascade from the closest ancestor.

@deliveryTarget

The intended delivery target of the content, for example "html", "pdf", or "epub". If no value is specified, but the attribute is specified on an ancestor within a map or within the related-links section, the value will cascade from the closest ancestor.

@product

Contains the name of the product to which the element applies. If no value is specified, but the attribute is specified on an ancestor within a map or within the related-links section, the value will cascade from the closest ancestor.

@otherprops

This attribute can be used for any other properties that might be needed to describe an audience, or to provide selection criteria for the element. Alternatively, the `@props` attribute can be specialized to provide a new metadata attribute instead of using the general `@otherprops` attribute. If no value is specified, but the attribute is specified on an ancestor within a map or within the related-links section, the value will cascade from the closest ancestor.

@importance

A range of values that describe an importance or priority attributed to an element. For example, in steps of a task, the attribute indicates whether a step is optional or required. This attribute is not used for DITAVAL-based filtering or flagging; applications might use the importance value to highlight elements. Allowable values are: obsolete, deprecated, optional, default, low, normal, high, recommended, required, urgent, and -dita-use-conref-target.

@rev

Indicates a revision level of an element that identifies when the element was added or modified. It can be used to flag outputs when it matches a run-time parameter; it cannot be used for filtering. It is not sufficient to be used for version control. If no value is specified, but the attribute is specified on an ancestor within a map or within the related-links section, the value will cascade from the closest ancestor.

@status

The modification status of the current element. Allowable values are: new, changed, deleted, unchanged, and -dita-use-conref-target.

Related concepts

3.3.4.2.1 Conditional processing attributes (46)
The metadata attributes specify properties of the content that can be used to determine how the content should be processed. Specialized metadata attributes can be defined to enable specific business-processing needs, such as semantic processing and data mining.

5.5.3 Conditional processing (profiling) (97)
Conditional processing, also known as profiling, is the filtering or flagging of information based on processing-time criteria.

5.5.3.1 Conditional processing values and groups (97)
Conditional processing attributes classify elements with metadata. The metadata is specified using space-delimited string values or grouped values.

5.5.3.2 Filtering (99)

At processing time, a conditional processing profile can be used to specify profiling attribute values that determine whether an element with those values is included or excluded.

6.6.3 Specialization (130)
The specialization feature of DITA allows for the creation of new element types and attributes that are explicitly and formally derived from existing types. This facilitates interchange of conforming DITA content and ensures a minimum level of common processing for all DITA content. It also allows specialization-aware processors to add specialization-specific processing to existing base processing.

7.7.3.6 DTD: Coding requirements for attribute domain modules (165)
The vocabulary modules that define attribute domains have additional coding requirements. The module must include a parameter entity for the new attribute, which can be referenced in document-type shells, as well as a text entity that specifies the contribution to the `@domains` attribute for the attribute domain.

8.8.1.3 Localization attribute group

The localization attribute group defines a set of common attributes related to translation and localization. These attributes are available on most DITA elements.

@translate

Indicates whether the content of the element should be translated or not. Allowable values are yes, no, and -dita-use-conref-target. See Element-by-element recommendations for translators (393) for suggested processing defaults for each element.

@xml:lang

Specifies the language of the element content. The `@xml:lang` attribute and its values are described in the XML Recommendation at http://www.w3.org/TR/REC-xml/#sec-lang-tag. Allowable values are language tokens or the null string.

@dir

Specifies the directionality of text: left-to-right (ltr, the processing default) or right-to-left (rtl). The value lro indicates an override of normal bidi text presentation, forcing the element into left-to-right mode; rlo overrides normal rules to force right-to-left presentation. Allowable values are ltr, rtl, lro, rlo, and -dita-use-conref-target. See The dir attribute (123) for more information.

The `@translate`, `@xml:lang`, and `@dir` attributes identify language-specific words or phrases for specific processing (or non-processing, in the case of `translate="no"`).

```
<p>The cordial response to the question is
<q translate="no" xml:lang="de-de" dir="ltr">nein.</q></p>
```

Related concepts

5.5.6 Translation and localization (121)
DITA has features that facilitate preparing content for translation and working with multilingual content, including the `@xml:lang` attribute, the `@dir` attribute, and the `@translate` attribute. In addition, the `<sort-as>` and `<index-sort-as>` elements provide support for sorting in languages in which the correct sorting of an element requires text that is different from the base content of the element.

8.8.2 Architectural attribute group

The architectural attributes group includes a set of attributes defined for document level elements such as `<topic>` and `<map>`. These attributes are intended to provide information about the DITA namespace, what level of DITA is in use, and what vocabulary modules are in use.

@DITAArchVersion

Designates the version of the architecture that is in use. The default value will increase with each release of DITA. This attribute is in the namespace "http://dita.oasis-open.org/architecture/2005/". This attribute is defined with the XML data type CDATA, but uses a default value of the current version of DITA. The current default is "1.3".

@xmlns:ditaarch

Declares the default DITA namespace. Although this is technically a namespace rather than an attribute, it is included here because it is specified as an attribute in the DTD grammar files distributed by OASIS. The value is fixed to "http://dita.oasis-open.org/architecture/2005/".

@domains

Indicates the specialized domains that are included in the DTD or Schema. This attribute is defined with the XML data type CDATA, and each new document type **SHOULD** specify a default. The value will differ depending on what domains are included in the current DTD or Schema; a sample value is "(topic ui-d) (topic hi-d) (topic pr-d) (topic sw-d) (topic ut-d) (topic indexing-d)".

8.8.3 Attributes common to many map elements

This attribute group collects several attributes that are used on a variety of map elements. For a few elements, the group is modified slightly to remove an attribute such as `@toc` or `@format`; in those cases the element definition will clarify that the element does not use this full set. That is generally done in order to specify a default for one attribute, such as defaulting `@format` to "ditamap" on the `<mapref>` element.

@cascade

Controls how metadata attributes cascade within a map. There are two defined values that should be supported: "merge" and "nomerge". If no value is set, and no value cascades from an ancestor element, processors **SHOULD** assume a default of "merge". See Cascading of metadata attributes in a DITA map (50) for more information about how this attribute interacts with metadata attributes.

@collection-type

Collection types describe how links relate to each other. The processing default is "unordered", although no default is specified in the DTD or Schema. Allowable values are:

unordered

Indicates that the order of the child topics is not significant.

sequence

Indicates that the order of the child topics is significant; output processors will typically link between them in order.

choice

Indicates that one of the children should be selected.

family

Represents a tight grouping in which each of the referenced topics not only relates to the current topic but also relate to each other.

-dita-use-conref-target

See Using the -dita-use-conref-target value (372) for more information.

@processing-role

Describes the processing role of the referenced topic. The processing default is "normal". If no value is specified, but the attribute is specified on an ancestor within a map or within the related-links section, the value will cascade from the closest ancestor. Allowable values are:

normal

Normal topic that is a readable part of the information.

resource-only

The topic is used as a resource for processing purposes. This topic should not be included in a rendered table of contents, and the topic should not be rendered on its own.

-dita-use-conref-target

See Using the -dita-use-conref-target value (372) for more information.

@locktitle

If the `@locktitle` attribute is set to "yes", the content of the `<navtitle>` element or `@navtitle` attribute is used for a navigation title, if it is present. If the `@locktitle` attribute is not present or set to "no", the content of the `<navtitle>` element or `@navtitle` attribute is ignored, and the title of the referenced topic is used as a navigation title.

Note: The `@navtitle` attribute is deprecated in favor of the `<navtitle>` element. When both a `<navtitle>` element and a `@navtitle` attribute are specified, the `<navtitle>` element should be used.

Note: The `@navtitle` attribute is deprecated in favor of the `<navtitle>` element. When both a `<navtitle>` element and a `@navtitle` attribute are specified, the `<navtitle>` element should be used.

Allowable values for `@locktitle` are:

yes

The content of the `<navtitle>` element or `@navtitle` attribute is used for a navigation title.

no

The content of the `<navtitle>` element or `@navtitle` attribute is ignored. This is the processing default.

-dita-use-conref-target

See Using the -dita-use-conref-target value (372) for more information.

@linking

Defines some specific linking characteristics of a topic's current location in the map. If the value is not specified locally, the value might cascade from another element in the map (for cascade rules, see Cascading of metadata attributes in a DITA map (50)). Allowable values are:

targetonly

A topic can only be linked to and cannot link to other topics.

sourceonly

A topic cannot be linked to but can link to other topics.

normal

A topic can be linked to and can link to other topics. Use this to override the linking value of a parent topic.

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none

A topic cannot be linked to or link to other topics.

-dita-use-conref-target

See Using the -dita-use-conref-target value (372) for more information.

@toc

Specifies whether a topic appears in the table of contents (TOC). If the value is not specified locally, the value might cascade from another element in the map (for cascade rules, see Cascading of metadata attributes in a DITA map (50)). Allowable values are:

yes

The topic appears in a generated TOC.

no

The topic does not appear in a generated TOC.

-dita-use-conref-target

See Using the -dita-use-conref-target value (372) for more information.

@search

Describes whether the target is available for searching. If the value is not specified locally, the value might cascade from another element in the map (for cascade rules, see Cascading of metadata attributes in a DITA map (50)). Allowable values are:

yes

no

-dita-use-conref-target

@chunk

When a set of topics is transformed using a map, the `@chunk` attribute allows multi-topic documents to be broken into smaller files and multiple individual topics to be combined into larger combined documents.

For a detailed description of the `@chunk` attribute and its usage, see Chunking (117).

@keyscope

Specifies that the element marks the boundaries of a key scope. See The keyscope attribute (371) for details on how to use the `@keyscope` attribute.

Related concepts

3.3.4.4 Cascading of metadata attributes in a DITA map (50)
Certain map-level attributes cascade throughout a map, which facilitates attribute and metadata management. When attributes *cascade*, they apply to the elements that are children of the element where the attributes were specified. Cascading applies to a containment hierarchy, as opposed to a element-type hierarchy.

8.8.4 Complex-table attribute group

The Complex-table attribute group includes several attributes that are defined on complex table elements. Most of these attributes are part of the OASIS Exchange model; table elements generally use only a subset of the attributes defined in this group. These attributes are not available for the `<simpletable>` elements.

@align

Describes the alignment of text in a table column. Allowable values are:

left

Indicates left alignment of the text.

right

Indicates right alignment of the text.

center

Indicates center alignment of the text.

justify

Justifies the contents to both the left and the right.

char

Use the character specified on the `@char` attribute for alignment.

-dita-use-conref-target

See Using the -dita-use-conref-target value (372) for more information.

The `@align` attribute is available on the following table elements: `<tgroup>`, `<colspec>`, and `<entry>`.

@char

Specifies the character for aligning the table entry data.

Default source for `<entry>` elements starting in this column. If character alignment is specified, the value is the single alignment character source for any implied `@char` values for entry immediately in this column. A value of "" (the null string) means there is no aligning character.

For example, if `align="char"` and `char="r"` are specified, then text in the entry should align with the first occurrence of the letter "r" within the entry.

The `@char` attribute is available on the following table elements: `<colspec>` and `<entry>`.

@charoff

Specifies the horizontal offset of alignment character when `align="char"`.

Default source for `<entry>` elements starting in this column. For character alignment on an entry in the column, horizontal character offset is the percent of the current column width to the left of the (left edge of the) alignment character.

This value should be number, greater than 0 and less than or equal to 100.

For example, if `align="char"`, `char="r"`, and `charoff="50"` are all specified, then text in the entry should align 50% of the distance to the left of the first occurrence of the character "r" within the entry.

The `@charoff` attribute is available on the following table elements: `<colspec>` and `<entry>`.

@colsep

Column separator. A value of 0 indicates no separators; 1 indicates separators.

The `@colsep` attribute is available on the following table elements: `<table>`, `<tgroup>`, `<colspec>`, and `<entry>`.

@rowsep

Row separator. A value of 0 indicates no separators; 1 indicates separators.

The `@rowsep` attribute is available on the following table elements: `<table>`, `<tgroup>`, `<row>`, `<colspec>`, and `<entry>`.

@rowheader

Indicates whether the entries in the respective column **SHOULD** be considered row headers. Allowable values are:

firstcol

Indicates that entries in the first column of the table are functionally row headers (analogous to the way that a `<thead>` element provides column headers). Applies when `@rowheader` is used on the `<table>` element.

headers

Indicates that entries of a column described using the `<colspec>` element are functionally row headers (for cases with more than one column of row headers). Applies when `@rowheader` is used on the `<colspec>` element.

norowheader

Indicates that entries in the first column have no special significance with respect to column headers. Applies when `@rowheader` is used on the `<table>` element.

-dita-use-conref-target

See Using the -dita-use-conref-target value (372) for more information.

Note: This attribute is not part of the OASIS Exchange Table model upon which DITA tables are based. Some DITA processors or output formats might not support all values.

Note: This attribute is not part of the OASIS Exchange Table model upon which DITA tables are based. Some DITA processors or output formats might not support all values.

The `@rowheader` attribute is available on the following table elements: `<table>` and `<colspec>`.

@valign

Indicates the vertical alignment of text in a table entry (cell). Allowable values are:

top

Align the text to the top of the table entry (cell).

bottom

Align the text to the bottom of the table entry (cell).

middle

Align the text to the middle of the table entry (cell).

-dita-use-conref-target

See Using the -dita-use-conref-target value (372) for more information.

The `@valign` attribute is available on the following table elements: `<thead>`, `<tbody>`, `<row>`, and `<entry>`.

8.8.5 Data-element attributes group

The data element attributes group includes attributes that are defined for the `<data>` element, and are reused on most or all specializations of the `<data>` element.

@name
: Defines a unique name for the object.

@datatype
: Describes the type of data contained in the `@value` attribute or within the `<data>` element. A typical use of `@datatype` will be the identifying URI for an XML Schema datatype.

@value
: Specifies a value associated with the current property or element.

8.8.6 Date attributes group

The date attributes group includes attributes that take date values, and are defined on metadata elements that work with date information.

@expiry
: The date when the information should be retired or refreshed, entered as YYYY-MM-DD, where YYYY is the year, MM is the month from 01 to 12, and DD is the day from 01-31.

@golive
: The publication or general availability (GA) date, entered as YYYY-MM-DD, where YYYY is the year, MM is the month from 01 to 12, and DD is the day from 01-31.

8.8.7 Display attribute group

The display attribute group includes attributes whose values can be used for affecting the display of many elements.

@expanse
: Determines the horizontal placement of the element. Allowable values are:

page
: Places the element on the left page margin for left-to-right presentation, or right page margin for right-to-left presentation.

column
: Aligns the element with the current column margin

textline
: Aligns the element with the left (for left to right presentation) or right (for right to left presentation) margin of the current text line and takes indention into account.

spread
: Indicates that, if possible, the object should be rendered across a multi-page spread. If the rendition target does not have anything corresponding to spreads then spread has the same meaning as "page".

-dita-use-conref-target
: See Using the -dita-use-conref-target value (372) for more information.

In DITA tables, in place of the `@expanse` attribute used by other DITA elements, the `@pgwide` attribute is used in order to conform to the OASIS Exchange Table Model. The `@pgwide` attribute has a similar semantic (1=page width; 0=resize to galley or column).

Some DITA processors or output formats might not be able to support all values.

@frame

Specifies which portion of a border should surround the element. Allowable values are:

top
: Draw a line before the element

bottom
: Draw a line after the element

topbot
: Draw a line both before and after the element

all
: Draw a box around the element

sides
: Draw a line at each side of the element

none
: Don't draw any lines around this element

-dita-use-conref-target
: See Using the -dita-use-conref-target value (372) for more information.

Some DITA processors or output formats might not be able to support all values.

@scale

Specifies a percentage, selected from an enumerated list, that is used to resize fonts in relation to the normal text size. This attribute is primarily useful for print-oriented display.

The `@scale` attribute provides an acknowledged style-based property directly on DITA elements. For the `<table>` and `<fig>` elements, the intent of the property is to allow authors to adjust font sizes on the content of the containing element, primarily for print accommodation. An `<image>` in these contexts is to be scaled only by its own direct scale property. If not specifically scaled, such an `<image>` is unchanged by the scale property of its parent `<table>` or `<fig>`.

Allowable values are 50, 60, 70, 80, 90, 100, 110, 120, 140, 160, 180, 200, and -dita-use-conref-target. Some DITA processors or output formats might not be able to support all values.

8.8.8 Link-relationship attribute group

The link relationship attribute group includes attributes whose values can be used for representing navigational relationships. These attributes occur only on elements that represent relationships among DITA elements or between DITA elements and non-DITA resources.

@href

Provides a reference to a resource. See The href attribute (369) for detailed information on supported values and processing implications..

@format

The `@format` attribute identifies the format of the resource being referenced. See The format attribute (383) for details on supported values.

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@scope

The `@scope` attribute identifies the closeness of the relationship between the current document and the target resource. Allowable values are local, peer, external, and -dita-use-conref-target; see The scope attribute (384) for more information on these values.

@type

Describes the target of a reference. See The type attribute (381) for detailed information on supported values and processing implications.

8.8.9 Other common attributes

These common attributes are used across a wide variety of elements, with the common definition included below. These attributes are not defined as a group, and many elements only specify one or two from this list.

@keyref

`@keyref` provides a redirectable reference based on a key defined within a map. See The keyref attribute (370) for information on using this attribute.

@compact

Indicates close vertical spacing between list items. Expanded spacing is the processing default. The output result of compact spacing depends on the processor or browser. Allowable values are:

yes

Indicates compact spacing.

no

Indicates expanded spacing.

-dita-use-conref-target

See Using the -dita-use-conref-target value (372) for more information.

@xml:space

This attribute is provided on `<pre>`, `<lines>`, and on elements specialized from those. It ensures that parsers in editors and transforms respect the white space, including line-end characters, that is part of the data in those elements. It is intended to be part of the default properties of these elements, and not for authors to change or delete. When defined, it has a fixed value of "preserve".

@anchorref

Identifies a location within another map file where this map will be anchored at runtime. Resolution of the map is deferred until the final step in the delivery of any rendered content. For example, `anchorref="map1.ditamap/a1"` causes this map to be pulled into the location of the anchor point "a1" inside `map1.ditamap` when `map1.ditamap` is rendered for delivery.

@mapkeyref

Identifies the map, if any, from which the contained links or metadata are derived. This value might be automatically generated by a process that creates the links or metadata based on map context, as a way to identify which map the material came from. If the `<linklist>`, or `<linkpool>`, or metadata is manually created by an author, there is no need to use this attribute. Note that this attribute is not related to the `@keyref` attribute, and is not used for key based processing.

8.8.10 Simpletable attribute group

The simpletable attribute group includes several attributes that are defined on the `<simpletable>` element and `<simpletable>` specializations. These attributes are not defined for the OASIS exchange table (`<table>`).

@keycol

Defines the column that contains headings for each row. No value indicates no key column. When present, the numerical value causes the specified column to be treated as a vertical header.

@relcolwidth

Specifies the width of each column in relationship to the width of the other columns. The value is a space separated list of relative column widths; each column width is specified as a positive integer or decimal number followed by an asterisk character.

For example, the value `relcolwidth="1* 2* 3*"` gives a total of 6 units across three columns. The relative widths are 1/6, 2/6, and 3/6 (16.7%, 33.3%, and 50%). Similarly, the value `relcolwidth="90* 150*"` causes relative widths of 90/240 and 150/240 (37.5% and 62.5%).

8.8.11 Specialization attributes group

These attributes are designed to be used by specializers, and are not intended for direct use by authors.

@specentry

The specialized entry attribute allows architects of specialized types to define a fixed or default header title for a specialized `<stentry>` element. Not intended for direct use by authors.

@spectitle

The specialized title attribute allows architects of specialized types to define a fixed or default title for a specialized element. Not intended for direct use by authors.

8.8.12 Topicref-element attributes group

The topicref element attributes group includes attributes that are defined for the `<topicref>` element. These attributes also are used on most or all specializations of the `<topicref>` element.

@copy-to

Use the `@copy-to` attribute on the `<topicref>` element to provide a different resource name for a particular instance of a resource referenced by the `<topicref>` (for example, to separate out the different versions of the topic, rather than combining them on output). If applicable, the `@copy-to` value can include path information. The links and navigation associated with that instance will point to a copy of the topic with the file name you specified. Applications **MAY** support `@copy-to` for references to local non-DITA resources. The `@copy-to` attribute is not supported for references to resources where the effective value for `@scope` is "peer" or "external".

Use the `<linktext>` and `<shortdesc>` in the `<topicref>`'s `<topicmeta>` to provide a unique name and short description for the new copy.

8.8.13 Complex attribute definitions

Several DITA attributes require more explanation than can fit in a single table cell. Those attributes are collected here.

8.8.13.1 The @href attribute

The `@href` attribute is used to reference another DITA topic or map, a specific element inside a DITA topic or map, an external Web page, or another non-DITA resource.

The value of a DITA `@href` attribute must be a valid URI reference [RFC 3986]. It is an error if the value is not a valid URI reference. An implementation **MAY** generate an error message; it **MAY** recover from this error condition by attempting to convert the value to a valid URI reference. Note that the path separator character in a URI is the forward slash (“/”); the backward slash character (“\”) is not permitted unescaped within URIs.

When an `@href` attribute references a DITA resource, an `@href` value that consists of a URI without a fragment identifier resolves to the document element in the referenced document. For the purposes of rendering, such as when a `<topicref>` reference to a DITA document is used to render the content as HTML, this means that all topics (and topic specializations) in the target document are included in the reference. For the purpose of linking, the reference resolves to the first (or only) topic (or topic specialization) in the document.

An `@href` value that consists of a URI with a fragment identifier must have a DITA local identifier as the portion after the hash. A DITA local identifier consists of *`topicID/elementID`* for a subelement of a topic, and of *elementID* for topics, maps, and subelements of a map. If the topic referenced by a DITA local identifier is for the same topic, then *topicID* can be replaced by a period; see Processing xrefs and conrefs within a conref (94) for more information on how this syntax relates to conref resolution.

Note that certain characters - including but not limited to the hash sign ("#"), question mark ("?"), back slash ("\"), and space - are not permitted unescaped within URIs. Such characters must be percent-encoded. Also note that the ampersand ("&") and less than (“<”) characters are not permitted in XML attribute values; they must be represented by appropriate character or entity references. Some tools might perform this encoding automatically, while other tools might require that users either avoid the special characters or manually insert the encoding.

Example: Common syntax for the @href attribute

The following table includes some examples of common `@href` syntax. Note that these examples represent only a few common scenarios and are not all inclusive.

Target	Syntax
The first topic in a DITA document	`href="file.dita"`
A specific topic in a DITA document	`href="file.dita#`*`topicid`*`"`
A non-topic element inside a DITA topic	`href="#`*`topicid/elementid`*`"`
A non-topic element inside the same DITA topic as the reference	`href="#./`*`elementid`*`"`
An element in a DITA map	`href="myMap.ditamap#`*`map-branch`*`"`

Target	Syntax
An image	`href="exampleImage.jpg"`
An external resource	`href="http://www.example.org"`

where:

- *topicid* is the value of the `@id` attribute on the DITA topic.
- *elementid* is the value of the `@id` attribute on the element within the DITA topic.
- *map-branch* is the value of the `@id` attribute on the DITA map element.

8.8.13.2 The @keys attribute

A `@keys` attribute consists of one or more space-separated keys. Map authors define keys using a `<topicref>` or `<topicref>` specialization that contains the `@keys` attribute. Each key definition introduces an identifier for a resource referenced from a map. Keys resolve to the resources given as the `@href` value on the key definition `<topicref>` element, to content contained within the key definition `<topicref>` element, or both.

The `@keys` attribute uses the following syntax:

- The value of the `@keys` attribute is one or more space-separated key names.
- Key names consist of characters that are legal in a URI. The case of key names is significant.
- The following characters are prohibited in key names: "{", "}", "[", "]", "/", "#", "?", and whitespace characters.

A key cannot resolve to sub-topic elements, although a `@keyref` attribute can do so by combining a key with a sub-topic element id.

Related concepts

4.4.4 Indirect key-based addressing (65)
DITA keys provide an alternative to direct addressing. The key reference mechanism provides a layer of indirection so that resources (for example, URIs, metadata, or variable text strings) can be defined at the DITA map level instead of locally in each topic.

8.8.13.3 The @keyref attribute

The `@keyref` attribute provides an indirect, late-bound reference to topics, to collections of topics (ditabase), to maps, to referenceable portions of maps, to non-DITA documents, to external URIs, or to XML content contained within a key definition topic reference. When the DITA content is processed, the key references are resolved using key definitions from DITA maps.

For elements that only refer to topics or non-DITA resources, the value of the `@keyref` attribute is a key name. For elements that can refer to elements within maps or topics, the value of the `@keyref` attribute is a key name, a slash ("/"), and the ID of the target element, where the key name must be bound to either the map or topic that contains the target element.

Related concepts

4.4.4 Indirect key-based addressing (65)

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DITA keys provide an alternative to direct addressing. The key reference mechanism provides a layer of indirection so that resources (for example, URIs, metadata, or variable text strings) can be defined at the DITA map level instead of locally in each topic.

8.8.13.4 The @keyscope attribute

The `@keyscope` attribute consists of one or more space-separated key scope names. Map authors define the boundaries for key scopes by specifying the `@keyscope` attribute on `<map>` elements, `<topicref>` elements, or elements that are specializations of `<map>` or `<topicref>`. Such elements, their contents, and any locally-scoped content referenced from within the element, are considered to be part of the scope. Keys defined within a scope are only directly referenceable from within the same scope. They can be referenced from the parent scope using the scope's name, followed by a period, followed by the key name.

All key scopes are contiguous and non-intersecting. Within a root map, two distinct key scopes with the same name have no relationship with each other aside from that implied by their relative locations in the key scope hierarchy. They do not, for example, share key definitions. The only processing impact of a key scope's names is in defining the prefixes used when contributing qualified key names to the parent scope. For example, consider the following map segment:

```
<map>
  <topicgroup keyscope="xyz" id="scope1">
    <keydef keys="a" id="def1"/>
    <!-- other topic references -->
  </topicgroup>
  <topicgroup keyscope="xyz" id="scope2">
    <keydef keys="a" id="def2"/>
    <!-- other topic references -->
  </topicgroup>
  <!-- lots of other content -->
</map>
```

This map creates two distinct scopes that happen to use the same name (xyz). This results in the following:

- Each `<topicgroup>` sets a scope of "xyz" and includes a key "a". From outside of those two scopes, references to `keyref="xyz.a"` (key "a" within the scope "xyz") will always resolve to the first instance of that value, which is in the first `<topicgroup>`.
- Within the first `<topicgroup>`, content uses `keyref="a"` will resolve to the key in that branch (defined on the element with `id="def1"`).
- Within the second `<topicgroup>`, content uses `keyref="a"` will resolve to the key in that branch (defined on the element with `id="def2"`).

8.8.13.5 The @conref attribute

The `@conref` attribute is used to reference content that can be reused. It allows reuse of DITA elements, including topic or map level elements.

The value of the `@conref` attribute must be a URI reference to a DITA element. See URI-based (direct) addressing (63) for details on specifying URI references to DITA elements. As with other DITA references, a `@conref` attribute that references a resource without an ID is treated as a reference to the first topic or map in the document.

Note: When using the `@conref` attribute on an element, the content of that element is ignored. For example, if a phrase is marked up like this:

```
<ph conref="#topic/ph">Something</ph>
```

the word "Something" will be replaced by the content of the referenced `<ph>` element.

Note: When using the `@conref` attribute on an element, the content of that element is ignored. For example, if a phrase is marked up like this:

```
<ph conref="#topic/ph">Something</ph>
```

the word "Something" will be replaced by the content of the referenced `<ph>` element.

Related concepts

5.5.2 Content reference (conref) (92)
The DITA conref attributes provide mechanisms for reusing content. DITA content references support reuse scenarios that are difficult or impossible to implement using other XML-based inclusion mechanisms like XInclude and entities. Additionally, DITA content references have rules that help ensure that the results of content inclusion remain valid after resolution

8.8.13.5.1 Using the -dita-use-conref-target value

The value -dita-use-conref-target is available on enumerated attributes and can also be specified on other attributes. When an element uses `@conref` to pull in content, for any of its attributes assigned a value of "-dita-use-conref-target", the resulting value for those attributes is also pulled in from the referenced element.

Ordinarily, when an element uses `@conref`, any other attributes specified locally will be preserved when the reference is resolved. This causes problems when attributes are required, because required attributes must be specified regardless of whether the `@conref` attribute is present. The purpose of the -dita-use-conref-target value is to allow the author to specify a value for a required attribute while still allowing the conref resolution process to use the matching attribute from the referenced element. The value has the same result when the attribute is not required.

The -dita-use-conref-target token is allowed on any attribute where it is not prohibited by the XML grammar files or by the specification. For example, while `@cols` on the `<tgroup>` element is defined as being a number, this token is implicitly allowed in order to support conref processing for `<tgroup>`. However, the token is not allowed for the `@id` attribute on the `<topic>` element, because "-dita-use-conref-target" does not fit the syntax required by the XML grammar files.

This example shows a map where the `<topichead>` element uses `@conref`. It specifies the `@navtitle` attribute as well as the `@toc` attribute. In the resolved element, `@navtitle` from the referencing element is not preserved because it uses -dita-use-conref-target. The `@toc` attribute from the referencing element overrides the `@toc` attribute on the referenced element using normal conref resolution rules.

Note: In earlier versions of DITA, `@navtitle` was required on the `<topichead>` element. While it is no longer required, the example still illustrates the expected processing for both required and non-required attributes.

Note: In earlier versions of DITA, `@navtitle` was required on the `<topichead>` element. While it is no longer required, the example still illustrates the expected processing for both required and non-required attributes.

```
<map><title>Conref demonstration</title>
  <topichead id="heading"
             navtitle="This is a heading"
             toc="yes"
             linking="normal">
    <topicref href="topic.dita" navtitle="content"/>
  </topichead>

  <topichead conref="#heading"
```

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```
              navtitle="-dita-use-conref-target"
              toc="no">
  </topichead>
</map>
```

Figure 106: Pre-resolution

```
<map><title>Conref demonstration</title>
  <topichead id="heading"
             navtitle="This is a heading"
             toc="yes"
             linking="normal">
    <topicref href="topic.dita" navtitle="content"/>
  </topichead>

  <topichead navtitle="This is a heading"
             toc="no"
             linking="normal">
    <topicref href="topic.dita" navtitle="content"/>
  </topichead>
</map>
```

Figure 107: Effective result post-resolution

Related concepts

5.5.2 Content reference (conref) (92)
The DITA conref attributes provide mechanisms for reusing content. DITA content references support reuse scenarios that are difficult or impossible to implement using other XML-based inclusion mechanisms like XInclude and entities. Additionally, DITA content references have rules that help ensure that the results of content inclusion remain valid after resolution

8.8.13.6 The @conaction attribute

The `@conaction` attribute allows users to push content from one topic into another. It causes the `@conref` attribute to work in reverse, so that the content is pushed from the current topic into another, rather than pulled from another topic into the current one. Allowable values for `@conaction` are: pushafter, pushbefore, pushreplace, mark, and -dita-use-conref-target.

Note: In the descriptions below, the word *target* always refers to the element referenced by a `@conref` attribute.

Note: In the descriptions below, the word *target* always refers to the element referenced by a `@conref` attribute.

There are three possible functions using the `@conaction` attribute: replacing an element, pushing content before an element, and pushing content after an element. The `@conaction` attribute always declares the desired function while the `@conref` attribute provides the target of the reference using the standard `@conref` syntax.

In each case, an element pushed using `@conref` must be of the same type as, or more specialized than, its target. If the pushed element is more specialized than the target, then it should be generalized when the `@conref` is resolved. This ensures that the content will be valid in the target topic.

- It is valid to push using `@conref` when the two elements involved are of the same type. For example, a `<step>` element can use the conref push feature with another `<step>` as the target of the `@conref`.
- The target element can be more general than the source. For example, it is legal to push a `<step>` element to replace a general list item (`<li>`); the `<step>` element should be generalized back to a list item during the process.

- It is not possible to push a more general element into a specialized context. For example, it is not legal to push a list item (`<li>`) in order to replace a `<step>`, because the list item allows many items that are not valid in the specialized context.

Replacing content in another topic

When the `@conaction` attribute is set to "pushreplace", the source element will replace the target specified on the `@conref` attribute. The pushed content remains in the source topic where it was originally authored.

For example, assume that a task in `example.dita` has the id "example", and contains a `<step>` with the id "b":

```
<task id="example" xml:lang="en">
  <title>Example topic</title>
  <taskbody>
    <steps>
      <step id="a"><cmd>A</cmd></step>
      <step id="b"><cmd>B</cmd></step>
      <step id="c"><cmd>C</cmd></step>
    </steps>
  </taskbody>
</task>
```

In order to replace the step with id="b", another topic must combine a `@conaction` value of "pushreplace" with a `@conref` attribute that references this `<step>`:

```
<task id="other" xml:lang="en">
  ...
   <step conaction="pushreplace"
         conref="example.dita#example/b">
     <cmd>Updated B</cmd>
   </step>
  ...
</task>
```

The result will be an updated version of `example.dita` which contains the pushed `<step>`:

```
<task id="example" xml:lang="en">
  <title>Example topic</title>
  <taskbody>
    <steps>
      <step id="a"><cmd>A</cmd></step>
      <step id="b"><cmd>Updated B</cmd></step>
      <step id="c"><cmd>C</cmd></step>
    </steps>
  </taskbody>
</task>
```

When resolving a conref push action, attributes are resolved using the same precedence as for normal `@conref`, with one exception. Attributes on the element with the `@conref` attribute (in this case, the source doing the push) will take priority over those on the referenced element. The exception is that if the source element does not specify an ID, the ID on the referenced element remains; if the source element does specify an ID then that replaces the ID on the referenced element.

It is an error for two source topics to replace the same element. Applications **MAY** warn users if more than one element attempts to replace a single target.

Pushing content before or after another element

Setting the @conaction attribute to "pushbefore" allows an element to be pushed before the element referenced by the @conref attribute. Likewise, setting the @conaction attribute to "pushafter" allows an element to be pushed after the element referenced by the @conref attribute. Multiple sources can push content before or after the same target; the order in which that content is pushed is undefined.

When an element is pushed before or after a target, the resulting document will have at least two of that element. Because this is not always valid, a document attempting to push content before or after a target must take an extra step to ensure that the result will be valid. The extra step makes use of the conaction="mark" value.

When pushing before, the @conref attribute itself looks just as it did when replacing, but the @conaction attribute is set to "mark" because it is marking the target element. This element remains empty; its purpose is to ensure that it is legal to have more than one of the current element. Immediately before the element which marks the target, you will place the content that you actually want to push. This element will set the @conaction attribute to "pushbefore".

When pushing after, the procedure is the same, except that the order of the elements is reversed. The element with conaction="pushafter" comes immediately after the element which marks the target.

Attributes on the element which is pushed (the one with conaction="pushbefore") must be retained on the target, apart from the @conaction attribute itself. If this causes the result document to end up with duplicate IDs, an application can recover by dropping the duplicate ID, modifying it to ensure uniqueness, or warning the user.

The following restrictions apply when pushing content before or after an element:

- The elements that use conaction="mark" and conaction="pushbefore" are the same type as each other and appear in sequence. This restriction prevents a topic from trying to push a <body> element before or after another <body> element, because it is not valid to have two body elements in sequence.
- Either the container elements of the source and target match, or the container of the source element is be a specialization of the target's container. This is also to ensure validity of the target; for example, while it is possible to include multiple titles in a <section>, it is not possible to do so in a figure. Comparing the parents prevents a second <section> title from being pushed before a figure title (the resulting figure would not be valid DITA). This restriction only applies to the pushbefore or pushafter actions, not to the pushreplace action.

When content is pushed from one topic to another, it is still rendered in the original context. Processors might delete the empty element that has the conaction="mark" attribute. In order to push content from a topic without actually rendering that topic on its own, the topic should be referenced from the map with the @processing-role attribute set to "resource-only".

Example: pushing an element before the target

The following example pushes a <step> before "b" in the example.dita file shown above.

```
<step conaction="pushbefore"><cmd>Do this before B</cmd></step>
<step conaction="mark" conref="example.dita#example/b">
  <cmd/>
</step>
```

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The result contains the pushed `<step>` element before "b".

```
<task id="example" xml:lang="en">
  <title>Example topic</title>
  <taskbody>
    <steps>
      <step id="a"><cmd>A</cmd></step>
      <step><cmd>Do this before B</cmd></step>
      <step id="b"><cmd>B</cmd></step>
      <step id="c"><cmd>C</cmd></step>
    </steps>
  </taskbody>
</task>
```

Example: pushing an element after the target

Pushing an element after a target is exactly the same as pushing before, except that the order of the "mark" element and the pushed element are reversed.

```
<step conaction="mark" conref="example.dita#example/b">
  <cmd/>
</step>
<step conaction="pushafter"><cmd>Do this AFTER B</cmd></step>
```

In this case the resulting document has the pushed content after `<step>` b:

```
<task id="example" xml:lang="en">
  <title>Example topic</title>
  <taskbody>
    <steps>
      <step id="a"><cmd>A</cmd></step>
      <step id="b"><cmd>B</cmd></step>
      <step><cmd>Do this AFTER B</cmd></step>
      <step id="c"><cmd>C</cmd></step>
    </steps>
  </taskbody>
</task>
```

Combining @conaction with @conkeyref or @conrefend

The `@conkeyref` attribute can be used as an indirect way to specify a `@conref` target. If the `@conkeyref` attribute is specified on an element that also uses the `@conaction` attribute, the `@conkeyref` attribute is used to determine the target of the conref push (as it would normally be used to determine the target of `@conref`).

The conref push function does not provide the ability to push a range of elements, so it is an error to specify the `@conrefend` attribute together with the `@conaction` attribute. If the two are specified together an application can recover by warning the user, ignoring the `@conrefend` attribute, or with some other implementation strategy.

8.8.13.7 The @conrefend attribute

The `@conrefend` attribute is used when referencing a range of elements with the conref mechanism. The `@conref` or `@conkeyref` attribute references the first element in the range, while `@conrefend` references the last element in the range.

Using @conref together with @conrefend

Several items must be taken into account when using or implementing `@conrefend`.

- Processors will resolve the range by pulling in the start target and following sibling XML nodes across to and including the end target.
- The start and end elements of a range **MUST** be of the same type as the referencing element or generalizable to the referencing element. For example, `@conref` and `@conrefend` attributes on an `<li>` element might reference other `<li>` elements, or they might reference specializations of `<li>` such as `<step>`.
- As with `@conref`, if the `@conrefend` references a more specialized version of the referencing element, applications should generalize the target when resolving.
- It is not valid to use `@conrefend` to reference a more general version of an element (such as using `<step>` to reference an `<li>` element).
- Other nodes (such as elements or text) between the start and end of a range do not have to match the referencing element.
- The start and end elements in a range **MUST** share the same parent, and the start element **MUST** precede the end element in document order.
- The parent of the referencing element **MUST** be the same as the parent of the referenced range or generalizable to the parent of the referencing element. For example, it is possible to pull a range from `<conbody>` into `<body>`, because `<conbody>` is generalizable to `<body>`. It is not possible to pull a range from `<body>` into `<conbody>`, because the result might not be valid in `<conbody>`.
- With single conref, an `@id` attribute from the referenced element will not be preserved on the resolved content. With a range, an `@id` on both the start and the end elements will not be preserved. `@id` attributes on intermediate or child nodes should be preserved; if this results in duplicate `@id` values, an application can recover by changing the `@id`, warning the user, or implementing another strategy.
- With a single conref, attributes specified on the referencing elementcan be used to override attributes on the referenced element. With a conref range, the same is true, with the following clarifications:
  - When an `@id` attribute is specified on the referencing element, it will only be preserved on the first element of the resolved range.
  - When other attributes are specified, they will only apply to referenced elements of the same type. For example, if `<step>` is used to pull in a range of sequential `<step>` elements, locally specified attributes apply to all steps in the range. If `<ol>` is used to pull in a series of (`<ol>`, `<p>`, `<ol>`), locally specified attributes apply only to the `<ol>` elements in that range.

Example: reusing a set of list items

```
<topic id="x">
     ...
     <body>
         <ol>
```

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```
            <li id="apple">A</li>
            <li id="bear">B</li>
            <li id="cat">C</li>
            <li id="dog">D</li>
            <li id="eel">E</li>
        </ol>
    </body>
</topic>
```

Figure 108: List example: Source `topic.dita` with ids

```
<topic id="y">
    ...
    <body>
        <ol>
            <li>My own first item</li>
            <li conref="topic.dita#x/bear" conrefend="topic.dita#x/dog"/>
            <li>And a different final item</li>
        </ol>
    </body>
</topic>
```

Figure 109: List example: Reusing topic with conrefs

```
 <topic id="y">
     ...
     <body>
         <ol>
             <li>My own first item</li>
             <li>B</li>
             <li id="cat">C</li>
             <li>D</li>
             <li>And a different final item</li>
         </ol>
     </body>
</topic>
```

Figure 110: List example: Processed result of reusing topic

Example: Reusing a set of blocks

```
<topic id="x">
     ...
     <body>
   <p id="p1">First para</p>
      <ol id="mylist">
     <li id="apple">A</li>
     <li id="bear">B</li>
     <li id="cat">C</li>
     <li id="dog">D</li>
     <li id="eel">E</li>
   </ol>
   <p id="p2">Second para</p>
     </body>
 </topic>
```

Figure 111: Block level example: Source `topic.dita` with ids

```
<topic id="y">
    ...
    <body>
        <p conref="topic.dita#x/p1" conrefend="topic.dita#x/p2"/>
    </body>
 </topic>
```

Figure 112: Block level example: Reusing topic with conrefs

```
 <topic id="y">
     ...
     <body>
    <p>First para</p>
       <ol id="mylist">
      <li id="apple">A</li>
      <li id="bear">B</li>
      <li id="cat">C</li>
      <li id="dog">D</li>
      <li id="eel">E</li>
    </ol>
    <p>Second para</p>
     </body>
</topic>
```

Figure 113: Block level example: Processed result of reusing topic

Using @conrefend together with @conkeyref

When the `@conkeyref` attribute is used in place of `@conref`, a key is used to address the target of the reference. The `@conrefend` attribute, which indicates the end of a `@conref` range, cannot use a key. Instead the the map or topic element addressed by the key name component of the `@conkeyref` is used in place of whatever map or topic element is addressed by the `@conrefend` attribute.

For example, if the value of the `@conkeyref` attribute is "config/step1" and the value of the `@conrefend` is `defaultconfig.dita#config/laststep`, the conref range will end with the step that has id="laststep" in whatever topic is addressed by the key name "config". If the key name "config" is not defined, and the `@conref` attribute itself is not present for fallback, the `@conrefend` attribute is ignored.

Example: Combining @conrefend with @conkeyref

In this example the key "xmp" is defined as the first topic in the file `examples.dita`.

```
<map>
  <!-- ... -->
  <keydef keys="xmp" href="examples.dita"/>
  <!-- ... -->
</map>

examples.dita:
<topic id="examples">
  <title>These are examples</title>
  <body>
    <ul>
      <li id="first">A first example</li>
      <li>Another trivial example</li>
      <li id="last">Final example</li>
    </ul>
  </body>
</topic>
```

To reuse these list items by using the key, the `@conkeyref` attribute combines the key itself with the sub-topic id (first) to define the start of the range. The `@conrefend` attribute defines a default high-level object along with the sub-topic id (last) that ends the range:

```
<li conkeyref="xmp/first"
    conrefend="default.dita#default/last"/>
```

The `@conkeyref` attribute uses a key to reference the first topic in `examples.dita`, so the range begins with the object `examples.dita#examples/first`. The high-level object in the `@conrefend` attribute (`default.dita#default`) is replaced with the object represented by the key (the first topic in `examples.dita`), resulting in a range that ends with the object `examples.dita#examples/last`.

Figure 114: Defining and referencing a key with @conkeyref

When `@conref`, `@conkeyref`, and `@conrefend` are all specified, the key value takes priority.

```
<li conkeyref="thisconfig/start"
    conref="standardconfig.dita#config/start"
    conrefend="standardconfig.dita#config/end"/>
```

- If the key "thisconfig" is defined as `mySpecialConfig.dita#myconfig`, then the range will go from the list item with id="start" to the list item with id="end" in the topic `mySpecialConfig.dita#myconfig`.
- If the key "thisconfig" is defined as `myConfig.dita`, then the range will go from the list item with id="start" to the list item with id="end" within the first topic in `myConfig.dita`.
- If the key "thisconfig" is not defined, then the unchanged `@conref` and `@conrefend` attributes are used as fallback. In that case, the range will go from the list item with id="start" to the list item with id="end" within the topic `standardconfig.dita#config`.

Figure 115: Combining @conref, @conkeyref, and @conrefend

Error conditions

When encountering an error condition, an implementation can issue an error message.

Condition or Issue	Result
The `@conref` attribute cannot be resolved in the target document (the target element might have been removed or its id has changed).	The `@conref` is ignored.
The `@conrefend` attribute cannot be resolved in the target document (the target element might have been removed or its id has changed).	Range cannot be resolved, optional recovery processes the result as a simple conref.
Start and end elements are not siblings in the target document.	If the start element exists, optional recovery processes the result as a simple conref.
End element occurs before the start element in the target document.	If the start element exists, optional recovery processes the result as a simple conref.
An element has a `@conrefend` attribute but is missing the `@conref` attribute.	No result.

8.8.13.8 The @conkeyref attribute

The `@conkeyref` attribute provides an indirect content reference to topic elements, map elements, or elements within maps or topics. When the DITA content is processed, the key references are resolved using key definitions from DITA maps.

For content references from map elements to map elements or topic elements to topic elements, the value of the `@conkeyref` attribute is a key name, where the key must be bound to a map element (for references from map elements) or a topic element (for references from topic elements). For all other elements, the value of the `@conkeyref` attribute is a key name, an optional slash ("/"), and the ID of the target element, where the key name must be bound to the map or topic that contains the topic element.

When the key name specified by the `@conkeyref` attribute is not defined and the element also specifies a `@conref` attribute, the `@conref` attribute is used to determine the content reference relationship. If no `@conref` attribute is specified there is no content reference relationship. Processors **SHOULD** issue a warning when a `@conkeyref` reference cannot be resolved and there is no `@conref` attribute to use as a fallback. Processors **MAY** issue a warning when a `@conkeyref` cannot be resolved to an element and a specified `@conref` is used as a fallback.

The `@conrefend` attribute, which defines the end of a conref range, cannot include a key. Instead the map or topic element addressed by the key name component of the `@conkeyref` is used in place of whatever map or topic element is addressed by the `@conrefend` attribute. See Using conrefend together with conkeyref (379) for more information and for examples of this behavior.

8.8.13.9 The @type attribute

The `@type` attribute is used on linking elements to describe the target of a cross-reference. It also is used on the `<note>` element to describe the note type, as well as on several other elements for varying purposes.

The descriptions for the `@type` attribute on linking elements and on `<note>` are included in this section; for other elements, such as `<audience>`, `<copyright>`, and `<object>`, the description can be found with the topic for the specific element.

Using @type on a linking element

The `@type` attribute describes the target of a cross-reference and might generate cross-reference text based on that description. Only the `<xref>` element can link to content below the topic level: other types of linking can target whole topics, but not parts of topics. Typically `<xref>` should also be limited to topic-level targets, unless the output is primarily print-oriented. Web-based referencing works best at the level of whole topics, rather than anchor locations within topics.

If not explicitly specified on an element, the `@type` attribute value cascades from the closest ancestor element. If there is no explicit value for the `@type` attribute on any ancestor, a default value of “topic” is used. During output processing for references to DITA topics (`format="dita"`), it is an error if the actual type of a DITA topic and the explicit, inherited, or default value for the `@type` attribute are not the same as or a specialization of the `@type` attribute value. In this case, an implementation **MAY** give an error message, and **MAY** recover from this error condition by using the `@type` attribute value. During output processing for references to non-DITA objects (that is, either scope is “external" or format is neither “dita” nor “ditamap”) or other cases where the type of the referenced item cannot be determined from the item itself, the explicit, inherited, or default value for the `@type` attribute is used without any validation. When a referencing element is first added to or updated in a document, DITA aware editors **MAY** set the `@type` attribute value based on the actual type of a referenced DITA topic.

If the `@type` attribute is specified when referencing DITA content, it should match one of the values in the referenced element's `@class` attribute. The `@type` value can be an unqualified local name (for example, "fig") or a qualified name exactly as specified in the `@class` attribute (for example, "mymodule/mytype"). Processors might ignore qualified names or consider only the local name.

For example, if the value is set to `type="topic"`, the link could be to a generic topic, or any specialization of topic, including concept, task, and reference. Applications **MAY** issue a warning when the specified or inherited `@type` attribute value does not match the target (or a specialization ancestor of the target).

Some possible values for use on the `<xref>` element and its specializations include:

fig
: Indicates a link to a figure.

table
: Indicates a link to a table.

li
: Indicates a link to an ordered list item.

fn
: Indicates a link to a footnote.

section
: Indicates a link to a section.

Other values thatcan be used on any linking element include:

concept, task, reference, topic
: Cross-reference to a topic type.

(no value)
: The processor should retrieve the actual type from the target if available. If the type cannot be determined, the default should be treated as "topic".

-dita-use-conref-target
: See Using the -dita-use-conref-target value (372) for more information.

Other values can be used to indicate other types of topics or elements as targets. Processing is only required to support the above list or specializations of types in that list. Supporting additional types as targets might require the creation of processing overrides.

Using @type in a <note> element

In a `<note>` element, this defines the type of note. For example, if the note is a tip, the word **Tip** might be used to draw the reader's attention to it. The values danger, warning, and notice have meanings that are based on ANSI Z535 and ISO 3864 regulations.

If `@type` is set to "other", the value of the `@othertype` attribute can be used. If you use `@othertype`, many processors will require additional information on how to process the value. Allowable values for the `@type` attribute are:

note
: This is just a note.

attention
: Please pay extra attention to this note.

caution
: Care is required when proceeding.

danger
: Important! Be aware of this before doing anything else. When used with the `<hazardstatement>` element, this indicates an imminently hazardous situation which, if not avoided, **will** result in death or serious injury.

fastpath
: This note will speed you on your way.

important
: This note is important.

notice
: Indicates a potential situation which, if not avoided, might result in an **undesirable result or state**.

remember
: Don't forget to do what this note says.

restriction
: You can't do what this note says.

tip
: This is a fine little tip.

warning
: Indicates a potentially hazardous situation. When used with the `<hazardstatement>` element, this indicates a situation which, if not avoided, **could** result in death or serious injury.

trouble
: Provides information about how to remedy a trouble situation.

other
: This is something other than a normal note.

-dita-use-conref-target
: See Using the -dita-use-conref-target value (372) for more information.

8.8.13.10 The @format attribute

The `@format` attribute identifies the format of the resource that is referenced. If no value is specified, but the attribute is specified on an ancestor within a map or within the related-links section, the value will cascade from the closest ancestor.

The following values for `@format` have special processing implications:

dita
: The destination uses DITA topic markup or markup specialized from a DITA topic. Unless otherwise specified, when `@format` is set to "dita", the value for the `@type` attribute will be treated as "topic".

ditamap
: The linked-to resource is a DITA map. It represents the referenced hierarchy at the current point in the referencing map. References to other maps can occur at any point in a map, but because relationship tables are only valid as children of a map, referenced relationship tables are treated as children of the referencing map.

Note: If a `<topicref>` element that references a map contains child `<topicref>` elements, the processing behavior regarding the child `<topicref>` elements is undefined.

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Note: If a `<topicref>` element that references a map contains child `<topicref>` elements, the processing behavior regarding the child `<topicref>` elements is undefined.

(no value)

The processing default is used. The processing default for the `@format` attribute is determined by inspecting the value of the `@href` attribute. If the `@href` attribute specifies a file extension, the processing default for the `@format` attribute is that extension, after conversion to lower-case and with no leading period. The only exception to this is if the extension is "xml", in which case the default format is "dita". If there is no extension, but the `@href` value is an absolute URI whose scheme is "http" or "https", then the processing default is "html". In all other cases where no extension is available, the processing default is "dita".

If the actual format of the referenced content differs from the effective value of the `@format` attribute, and a processor is capable of identifying such cases, it **MAY** recover gracefully and treat the content as its actual format, but **SHOULD** also issue a message.

For other formats, using the file extension without the "." character typically represents the format. For example, the following values are all possible values for `@format`:

html

The format of the linked-to resource is HTML or XHTML.

pdf

The format of the linked-to resource is PDF.

txt

The format of the linked-to resource is a text file.

8.8.13.11 The @scope attribute

The `@scope` attribute identifies the closeness of the relationship between the current document and the target resource.

- Set `@scope` to "local" when the resource is part of the current set of content.
- Set `@scope` to "peer" when the resource is part of the current set of content but might not accessible at build time, or for maps to be treated as root maps for the purpose of creating map-to-map key references (peer maps). An implementation might open such resources in the same browser window to distinguish them from those with `@scope` set to "external".
- Set `@scope` to "external" when the resource is not part of the current information set and should open in a new browser window.
- See Using the -dita-use-conref-target value (372) for more information on -dita-use-conref-target.

If no value is specified, but the attribute is specified on an ancestor within a map or within the related-links section, the value will cascade from the closest ancestor. The processing default is determined by the value of the `@href` attribute. In most cases, the processing default is "local". However the processing default is "external" whenever the absolute URI in the `@href` attribute begins with one of the following schemes:

- http
- https
- ftp
- mailto

Processors can consider additional URI schemes as "external" by default. Processors **MUST** always consider relative URIs as "local" by default.

8.8.13.12 The @role and @otherrole attributes

The `@role` attribute defines the role the target topic plays in relationship with the current topic. For example, in a parent/child relationship, the role would be "parent" when the target is the parent of the current topic, and "child" when the target is the child of the current topic. This structure could be used to sort and classify links at display time.

Supported values for @role

Allowable values for the `@role` attribute are:

parent

Indicates a link to a topic that is a parent of the current topic.

child

Indicates a link to a direct child such as a directly nested or dependent topic.

sibling

Iindicates a link between two children of the same parent topic.

friend

Indicates a link to a similar topic that is not necessarily part of the same hierarchy.

next

Indicates a link to the next topic in a sequence.

previous

Indicates a link to the previous topic in a sequence.

cousin

Indicates a link to another topic in the same hierarchy that is not a parent, child, sibling, next, or previous.

ancestor

Indicates a link to a topic above the parent topic.

descendant

Indicates a link to a topic below a child topic.

other

Indicates any other kind of relationship or role. Enter that role as the value for the `@otherrole` attribute.

-dita-use-conref-target

See Using the -dita-use-conref-target value (372) for more information.

The `@otherrole` attribute is available to specify an alternate role that is not available in the list above, and should be used in conjunction with `role="other"`.

9 Conformance

An implementation is a conforming implementation of DITA if the implementation meets the conditionsthat are described in Section 4.1. A document is a conforming DITA document if the document meets the conditions in that are described in Section 4.2.

Conformance to the DITA specification allows documents and document types that are used with different processors to produce the same or similar results with little or no reimplementation or modification. Conformance also allows DITA specializations to work with any conforming DITA application, with at least the same level of support available to unspecialized documents.

4.1 Conformance of DITA implementations

The DITA specification defines several core features, as summarized in the following list. Any implementation that supports a feature **MUST** conform to all rules laid out in the section that describes the feature.

1. Specialization-based processing, as described in X.
2. Resolving links to elements in DITA documents, as described in section X.
3. Resolving `@keyref` attributes to a key defined in a map, as described in section X.
4. Resolving `@keyref` attributes across key scopes, as described in section X.
5. Pulling content references, as described in Content reference (conref) (92)
6. Pushing content references, as described in Content reference (conref) (92).
7. Resolving conditional processing based on DITAVAL documents, as described in Conditional processing (profiling) (97).
8. Resolving branch filtering markup, as described in Branch filtering (103).
9. Resolving `@chunk` attributes, as described in Chunking (117).

In addition, certain DITA elements have normative rules associated regarding how to render or process those elements.

1. `<desc>`, as described in desc (193)
2. `<draft-comment>`, as described in draft-comment (198)
3. `<image>`, as described in image (203)
4. `<linklist>`, as described in linklist (226)
5. `<navtitle>`, as described in navtitle (187)
6. `<pre>`, as described in pre (217)
7. `<q>`, as described in q (218)
8. `<related-links>`, as described in related-links (188)
9. `<relcolspec>`, as described in relcolspec (247)
10. `<reltable>`, as described in reltable (244)
11. `<searchtitle>`, as described in searchtitle (189)
12. `<shortdesc>`, as described in shortdesc (189)
13. `<title>`, as described in title (191)
14. `<topichead>`, as described in topichead (256)

Conforming DITA implementations **SHOULD** include a conformance statement that gives the version of the DITA specification that is supported, indicate if all features from the list above are supported, and indicate that all normative rendering rules are supported.

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If only a subset of features is supported, implementations **SHOULD** indicate which features are (or are not) supported. If an implementation supports rendering DITA elements but does not render all elements as described above, that application **SHOULD** indicate which elements are (or are not) supported.

Not all DITA features are relevant for all implementations. For example, a DITA editor that does not render content references in context does not need to conform to rules regarding the `@conref` attribute. However, any application that renders content references **MUST** conform to the rules described inContent reference (conref) (92).

Implementations that support only a subset of DITA features are considered conforming as long as all supported features follow the requirements that are given in the DITA specification. An implementation that does not support a particular feature **MUST** be prepared to interoperate with other implementations that do support the feature.

4.2 Conformance of DITA documents

A document conforms with the DITA standard if it meets all of the following conditions.

1. A DITA document that refers to document type shells distributed by OASIS **MUST** be valid according to both the grammar files and any assertions provided in the language reference.
2. If a DITA document refers to a custom document type shell, that shell **MUST** also conform to the rules laid out in X.X.X.X Rules for document-type shells.
3. If a DITA document's custom document type shell includes constraints, that shell **MUST** also conform to the rules laid out in X.X.X.X Constraint rules
4. If a DITA document uses specialized elements or attributes, those elements or attributes **MUST** also conform to the rules laid out in X.X.X Specialization rules for element types, X.X.X Specialization rules for attributes, and X.X.X Class attribute rules and syntax.

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Appendix A Acknowledgments

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Deb Bissantz, Vasont
Carsten Brennecke, SAP
Bill Burns, Healthwise
Stan Doherty, Individual member
Kristen James Eberlein, Eberlein Consulting LLC
Carlos Evia, Virginia Tech
Nancy Harrison, Individual member
Alan Houser, Individual member
Scott Hudson, Boeing
Eliot Kimber, Individual member
Chris Nitchie, Oberon Technologies
Keith Schengili-Roberts, IXIASOFT
Eric Sirois, IXIASOFT
Dawn Stevens, Comtech Services
Bob Thomas, Individual member

Appendix B Non-normative information

This section contains non-normative information, including topics about new features in DITA 2.0 and migrating to DITA 2.0.

Appendix B.1 About the specification source

The DITA specification is authored in DITA. It is a complex document that uses many DITA features, including key references (keyrefs), content references (conrefs), and controlled values set in a subject scheme map.

The source files for the DITA specification are managed in a GitHub repository that is maintained by OASIS; they also can be downloaded from OASIS.

The DITA Technical Committee used the following applications to work with the DITA source:

- DITA Open Toolkit
- <oXygen/> XML Editor and XMetaL Author Enterprise
- DITAweb
- Antenna House Formatter

Appendix B.2 Changes from DITA 1.3 to DITA 2.0

Appendix B.3 File naming conventions

The DITA OASIS Technical Committee uses certain conventions for the names of XML grammar files. We suggest using these conventions as a best practice to facilitate interchange of grammar files.

Globally unique identifiers

Vocabulary modules that are intended for use outside of a narrowly-restricted context should have one or more associated, globally-unique names by which the modules can be referenced without regard to their local storage location. The globally-unique names can be public identifiers, URNs, or absolute URLs.

Document type shells

Document type shells should be given a name that distinguishes their name, owner, or purpose; for example, `acme-concept.dtd`. The document type shells that are provided by the DITA Technical Committee use the root element of the primary specialization as the basis for the file name.

Module names

Each vocabulary module has a short name that is used to construct entity names and other names that are used in associated declarations. Modules also can have abbreviated names that further shorten the short name, for example "hi-d" for the "highlight" domain, where "softwarehighlight" is the short name and "hi-d" is the abbreviated name.

For structural modules, the module name should be the element type name of the top-level topic or map type defined by the module, such as "concept" or "bookmap".

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For element domain modules, the module name should be a name that reflects the subject domain to which the domain applies, such as "highlight" or "software". Domain module names should be sufficiently unique that they are unlikely to conflict with any other domains.

DTD-based specialization modules

Use the following file-naming conventions for DTD-based specialization modules.

Module type	File name (entities)	File name (elements)	Example
Structural	`*ModuleName*.ent`	`*ModuleName*.mod`	`concept.ent` or `concept.mod`
Element domain	`*DomainName*Domain.ent`	`*DomainName*Domain.mod`	`highlightDomain.ent` or `highlightDomain.mod`
Attribute domain	`*AttributeName*AttDomain.ent`	Not applicable	`deliveryTargetAttDomain.ent`

where:

- *ModuleName* is the name of the element type, such as "concept" or "glossentry".
- *DomainName* is the name of the domain, for example, "highlight" or "utilities".
- *AttributeName* is the name of the specialized attribute, for example, "deliveryTarget".

RELAX NG-based specialization modules

Use the following file-naming conventions for RELAX NG-based specialization modules.

Module type	File name	Example
Structural	`*ModuleName*Mod.*rng*`	`conceptMod.rng`
Element domain	`*DomainName*DomainMod.rng`	`highlightDomainMod.rng`
Attribute domain	`*AttributeName*AttDomain.rng`	`deliveryTargetAttDomainMod.rng`

where:

- *ModuleName* is the name of the element type, such as "concept" or "glossentry".
- *DomainName* is the name of the domain, for example, "highlight" or "utilities".
- *AttributeName* is the name of the specialized attribute, for example, "deliveryTarget".

XSD-based specialization modules

Use the following file-naming conventions for XSD-based specialization modules.

Module	File name	Example
Structural modules: Element groups	`*ModuleName*Grp.xsd`	`conceptGrp.xsd`
Structural modules: All	`*ModuleName*Mod.xsd`	`conceptMod.xsd`

Module	File name	Example
other declarations		
Domain modules	`*DomainName*.xsd`	`highlightDomain.xsd`
Attribute domain	`*AttributeName*AttDomain.xsd`	`deliveryTargetAttDomain.xsd`

where:

- *ModuleName* is the name of the element type, such as "concept" or "glossentry".
- *DomainName* is the name of the domain, for example, "highlight" or "utilities".
- *AttributeName* is the name of the specialized attribute, for example, "deliveryTarget".

Constraint modules

Use the following file-naming conventions for constraint modules.

Structural modules

Structural constraint modules should be named using the following format:

DTD	`*qualifierTagname*Constraint.mod`
RELAX NG	`*qualifierTagname*ConstraintMod.rng`
XSD	`*qualifierTagname*ConstraintMod.xsd`

where:

- *qualifier* is a string that is specific to the constraints module and characterizes it, for example, "strict" or "requiredTitle" or "myCompany-".
- *Tagname* is the element type name with an initial capital, for example, "Taskbody" or "Topic".

For example, the file names for the constraint that is applied to the general task to create the strict task are `strictTaskbodyConstraint.mod`, `strictTaskbodyConstraintMod.rng`, or `strictTaskbodyConstraintMod.xsd`.

Domain modules

Domain constraint modules should be named using the following format:

DTD	`*qualifierdomain*DomainConstraint.ent`
RELAX NG	`*qualifierdomain*DomainConstraintMod.rng`
XSD	`*qualifierdomain*DomainConstraintMod.xsd`

where:

- *qualifier* is a string that is specific to the constraints module and characterizes it, for example, "noSyntaxDiagram" or "myCompany-".
- *domain* is the name of the domain to which the constraints apply, for example, "Highlighting" or "Programming".

For example, the file name for a constraint module that removes the syntax diagram from the programming domain might be `noSyntaxDiagramProgrammingDomainConstraint.ent`.

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Because of restrictions on the redefine feature of XML Schema, it is sometimes necessary to use an intermediate level of redefinition, which requires a separate XSD document. In that case, the intermediate XSD document should be named `*qualifierdomain*DomainConstraintsInt.xsd`.

Appendix B.4 Migrating to DITA 2.0

Appendix B.5 Considerations for generalizing <foreign> elements

The `<foreign>` element can contain a mixture of DITA and non-DITA content. Non-DITA content that is contained within a `<foreign>` element cannot be generalized. However, the `<foreign>` element itself, as well as any DITA elements that it contains, can be generalized using normal rules.

If a `<foreign>` element contains non-DITA content, the non-DITA content can be exported to a separate file and replaced in-line with an `<object>` element. The `@data` attribute of the `<object>` element would reference the generated file, and the `@type` attribute of the `<object>` element would be set to the value "DITA-foreign".

If an `<object>` element is present within the `<foreign>` element during generalization, it is not included with the content that is exported to the separate file. This original `<object>`element is used to specify alternate content in publishing systems that cannot display the foreign content. It would not be modified except as the ordinary rules of generalization require it.

In the exported file, exported content would be enclosed within a root `<foreign>` element in order to accommodate the possibility that it might contain several main elements apart from the alternate content.

For easy recognition, the name of the exported file would start with “dita-generalized-” , and it is recommended that the file name also contain the topic ID, specialization type, and element ID or generated identifier.

Example: Simple object generalization

For example, a DITA document could contain a specialization of `<foreign>` for MathML using the MathML domain that ships with DITA 1.3. It could look like this:

```
<mathml class="+ topic/foreign mathml-d/mathml ">
  <m:math>
    <m:mi>x</m:mi><m:mo>+</m:mo><m:mn>3</m:mn>
  </m:math>
  <data-about>X plus three</data-about>
</mathml>
```

The `<mathml>` container is a DITA element, so it should be generalized using normal rules. The `<m:math>` element, which is not a DITA element, will be exported to another file. The `<data-about>` element will remain:

```
<foreign class="+ topic/foreign mathml-d/mathml ">
  <object data="dita-generalized-topicid_mathml1.xml" type="DITA-foreign"/>
  <data-about>X plus three</data-about>
</foreign>

Contents of dita-generalized-topicid_mathml1.xml:
<foreign class="+ topic/foreign mathml-d/mathml "
         xmlns:m="http://www.w3.org/1998/Math/MathML">
>
  <m:math>
    <m:mi>x</m:mi><m:mo>+</m:mo><m:mn>3</m:mn>
  </m:math>
</foreign>
```

Example: Multiple object generalization

An object might also contain multiple object elements:

```
<mathml class="+ topic/foreign mathml-d/mathml ">
  <m:math>
    <m:mi>x</m:mi><m:mo>+</m:mo><m:mn>3</m:mn>
  </m:math>
  <data-about>X plus three</data-about>
  <m:math>
    <m:mi>y</m:mi><m:mo>-</m:mo><m:mn>2</m:mn>
  </m:math>
</mathml>
```

The `<mathml>` container, which is a normal DITA element, should be generalized using normal rules. A file should generated for each set of elements bounded by the container and any existing object elements. In this case, two files will be generated, and two new object elements added to the source.

The modified source:

```
<foreign class="+ topic/foreign mathml-d/mathml ">
  <object data="dita-generalized-topicid_mathml1.xml" type="DITA-foreign"/>
  <data-about>X plus three</data-about>
  <object data="dita-generalized-topicid_mathml2.xml" type="DITA-foreign"/>
</foreign>
```

The contents of dita-generalized-topicid_mathml1.xml, the first exported file:

```
<foreign class="+ topic/foreign mathml-d/mathml "
         xmlns:m="http://www.w3.org/1998/Math/MathML">
  <m:math>
    <m:mi>x</m:mi><m:mo>+</m:mo><m:mn>3</m:mn>
  </m:math>
</foreign>
```

The contents of dita-generalized-topicid_mathml2.xml, the second exported file:

```
<foreign class="+ topic/foreign mathml-d/mathml "
         xmlns:m="http://www.w3.org/1998/Math/MathML">
  <m:math>
    <m:mi>y</m:mi><m:mo>-</m:mo><m:mn>2</m:mn>
  </m:math>
</foreign>
```

Appendix B.6 Element-by-element recommendations for translators

This topic contains a list of all OASIS DITA elements that are available in the edition. It includes recommendations on how to present the element type to translators, whether the element contents are likely to be suitable for translation, and whether the element has attributes whose values are likely to be suitable for translation. Examples of content that is not suitable for translation include code fragments and mailing addresses.

Since the distinction between block and inline elements is ultimately controlled by the container of the element and the processing associated with it, the same element might be a block in one context and an inline element in another. Specializing document types might vary this behavior according to the needs of the document type being created, and the distinctions given below are provided only as a guide to known behavior with the base DITA document types.

Notes on the tables below

- For specializations, the second column gives the ancestor element, and the third column gives a quick yes/no guide to indicate whether all behavior is inherited. If something is not inherited, the change will appear in bold.
- For any specialization not listed below, the suggested default is to fall back to the closest listed ancestor.
- The block/inline presentation column indicates whether the element is formatted as a single block.
- The block/inline translation column indicates whether the element represents a complete translatable segment. For example, the element `<cmd>` is presented inline with other elements, but represents a complete translation segment.
- Items marked as block*** are blocks on their own, but might appear in the middle of a segment. They should not break the flow of the current segment. These are considered "subflow" elements for translation. We recommend that, when possible, these elements should only be placed at sentence boundaries to aid in translation.
- For all elements, the `@translate` attribute will override the suggested default translation setting. So, a translation setting of "yes" or "no" in the table below does not guarantee that an element will always, or never, be translated.
- If an element has translatable attributes, they are listed in the last column. Note that the `@spectitle` and `@specentry` attributes are described with a footnote.
- The `<keyword>` element (as well as specializations of `<keyword>`) is an inline, phrase-like element when it appears in the body of a document. It can also appear in the `<keywords>` element in `<topicmeta>` (for maps) or in the `<prolog>` (for topic). When it appears in the `<keywords>` element, each `<keyword>` represents an individual segment, and is not part of a larger segment; in that location, `<keyword>` can be considered a "subflow" element.

Topic elements

Element name	Specialized from	Block/Inline (presentation)	Block/Inline (translation)	Translatable content?	Translatable attributes?
`<abstract>`	N/A	block	block	yes	
`<alt>` [5]	N/A	block***[1]	block	yes	
`<audience>`	N/A	block (metadata)	block	yes	
`<author>`	N/A	block (metadata)	block	yes	

[1] This element is considered a "subflow" element for translation. If it is located in the middle of a translation segment, it should not be translated as part of that segment. For example, `<indexterm>`, `<fn>`, and `<draft-comment>` might divide a sentence in two, but should be treated as blocks, and should not interrupt the sentence.

[2] The `@spectitle` and `@specentry` attributes can contain translatable text. The direct use of fixed-in-the-DTD text by tools is discouraged, in favor of using the value as a lookup string to find the translation outside of the file, using accepted localization methods for generated text.

[3] The block vs. inline designation for the `<foreign>` element is likely to change for some specializations.

[4] The `<desc>`, `<object>`, and `<image>` elements inside `<foreign>` should still be translatable; they provide an alternative display if the foreign content cannot be processed.

[5] The use of the `@alt` attribute is deprecated in favor of the `<alt>` element.

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Element name	**Specialized from**	**Block/Inline (presentation)**	**Block/Inline (translation)**	**Translatable content?**	**Translatable attributes?**
`<body>`	N/A	block	block	yes	
`<bodydiv>` *(new in DITA 1.2)*	N/A	block	block	yes	
`<brand>`	N/A	block (metadata)	block	yes	
`<category>`	N/A	block (metadata)	block	yes	
`<cite>`	N/A	inline	inline	yes	
`<colspec>`	N/A	n/a	n/a	n/a	
`<component>`	N/A	block (metadata)	block	yes	
`<copyrholder>`	N/A	block (metadata)	block	yes	
`<copyright>`	N/A	block (metadata)	block	yes	
`<copyryear>`	N/A	block (metadata)	block	yes	
`<created>`	N/A	block (metadata)	block	yes	
`<critdates>`	N/A	block (metadata)	block	yes	
`<data>`	N/A	N/A (metadata)	block	no (likely to change for some specializations)	
`<data-about>`	N/A	N/A (metadata)	block	no	
`<dd>`	N/A	block	block	yes	
`<ddhd>`	N/A	block	block	yes	
`<desc>`	N/A	block	block	yes	
`<div>` *(new in DITA 1.3)*	N/A	block	block	yes	
`<dl>`	N/A	block	block	yes	`@spectitle`[2]
`<dlentry>`	N/A	block	block	yes	
`<dlhead>`	N/A	block	block	yes	
`<draft-comment>`	N/A	block***[1]	block	**no**	
`<dt>`	N/A	block	block	yes	
`<dthd>`	N/A	block	block	yes	
`<entry>`	N/A	block	block	yes	
`<example>`	N/A	block	block	yes	`@spectitle`[2]
`<fallback>`	N/A	block	block	yes	
`<featnum>`	N/A	block (metadata)	block	yes	
`<fig>`	N/A	block	block	yes	`@spectitle`[2]

[6] The desc, object, and image elements inside `<foreign>` should still be translatable; they provide an alternative display if the foreign content cannot be processed.

Element name	Specialized from	Block/Inline (presentation)	Block/Inline (translation)	Translatable content?	Translatable attributes?
`<figgroup>`	N/A	block	block	yes	
`<fn>`	N/A	block***[1]	block	yes	
`<foreign>` [7]	N/A	block[3]	block[3]	no[4]	
`<image>`	N/A	block when `@placement`= break, otherwise inline	block when `@placement`= break, otherwise inline	yes	
`<index-base>`	N/A	block***[1]	block	yes	
`<index-sort-as>` *(new in DITA 1.2)*	N/A	block***[1]	block	yes	
`<include>`	N/A	inline	inline	yes	
`<indexterm>`	N/A	block***[1]	block	yes	
`<itemgroup>`	N/A	inline	inline	yes	
`<keyword>`	N/A	inline	inline (except when within `<keywords>` – see note above the table)	yes	
`<keywords>`	N/A	block	block	yes	
`<li>`	N/A	block	block	yes	
`<lines>`	N/A	block	block	yes	`@spectitle`[2]
`<link>`	N/A	block	block	yes	
`<linkinfo>`	N/A	block	block	yes	
`<linklist>`	N/A	block	block	yes	`@spectitle`[2]
`<linkpool>`	N/A	block	block	yes	
`<linktext>`	N/A	block	block	yes	
`<lq>`	N/A	block	block	yes	`@reftitle`
`<metadata>`	N/A	block (metadata)	block	yes	
`<navtitle>`	N/A	block	block	yes	
`<no-topic-nesting>`	N/A	n/a	n/a	n/a	
`<note>`	N/A	block	block	yes	`@othertype`, `@spectitle`[2]
`<object>`	N/A	block	block	yes	`@standby`
`<ol>`	N/A	block	block	yes	`@spectitle`[2]

[7] The block vs. inline designation for the `<foreign>` element is likely to change for some specializations.

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Element name	**Specialized from**	**Block/Inline (presentation)**	**Block/Inline (translation)**	**Translatable content?**	**Translatable attributes?**
`<othermeta>`	N/A	block (metadata)	block	yes	`@content`
`<p>`	N/A	block	block	yes	
`<param>`	N/A	block	block	n/a	
`<permissions>`	N/A	block (metadata)	block	yes	
`<ph>`	N/A	inline	inline	yes	
`<platform>`	N/A	block (metadata)	block	yes	
`<pre>`	N/A	block	block	yes	`@spectitle`[2]
`<prodinfo>`	N/A	block (metadata)	block	yes	
`<prodname>`	N/A	block (metadata)	block	yes	
`<prognum>`	N/A	block (metadata)	block	yes	
`<prolog>`	N/A	block (metadata)	block	yes	
`<publisher>`	N/A	block (metadata)	block	yes	
`<q>`	N/A	inline	inline	yes	
`<related-links>`	N/A	block	block	yes	
`<required-cleanup>`	N/A	block***[1]	block	**no**	
`<resourceid>`	N/A	block (metadata)	block	yes	
`<revised>`	N/A	block (metadata)	block	yes	
`<row>`	N/A	block	block	yes	
`<searchtitle>`	N/A	block	block	yes	
`<section>`	N/A	block	block	yes	`@spectitle`[2]
`<sectiondiv>` *(new in DITA 1.2)*	N/A	block	block	yes	
`<series>`	N/A	block (metadata)	block	yes	
`<shortdesc>`	N/A	block	block	yes	
`<simpletable>`	N/A	block	block	yes	`@spectitle`[2]
`<sl>`	N/A	block	block	yes	`@spectitle`[2]
`<sli>`	N/A	block	block	yes	
`<source>`	N/A	block (metadata)	block	yes	
`<state>`	N/A	inline	inline	yes	`@value`
`<stentry>`	N/A	block	block	yes	`@specentry`[2]
`<sthead>`	N/A	block	block	yes	
`<strow>`	N/A	block	block	yes	
`<table>`	N/A	block	block	yes	

Element name	Specialized from	Block/Inline (presentation)	Block/Inline (translation)	Translatable content?	Translatable attributes?
`<tbody>`	N/A	block	block	yes	
`<term>`	N/A	inline	inline	yes	
`<text>` *(new in DITA 1.2)*	N/A	inline	inline	yes	
`<tgroup>`	N/A	block	block	yes	
`<thead>`	N/A	block	block	yes	
`<title>`	N/A	block	block	yes	
`<titlealts>`	N/A	block	block	yes	
`<tm>`	N/A	inline	inline	yes	
`<topic>`	N/A	block	block	yes	
`<ul>`	N/A	block	block	yes	`@spectitle`[2]
`<unknown>` *(new in DITA 1.1)*	N/A	block	block	no	
`<vrm>`	N/A	block (metadata)	block	yes	
`<vrmlist>`	N/A	block (metadata)	block	yes	
`<xref>`	N/A	inline	inline	yes	

Map elements

Element name	Specialized from	Block/Inline (presentation)	Block/Inline (translation)	Translatable content?	Translatable attributes?
`<anchor>`	N/A	n/a	n/a	n/a	
`<linktext>`	N/A	block	block	yes	
`<map>`	N/A	block	block	yes	
`<navref>`	N/A	n/a	n/a	n/a	
`<relcell>`	N/A	block	block	yes	
`<relcolspec>`	N/A	block	block	yes	
`<relheader>`	N/A	block	block	yes	
`<relrow>`	N/A	block	block	yes	
`<reltable>`	N/A	block	block	yes	
`<searchtitle>`	N/A	block	block	yes	
`<shortdesc>`	N/A	block	block	yes	
`<topicmeta>`	N/A	block	block	yes	
`<topicref>`	N/A	block	block	yes	`@navtitle`
`<ux-window>`	N/A	N/A (empty)	N/A (empty)	no	

Subject scheme elements

Element name	Specialized from	Inherits everything from ancestor?	Block/Inline (presentation)	Block/Inline (translation)	Translatable content?	Translatable attributes?
`<attributedef>`	`<data>`	yes	N/A (metadata	block	no	
`<defaultSubject>`	`<topicref>`	yes	block	block	yes	
`<elementdef>`	`<data>`	yes	N/A (metadata)	block	no	
`<enumerationdef>`	`<topicref>`	yes	block	block	yes	
`<hasInstance>`	`<topicref>`	yes	block	block	yes	
`<hasKind>`	`<topicref>`	yes	block	block	yes	
`<hasNarrower>`	`<topicref>`	yes	block	block	yes	
`<hasPart>`	`<topicref>`	yes	block	block	yes	
`<hasRelated>`	`<topicref>`	yes	block	block	yes	
`<relatedSubjects>`	`<topicref>`	yes	block	block	yes	
`<subjectdef>`	`<topicref>`	yes	block	block	yes	
`<subjectHead>`	`<topicref>`	yes	block	block	yes	
`<subjectHeadMeta>`	`<topicmeta>`	yes	block	block	yes	
`<schemeref>`	`<topicref>`	yes	block	block	yes	
`<subjectRel>`	`<relrow>`	yes	block	block	yes	
`<subjectRelHeader>`	`<relrow>`	yes	block	block	yes	
`<subjectRelTable>`	`<reltable>`	yes	block	block	yes	
`<subjectRole>`	`<relcell>`	yes	block	block	yes	
`<subjectScheme>`	`<map>`	yes	block	block	yes	

Hazard statement domain (hazard-d elements)

Element name	Specialized from	Inherits everything from ancestor?	Block/Inline (presentation)	Block/Inline (translation)	Translatable content?	Translatable attributes?
`<consequence>`	`<li>`	yes	block	block	yes	
`<hazardstatement>`	`<note>`	yes	block	block	yes	`@othertype`, `@spectitle`[2]
`<hazardsymbol>`	`<image>`	yes	block when `@placement=` break, otherwise inline	block when `@placement=` break, otherwise inline	yes	*removes* `@alt`

Element name	Specialized from	Inherits everything from ancestor?	Block/Inline (presentation)	Block/Inline (translation)	Translatable content?	Translatable attributes?
`<howtoavoid>`	`<li>`	yes	block	block	yes	
`<messagepanel>`	`<ul>`	yes	block	block	yes	`@spectitle`[2]
`<typeofhazard>`	`<li>`	yes	block	block	yes	

Highlight domain elements (hi-d)

Element name	Specialized from	Inherits everything from ancestor?	Block/Inline (presentation)	Block/Inline (translation)	Translatable content?	Translatable attributes?
`<b>`	`<ph>`	yes	inline	inline	yes	
`<line-through>` *(new in DITA 1.3)*		yes	inline	inline	yes	
`<i>`	`<ph>`	yes	inline	inline	yes	
`<overline>` *(new in DITA 1.3)*	`<ph>`	yes	inline	inline	yes	
`<sub>`	`<ph>`	yes	inline	inline	yes	
`<sup>`	`<ph>`	yes	inline	inline	yes	
`<tt>`	`<ph>`	yes	inline	inline	yes	
`<u>`	`<ph>`	yes	inline	inline	yes	

Indexing domain elements (indexing-d)

Element name	Specialized from	Inherits everything from ancestor?	Block/Inline (presentation)	Block/Inline (translation)	Translatable content?	Translatable attributes?
`<index-see>`	`<index-base>`	yes	block***[1]	block	yes	
`<index-see-also>`	`<index-base>`	yes	block***[1]	block	yes	
`<index-sort-as>`	`<index-base>`	yes	block***[1]	block	yes	

Media domain elements (media-d) *(new in DITA 2.0)*

Element name	Specialized from	Inherits everything from ancestor?	Block/Inline (presentation)	Block/Inline (translation)	Translatable content?	Translatable attributes?
`<video>`	`<object>`	no	block	block	yes	
`<audio>`	`<object>`	no	block	block	yes	
`<media-controls>`	`<param>`	no	block	block	n/a	
`<media-autoplay>`	`<param>`	no	block	block	n/a	
`<media-loop>`	`<param>`	no	block	block	n/a	
`<media-muted>`	`<param>`	no	block	block	n/a	
`<video-poster>`	`<param>`	no	block	block	n/a	
`<media-source>`	`<param>`	no	block	block	n/a	
`<media-track>`	`<param>`	no	block	block	n/a	

Utilities domain elements (ut-d)

Element name	Specialized from	Inherits everything from ancestor?	Block/Inline (presentation)	Block/Inline (translation)	Translatable content?	Translatable attributes?
`<area>`	`<figgroup>`	yes	block	block	yes	
`<coords>`	`<ph>`	**NO**	inline	inline	**no**	
`<imagemap>`	`<fig>`	yes	block	block	yes (can contain translatable alternate text)	`@spectitle`[2]
`<shape>`	`<keyword>`	**NO**	inline	inline	**no**	
`<sort-as>` *(new in DITA 1.3)*	`<data>`	**NO**	block***[1]	block	yes	

Classification domain elements (classify-d)

Element name	Specialized from	Inherits everything from ancestor?	Block/Inline (presentation)	Block/Inline (translation)	Translatable content?	Translatable attributes?
`<subjectCell>`	`<relcell>`	yes	block	block	yes	
`<subjectref>`	`<topicref>`	yes	block	block	yes	`@navtitle`
`<topicapply>`	`<topicref>`	yes	block	block	yes	`@navtitle`
`<topicCell>`	`<relcell>`	yes	block	block	yes	
`<topicsubject>`	`<topicref>`	yes	block	block	yes	`@navtitle`
`<topicSubjectHeader>`	`<relrow>`	yes	block	block	yes	
`<topicSubjectRow>`	`<relrow>`	yes	block	block	yes	
`<topicSubjectTable>`	`<reltable>`	yes	block	block	yes	

DITAVALref domain elements (ditavalref-d)

Element name	Specialized from	Inherits everything from ancestor?	Block/Inline (presentation)	Block/Inline (translation)	Translatable content?	Translatable attributes?
`<ditavalmeta>`	`<topicmeta>`	yes	block	block	yes	
`<ditavalref>`	`<topicref>`	yes	block	block	yes	`@navtitle`
`<dvrKeyscopePrefix>`	`<data>`	yes	N/A (metadata)	block	no	
`<dvrKeyscopeSuffix>`	`<data>`	yes	N/A (metadata)	block	no	
`<dvrResourcePrefix>`	`<data>`	yes	N/A (metadata)	block	no	
`<dvrResourceSuffix>`	`<data>`	yes	N/A (metadata)	block	no	

Map group domain elements (mapgroup-d)

Element name	Specialized from	Inherits everything from ancestor?	Block/Inline (presentation)	Block/Inline (translation)	Translatable content?	Translatable attributes?
`<anchorref>` *(new in DITA 1.2)*	`<topicref>`	yes	block	block	yes	`@navtitle`
`<keydef>` *(new in DITA 1.2)*	`<topicref>`	yes	block	block	yes	`@navtitle`
`<mapref>` *(new in DITA 1.2)*	`<topicref>`	yes	block	block	yes	`@navtitle`

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Element name	Specialized from	Inherits everything from ancestor?	Block/Inline (presentation)	Block/Inline (translation)	Translatable content?	Translatable attributes?
`<topicgroup>`	`<topicref>`	yes	block	block	yes	`@navtitle`
`<topichead>`	`<topicref>`	yes	block	block	yes	`@navtitle`
`<topicset>` *(new in DITA 1.2)*	`<topicref>`	yes	block	block	yes	`@navtitle`
`<topicsetref>` *(new in DITA 1.2)*	`<topicref>`	yes	block	block	yes	`@navtitle`

DITAVAL elements

The DITAVAL elements are not specialized, and are not rendered on their own, so related columns are dropped from this table. There are no translatable attributes in the DITAVAL element set.

The only element that directly contains text for translation is `<alt-text>`.

Element name	Block/Inline (translation)	Translatable content?
`<alt-text>`	block	yes
`<endflag>`	block	yes (inside nested elements)
`<prop>`	block	yes (inside nested elements)
`<revprop>`	block	yes (inside nested elements)
`<startflag>`	block	yes (inside nested elements)
`<style-conflict>`	block	N/A *(empty element)*
`<val>`	block	yes (inside nested elements)

Appendix B.7 Formatting expectations

DITA is a standard that supports the creation of human-readable content. Accordingly, DITA defines fundamental document components. Since there is a reasonable expectation that such document components be rendered consistently, we suggest the following formatting conventions.

Table 11: Formatting expectations for DITA elements

Element	Suggested formatting
`<b>`	Apply bold highlighting to the contents of the `<b>` element.
`<cite>`	Set citations apart from the surrounding text by a form of highlighting, for example, italics.
`<dd>`	See `<dl>`.

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Element	**Suggested formatting**
`<dl>`	Apply the following conventions: • The term (`<dt>`) is against the starting margin of the page or column. • The description or definition (`<dd>`) is either indented and on the next line or on the same line after the term. • The `<dlhead>` looks like a table heading row.
`<dlhead>`	See `<dl>`.
`<dt>`	See `<dl>`.
`<i>`	For Western languages, apply italic highlighting to the contents of the `<i>` element.
`<li>`	Apply the following conventions: • In ordered lists, list items are indicated by numbers or alphabetical characters. • In unordered lists, list items are indicated by bullets or dashes.
`<lines>`	Render the contents of `<lines>` elements in a non-monospaced font.
`<note>`	Render a label for notes. The content of the label depends on the values of the `@type` attribute. A note typically is formatted in a way that stands out from the surrounding content.
`<ol>`	See `<li>`.
`<overline>`	Render a line above the contents of the `<overline>` element.
`<pre>`	Render the content of a `<pre>` element in a monospaced font.
`<sl>`	See `<sli>`.
`<sli>`	Apply the following conventions: • The content of each simple list item is placed on a separate line. • The lines are not distinguished by numbers, bullets, or other icons.
`<sub>`	Render the contents of the `<sub>` element lower in relationship to the surrounding text and in a smaller font.
`<sup>`	Render the contents of the `<sup>` element higher in relationship to the surrounding text and in a smaller font.
`<tt>`	Render the contents of the `<tt>` element in a monospaced font.
`<u>`	Apply underlining to the contents of the `<u>` element.

Appendix B.8 DTD public identifiers

Each document-type shell (`.dtd` file) or module component (`.mod` or `.ent` file) has a public identifier. The public identifier can reference either the latest version or a specific version of the document-type shell or module component.

The public identifiers for the DTD files that are maintained by OASIS use the following format:

```
"-//OASIS//DTD DITA version information-type//EN"
```

where:

- *version* either is the DITA version number (for example, 1.0, 1.1, 1.2, or 1.3) or is omitted entirely.
- *information-type* is the name of the topic or map type in camel case, for example, Concept or BookMap.

Note that "OASIS" is the owner identifier; this indicates that the artifacts are owned by OASIS. The keyword "DITA" is a convention that indicates that the artifact is DITA-related.

Appendix B.9 Domains and constraints in the OASIS specification

This section provides a summary of the domains and constraints that are available as part of the OASIS specification, as well as a summary of how they are used.

Appendix B.9.1 Domains and constraints in the OASIS specification

OASIS distributes grammar files for a set of domains and constraints.

A designation of (map) after the domain name indicates that the domain only specializes map elements; a designation of (topic) indicates that the domain specializes elements that are only available in topic or that it can only be used in topics. A designation of (map/topic) indicates that the domain specializes elements that are common to both maps and topics, so could be used in either even if it is generally intended for one or the other. Attribute domains can always be used in both topics and maps.

Table 12: Base domains

Domain	Description	Short name
Classify (map)	For associating content in a map with subjects in a subject scheme.	classify-d
`@deliveryTarget` attribute	Attribute for filtering based on delivery target.	N/A
Ditavalref (map)	For filtering a branch of a map.	ditavalref-d
Hazard statements (map/topic)	For providing detailed information about safety hazards.	hazard-d
Highlighting (map/ topic)	For highlighting when the appropriate semantic element does not exist yet.	hi-d
Indexing (map/topic)	For extended indexing functions such as see and see-also.	indexing-d
Map group (map)	Utility elements for use in maps.	mapgroup-d
Utilities (map/topic)	For providing imagemaps, sort keys, and other useful structures.	ut-d

Appendix B.9.2 Base domains: Where they are used

This section provides a summary of which document types use each of the base OASIS domains.

Domain	What includes it	What does NOT include it
Classify (map)		• Base map, base topic
`@deliveryTarget` attribute (base)	• Base map, base topic	• N/A

Domain	What includes it	What does NOT include it
Ditavalref (map)	• Base map	• Base topic
Hazard statement (map/topic)	• Base map, base topic	
Highlighting (map/topic)	• Base map, base topic	• N/A
Indexing (map/topic)	• Base map, base topic	
Map group (map)	• Base map	• Base topic
Utilities (map/topic)	• Base map, base topic	• N/A

Appendix B.9.3 Base document types: Included domains

This topic provides a summary of which domains are used in each of the base document types.

Table 13: Domain usage in base document types

Document type	Includes these domains	Does not include
base map	• `@deliveryTarget` attribute • Hazard statement (map/topic) • Highlighting (map/topic) • Indexing (map/topic) • Utilities (map/topic) • Ditavalref (map) • Map group (map)	
base topic	• `@deliveryTarget` attribute • Hazard statement (map/topic) • Highlighting (map/topic) • Indexing (map/topic) • Utilities (map/topic)	• Base domains – Ditavalref (map) – Map group (map)

Appendix B.10 Processing interoperability considerations

The DITA specification does not require processors to perform filtering, content reference resolution, key space construction, and other processing related to base DITA semantics in any particular order. This means that different conforming DITA processors might produce different results for the same initial data set and filtering conditions. DITA users and DITA implementers need to be aware of these potential differences in behavior when DITA content will be processed by different processors.

In general, in any situation in which two elements interact during processing, applying filtering before or after the processing is done can result in different results when either or both of the elements is conditional.

For conditional elements, an element is "applicable" if it is filtered in and "inapplicable" if it is filtered out.

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Filtering and content reference resolution

When two elements are merged as result of a content reference, the attributes of the two elements are combined. By default, the attributes of the referencing element take precedence over the referenced element. However, any attribute can specify the value "-dita-use-conref-target", which causes the referenced element attribute to take precedence. This means that the effective value of filtering attributes might reflect either the referencing element or the referenced element depending on how each attribute is configured on the referencing element. This in turn means that, in certain cases, filtering before resolving content references will produce a different result than when filtering is applied after resolving content references.

In two cases, the order in which filtering is applied results in either an element being in the effective result or an element not being in the effective result. There is a third case in which there will be either an empty element (and unresolvable content reference) or no element.

In the case where a referenced element is not applicable and the referencing element is explicitly applicable for the same condition (that is, both elements specify values for the same filtering attribute and the referencing element is applicable), if content references are resolved *before* filtering, the content reference is resolved and the effective value of the referencing element reflects the referenced element. If content referencing is resolved *after* filtering, the referenced element is filtered out and the content reference cannot be resolved, typically generating an error.

The same scenario results in different results for the case of conref push. An applicable, referencing element can use conref push to replace another element that would otherwise be filtered out. If content references are resolved *before* filtering, the content is pushed and the effective value of the referenced element reflects the referencing element. If content referencing is resolved *after* filtering, the referenced element will be filtered out and the content reference can no longer be resolved.

If the referencing element is not conditional and the referenced element is inapplicable, filtering applied before content reference resolution results in an unresolvable content reference. If filtering is applied after content resolution, the explicit condition on the referenced element becomes the effective value for that condition following content resolution and the result is then filtered out. The difference in these two cases is that in the first case the content reference cannot be resolved, resulting in a processing error and a potentially nonsensical element if the referencing element has required subelements (for example, a content reference from a topic to another topic, where the referencing topic must have a title subelement), but in the second case the element is filtered completely out.

Different processing orders might also provide different results in the case where pushed content is wrapped in an element that is filtered out. If filtering is applied before content resolution, that entire block of content (the wrapper and the content to be pushed) is filtered out before the content reference is resolved. If filtering is applied after content resolution, the push action will be resolved first so that content appears in the referenced location, after which the referencing element (along with its wrapper) is filtered from the original source location.

Filtering and key space resolution

See Keys and conditional processing (73) for a discussion of effective key definitions and conditional processing.

As an implementation detail for key-space-constructing processors, if filtering is applied before constructing the key space, then the set of effective key definitions is simply the first definition of each unique key name. However, if filtering is applied after key space construction, and in particular, if a processor needs to allow dynamic resolution of keys based on different filtering specifications applied to the same constructed key space, then the set of effective key definitions is the first definition of each pair of unique key name and unique selection specification set. This second form of constructed key space would be needed by processors such as editors and content management systems that need to quickly

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provide different filtering-specific key bindings without reconstructing the entire key space for each new set of filtering conditions.

For example, given a map that contains two definitions for the key "topic-01", one with an `@audience` value of "expert" and one with an `@audience` value of "novice", a filter-first processor would only have at most one effective key definition for the key name "topic-01", whichever of the two definitions was filtered in by the active filter specification and was the first definition encountered (if both happen to be filtered in). In a processor that supports dynamic key definition filtering, there would be two effective definitions for the key name "topic-01", one for `@audience` of "expert" and one for `@audience` of "novice". The processor would also need to maintain knowledge of the definition order of the two key definitions in order to correctly handle the case when both "expert" and "novice" are applicable for a given key access request (in which case, whichever of the two definitions was first would be used as the effective value of the key).

Link resolution

If a cross reference, link, or other linking element is resolved to its target before filtering and the target is subsequently filtered out, the link would be to a non-existent target but might reflect properties of the target (for example, a cross reference link text might reflect the target title). If the link is resolved after filtering is applied and the target is filtered out, the link is to a non-existent target, which will result in a different link text. The rendition effect for the navigation link is the same: the link cannot be navigated because the target does not exist in the rendered result.

Topicref resolution

Resolution of topicrefs before filtering can result in use of topic-provided navigation titles or metadata that would not be used if the target topic was filtered out before resolution. In both cases, the topicref as rendered would be to a missing topic.

Copy-to processing

If copy-to processing is done before filtering, two `<topicref>` elements, only one of which is applicable, could specify the same `@copy-to` target, leading to a conflict and a potential ambiguity about which governs. If the `<topicref>` elements are filtered before `@copy-to` processing, the conflict does not occur.

Appendix B.11 Specialization design, customization, and the limits of specialization

DITA specialization imposes certain restrictions. An inherent challenge in designing DITA vocabulary modules and document types is understanding how to satisfy markup requirements within those restrictions and, when the requirements cannot be met by a design that fully conforms to the DITA architecture, how to create customized document types that diverge from the DITA standard as little as possible.

DITA imposes the following structural restrictions:

- All topics must have titles.
- Topic body content must be contained within a body element.
- Section elements cannot nest.
- Metadata specific to an element type must be represented using elements, not attributes.

When markup requirements cannot be met within the DITA architecture, there still might be an interest in using DITA features and technology, or a business need for interoperability with conforming DITA documents and processors. In this case, the solution is to create *customized document types*. Customized document types are document types that do not conform to the DITA standard. To reduce the cost of producing conforming documents from non-conforming documents, custom document types should minimize the extent to which they diverge from the DITA standard.

Typical reasons for considering custom document types include the following:

- Optimizing markup for authoring
- Supporting legacy markup structures that are not consistent with DITA structural rules, for example, footnotes within titles
- Defining different forms of existing structures, such as lists, where the DITA-defined structures are too constrained
- Providing attributes required by specific processors, such as CMS-defined attributes for maintaining management metadata
- Embedding tool-imposed markup in places that do not allow the `<foreign>` or `<unknown>` elements

Remember that customized document types do not conform to the DITA standard, and thus are not considered DITA. In many of the cases above, it is possible to define document types that conform to the DITA standard. Explore this fully before developing customized document types.

Optimizing document types

Conforming DITA grammar files are modular, which facilitates exchange of vocabulary modules and constraints and simplifies the process of assembling document type shells. In some cases there might be a reason to avoid the modular approach and use an optimized document type composed of a single file (or a smaller number of files). For example, this could be advantageous in situations where validation occurs over a network.

In an optimized DTD, entities might also be resolved to further optimize processing or validation. This could speed up processing for environments that process and validate large numbers of DITA maps and topics.

An optimized document type will still allow for the creation of conforming DITA content that follows all other rules in the DITA specification. In these cases it is still possible to create a document type that conforms completely to standard DITA coding practices. Maintaining a conforming copy ensures that the optimized document type is still conforming to the standard, and might also ease interchange with tools that expect conforming document types.

Creating custom document types for non-standard markup

When the relaxed content models for DITA elements are inappropriately open for authoring purposes, document type shells can remove undesireable domains or use constraint modules to restrict content models. If content models are not relaxed enough, and markup requirements include content models that are *less* constrained than those defined by DITA, custom document types might be the only option.

Customized document types do not conform to the DITA standard. Preprocessing can ensure compatibility with existing publishing processes, but it does not ensure compatibility with DITA-supporting authoring tools or content management systems. However, when an implementation is being heavily customized, a customized document type can help isolate and control the consequences of non-standard design.

For example, if an authoring group requires the `<p>` element to be spelled out as `<paragraph>`, the document type could be customized to change `<p>` to `<paragraph>` for authoring purposes. Such documents then could be preprocessed to rename `<paragraph>` back to `<p>` before they are fed into a standard DITA publishing process.

Because DITA document types are designed to enable constraints, such customized documents can still take advantage of existing override schemes. While still not valid DITA, a document type shell could be set up that implements local requirements (such as adding global CMS-defined attributes), and then imports an otherwise valid document type shell. This helps isolate non-compliant portions of the document type, while reusing as much as possible of the original DITA grammar.

Specialization design considerations

Requirements for new markup often appear to be incompatible with DITA architectural rules or existing markup, especially when mapping existing non-DITA markup practice to DITA, where the existing markup might have used structures that cannot be directly expressed in DITA. For example, you might need markup for a specialized form of list where the details are not consistent with the base model for DITA lists.

In this case you have two alternatives, one that conforms to DITA and one that does not.

- Specialize from more generic base elements or attributes.
- Define non-conforming structures and map them to conforming DITA structures as necessary for processing by DITA-aware processors or for interchange as conforming DITA documents.

Specializing from more generic base elements, such as defining a list using specializations of `<ph>` or `<div>`, while technically conforming, might still impede interchange of such documents. Generic DITA processors will have no way of knowing that what they see as a sequence of phrases or divisions is really a list and should be rendered in a manner similar to standard DITA lists. However, your documents will be reliably interchangeable with conforming DITA systems.

Defining non-conforming markup structures means that the resulting documents are not conforming DITA documents. They cannot be reliably processed by generic DITA-aware processors or interchanged with other DITA systems. However, as long as the documents can be transformed into conforming DITA documents without undue effort, interchange and interoperation requirements can be satisfied as needed. For example, a content management system could add its own required markup for management metadata, but strip the metadata when delivering content to conforming DITA processors.

Note that even if one uses the DITA-defined types as a starting point, any change to those base types not accomplished through specialization or the constraint feature defines a completely new document type that has no normative relationship to the DITA document types, and cannot be considered in any way to be a conforming DITA application. In particular, the use of DITA specialization from non-DITA base types does not produce DITA-conforming vocabularies.

Specialize from generic elements or attributes

Most DITA element types have relaxed content models that are specifically designed to allow a wide set of options when specializing from them. However, some DITA element types do impose limits that might not be acceptable or appropriate for a specific markup application. In this case, consider specializing from a more generic base element or attribute.

Generic elements are available in DITA at every level of detail, from whole topics down to individual keywords, and the generic `@base` attribute is available for attribute domain specialization.

For example, if you want to create a new kind of list but cannot usefully do so specializing from `<ul>`, `<ol>`, `<sl>`, or `<dl>`, you can create a new set of list elements by specializing nested `<div>` elements. This new list structure will require specialized processing to generate appropriate output styling, because it is not semantically tied to the other lists by ancestry. Nevertheless, it will remain a valid DITA specialization, with the standard support for generalization, content referencing, conditional processing, and more.

The following base elements in `<topic>` are generic enough to support almost any structurally-valid DITA specialization:

<topic>
: Any content unit that has a title and associated content

<section>
: Any non-nesting division of content within a topic, titled or not

<p>
: Any non-nesting non-titled block of content below the section level

<fig>
: Any titled block of content below the section level

<ul>, <ol>, <dl>, <sl>, <simpletable>
: Any structured block of content that consists of listed items in one or more columns

<ph>
: Any division of content below the paragraph level

<text>
: Text within a phrase

<keyword>
: Any non-nesting division of content below the paragraph level

<data>
: Any content that acts as metadata rather than core topic or map content

<foreign>
: Any content that already has a non-DITA markup standard, but still needs to be authored as part of the DITA document. Processors should attempt to render this element, if at all possible.

<unknown>
: Any non-standard markup that does not fit the DITA model, but needs to be managed as part of a DITA document. Processors should not attempt to render this element.

<bodydiv>
: A generic, untitled, nestable container for content within topic bodies

<sectiondiv>
: A generic, untitled, nestable container for content within sections

<div>
: A generic, untitled, nestable container for content within topic bodies or sections

The following attributes in topic are suitable for domain specialization to provide new attributes that are required throughout a document type:

@props
: Any new conditional processing attribute

@base
: Any new attribute that is universally available, has a simple syntax (space-delimited alphanumeric values), and does not already have a semantic equivalent

Whenever possible, specialize from the element or attribute that is the closest semantic match.

Appendix C Revision history

The following table contains information about revisions to this document.

Revision	Date	Editor	Description of changes
01	10 May 2019	Kristen James Eberlein	Generated working draft #01

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