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J. Reschke
greenbytes
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The "xml2rfc" Version 2 Vocabulary

Abstract

This document defines the "xml2rfc" version 2 vocabulary: an XML-based language used for writing RFCs and Internet-Drafts.

Version 2 represents the state of the vocabulary (as implemented by several tools and as used by the RFC Editor) around 2014.

This document obsoletes RFC 2629.

Status of This Memo

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Table of Contents

1. Introduction	4
1.1. Syntax Notation	4
2. Elements	5
2.1. <abstract>	5
2.2. <address>	5
2.3. <annotation>	6
2.4. <area>	6
2.5. <artwork>	7
2.6. <author>	10
2.7. <back>	11
2.8. <c>	12
2.9. <city>	12
2.10. <code>	12
2.11. <country>	12
2.12. <cref>	13
2.13. <date>	14
2.14. <email>	15
2.15. <eref>	15
2.16. <facsimile>	16
2.17. <figure>	16
2.18. <format>	18
2.19. <front>	19
2.20. <iref>	20
2.21. <keyword>	21
2.22. <list>	21
2.23. <middle>	23
2.24. <note>	24
2.25. <organization>	24
2.26. <phone>	24
2.27. <postal>	25
2.28. <postamble>	25
2.29. <preamble>	26
2.30. <reference>	26
2.31. <references>	27
2.32. <region>	28
2.33. <rfc>	28
2.34. <section>	32
2.35. <seriesInfo>	33
2.36. <spanx>	34
2.37. <street>	35
2.38. <t>	35
2.39. <texttable>	36
2.40. <title>	38
2.41. <ttcol>	38
2.42. <uri>	39

2.43. <vspace>	39
2.44. <workgroup>	39
2.45. <xref>	40
3. Escaping for Use in XML	42
4. Special Unicode Code Points	42
5. Including Files	43
6. Internationalization Considerations	44
7. Security Considerations	44
8. IANA Considerations	44
8.1. Internet Media Type Registration	44
9. References	46
9.1. Normative References	46
9.2. Informative References	46
Appendix A. Front-Page ("Boilerplate") Generation	50
A.1. The "category" Attribute	50
A.2. The "ipr" Attribute	50
A.2.1. Current Values: "*trust200902"	51
A.2.2. Historic Values	52
A.3. The "submissionType" Attribute	54
A.4. The "consensus" Attribute	55
Appendix B. Changes from RFC 2629 ("v1")	56
B.1. Removed Elements	56
B.2. Changed Defaults	56
B.3. Changed Elements	57
B.4. New Elements	57
Appendix C. RELAX NG Schema	58
C.1. Checking Validity	65
IAB Members at the Time of Approval	66
Acknowledgments	66
Index	67
Author's Address	76

1. Introduction

This document describes version 2 ("v2") of the "xml2rfc" vocabulary: an XML-based language ("Extensible Markup Language" [XML]) used for writing RFCs [RFC7322] and Internet-Drafts [IDGUIDE].

Version 2 represents the state of the vocabulary (as implemented by several tools and as used by the RFC Editor) around 2014.

It obsoletes the original version ("v1") [RFC2629], which contained the original language definition and which was subsequently extended. Many of the changes leading to version 2 have been described in "Writing I-Ds and RFCs using XML (revised)" [V1rev], but that document has not been updated since 2008.

Processing Instructions (Section 2.6 of [XML]) generally are specific to a given processor and thus are not considered to be part of the vocabulary. See Section 4.1 of [TCLReadme] for a list of the Processing Instructions supported by the first implementation of an xml2rfc processor.

Note that the vocabulary contains certain constructs that might not be used when generating the final text; however, they can provide useful data for other uses (such as index generation, populating a keyword database, or syntax checks).

1.1. Syntax Notation

The XML vocabulary here is defined in prose, based on the RELAX NG schema [RNC] contained in Appendix C (specified in RELAX NG Compact Notation (RNC)).

Note that the schema can be used for automated validity checks, but certain constraints are only described in prose (example: the conditionally required presence of the "abbrev" attribute).

2. Elements

The sections below describe all elements and their attributes.

Note that attributes not labeled "mandatory" are optional.

Except inside <artwork>, horizontal whitespace and line breaks are collapsed into a single whitespace, and leading and trailing whitespace is trimmed off.

2.1. <abstract>

Contains the Abstract of the document. The Abstract ought to be self-contained and thus should not contain references or unexpanded abbreviations. See Section 4.3 of [RFC7322] for more information.

This element appears as a child element of <front> (Section 2.19).

Content model:

One or more <t> elements (Section 2.38)

2.2. <address>

Provides address information for the author.

This element appears as a child element of <author> (Section 2.6).

Content model:

In this order:

1. One optional <postal> element (Section 2.27)
2. One optional <phone> element (Section 2.26)
3. One optional <facsimile> element (Section 2.16)
4. One optional <email> element (Section 2.14)
5. One optional <uri> element (Section 2.42)

2.3. <annotation>

Provides additional prose augmenting a bibliographical reference.

This element appears as a child element of <reference> (Section 2.30).

Content model:

In any order:

- o Text
- o <xref> elements (Section 2.45)
- o <eref> elements (Section 2.15)
- o <iref> elements (Section 2.20)
- o <cref> elements (Section 2.12)
- o <spanx> elements (Section 2.36)

2.4. <area>

Provides information about the IETF area to which this document relates (currently not used when generating documents).

The value ought to be either the full name or the abbreviation of one of the IETF areas as listed on <<https://www.ietf.org/iesg/area.html>>. The list at the time that this document is being published is "Applications and Real-Time" ("art"), "General" ("gen"), "Internet" ("int"), "Operations and Management" ("ops"), "Routing" ("rtg"), "Security" ("sec"), and "Transport" ("tsv").

Note that the set of IETF areas can change over time; for instance, "Applications and Real-Time" ("art") replaced "Applications" ("app") and "Real-time Applications and Infrastructure" ("rai") in 2015.

This element appears as a child element of <front> (Section 2.19).

Content model: only text content.

2.5. <artwork>

This element allows the inclusion of "artwork" in the document.

<artwork> is the only element in the vocabulary that provides full control of horizontal whitespace and line breaks; thus, it is used for a variety of things, such as:

- o diagrams ("line art"),
- o source code,
- o formal languages (such as ABNF [RFC5234] or the RNC notation used in this document),
- o message flow diagrams,
- o complex tables, or
- o protocol unit diagrams.

Note that processors differ in the handling of horizontal TAB characters (some expand them, some treat them as single spaces), and thus these ought to be avoided.

Alternatively, the "src" attribute allows referencing an external graphics file, such as a bitmap or a vector drawing, using a URI ("Uniform Resource Identifier") [RFC3986]. In this case, the textual content acts as a fallback for output formats that do not support graphics; thus, it ought to contain either (1) a "line art" variant of the graphics or (2) prose that describes the included image in sufficient detail. Note that RFCs occasionally are published with enhanced diagrams; [RFC5598] is a recent example of an RFC that was published along with a PDF with images.

This element appears as a child element of <figure> (Section 2.17).

Content model:

Text

2.5.1. "align" Attribute

Controls whether the artwork appears left justified (default), centered, or right justified.

Allowed values:

- o "left" (default)
- o "center"
- o "right"

2.5.2. "alt" Attribute

Alternative text description of the artwork (not just the caption).

2.5.3. "height" Attribute

The suggested height of the graphics (when it was included using the "src" attribute).

This attribute is format dependent and ought to be avoided.

When generating HTML output [HTML], current implementations copy the attribute "as is", thus effectively treating it as CSS (Cascading Style Sheets) pixels (see Section 4.3.2 of [CSS]). For other output formats, it is usually ignored.

2.5.4. "name" Attribute

A filename suitable for the contents (such as for extraction to a local file).

This attribute generally isn't used for document generation, but it can be helpful for other kinds of tools (such as automated syntax checkers, which work by extracting the source code).

2.5.5. "src" Attribute

The URI reference of a graphics file (Section 4.1 of [RFC3986]).

Note that this can be a "data" URI [RFC2397] as well, in which case the graphics file is wholly part of the XML file.

2.5.6. "type" Attribute

Specifies the type of the artwork.

The value is either an Internet Media Type (see [RFC2046]) or a keyword (such as "abnf"). The set of recognized keywords varies across implementations.

How it is used depends on context and application. For instance, a formatter can attempt to syntax-highlight code in certain known languages.

2.5.7. "width" Attribute

The suggested width of the graphics (when it was included using the "src" attribute).

This attribute is format dependent and ought to be avoided.

When generating HTML output [HTML], current implementations copy the attribute "as is", thus effectively treating it as CSS pixels (see Section 4.3.2 of [CSS]). For other output formats, it is usually ignored.

2.5.8. "xml:space" Attribute

Determines whitespace handling.

"preserve" is both the default value and the only meaningful setting (because that's what the <artwork> element is for).

See also Section 2.10 of [XML].

Allowed values:

- o "default"
- o "preserve" (default)

2.6. <author>

Provides information about a document's author. This is used both for the document itself (at the beginning of the document) and for referenced documents (inside of <reference>).

The <author> elements contained within the document's <front> element are used to fill the boilerplate, and also to generate the "Author's Address" section (see Section 4.12 of [RFC7322]).

Note that an "author" can also be just an organization (by not specifying any of the name attributes, but adding the <organization> child element).

Furthermore, the "role" attribute can be used to mark an author as "editor". This is reflected on the front page and in the "Author's Address" section, as well as in bibliographical references. Note that this specification does not define a precise meaning for the term "editor".

See Sections 4.10 and 4.11 of [RFC7322] for more information.

This element appears as a child element of <front> (Section 2.19).

Content model:

In this order:

1. One optional <organization> element (Section 2.25)
2. One optional <address> element (Section 2.2)

2.6.1. "fullname" Attribute

The full name (used in the automatically generated "Author's Address" section).

2.6.2. "initials" Attribute

An abbreviated variant of the given name(s), to be used in conjunction with the separately specified surname. It usually appears on the front page, in footers, and in references.

Some processors will post-process the value -- for instance, when it only contains a single letter (in which case they might add a trailing dot). Relying on this kind of post-processing can lead to results varying across formatters and thus ought to be avoided.

2.6.3. "role" Attribute

Specifies the role the author had in creating the document.

Allowed values:

- o "editor"

2.6.4. "surname" Attribute

The author's surname, to be used in conjunction with the separately specified initials. It usually appears on the front page, in footers, and in references.

2.7. <back>

Contains the "back" part of the document: the references and appendices. In <back>, <section> elements indicate appendices.

This element appears as a child element of <rfc> (Section 2.33).

Content model:

In this order:

1. Optional <references> elements (Section 2.31)
2. Optional <section> elements (Section 2.34)

2.8. <c>

Provides the content of a cell in a table.

This element appears as a child element of <texttable> (Section 2.39).

Content model:

In any order:

- o Text
- o <xref> elements (Section 2.45)
- o <eref> elements (Section 2.15)
- o <iref> elements (Section 2.20)
- o <cref> elements (Section 2.12)
- o <spanx> elements (Section 2.36)

2.9. <city>

Gives the city name in a postal address.

This element appears as a child element of <postal> (Section 2.27).

Content model: only text content.

2.10. <code>

Gives the postal region code.

This element appears as a child element of <postal> (Section 2.27).

Content model: only text content.

2.11. <country>

Gives the country in a postal address.

This element appears as a child element of <postal> (Section 2.27).

Content model: only text content.

2.12. <cref>

Represents a comment.

Comments can be used in a document while it is a work in progress. They usually appear (1) inline and visually highlighted, (2) at the end of the document (depending on file format and settings of the formatter), or (3) not at all (when generating an RFC).

This element appears as a child element of <annotation> (Section 2.3), <c> (Section 2.8), <postamble> (Section 2.28), <preamble> (Section 2.29), and <t> (Section 2.38).

Content model: only text content.

2.12.1. "anchor" Attribute

Document-wide unique identifier for this comment. The processor will autogenerate an identifier when none is given.

The value needs to be a valid XML "Name" (Section 2.3 of [XML]), additionally constrained to US-ASCII characters [USASCII].

2.12.2. "source" Attribute

Holds the "source" of a comment, such as the name or the initials of the person who made the comment.

2.13. <date>

Provides information about the publication date.

Note that this element is used for the boilerplate of the document being produced, and also inside bibliographic references.

In the "boilerplate" case, it defines the publication date, which, when producing Internet-Drafts, will be used for computing the expiration date (see Section 8 of [IDGUIDE]). When one or more of "year", "month", or "day" are left out, the processor will attempt to use the current system date if the attributes that are present are consistent with that date.

Note that in this case, month names need to match the full (English) month name ("January", "February", "March", "April", "May", "June", "July", "August", "September", "October", "November", or "December") in order for expiration calculations to work (some implementations might support additional formats, though).

In the case of bibliographic references, the date information can have prose text for the month or year. For example, vague dates (year="ca. 2000"), date ranges (year="2012-2013"), non-specific months (month="Second quarter") and so on are allowed.

This element appears as a child element of <front> (Section 2.19).

Content model: this element does not have any contents.

2.13.1. "day" Attribute

In the "boilerplate" case, the day of publication; this is a number. Otherwise, an indication of the publication day, with the format not being restricted.

2.13.2. "month" Attribute

In the "boilerplate" case, the month of publication; this is the English name of the month. Otherwise, an indication of the publication month, with the format not being restricted.

2.13.3. "year" Attribute

In the "boilerplate" case, the year of publication; this is a number (usually four-digit). Otherwise, an indication of the publication year, with the format not being restricted.

2.14. <email>

Provides an email address.

The value is expected to be an email address conforming to the addr-spec definition in Section 2 of [RFC6068] (so does not include the prefix "mailto:").

This element appears as a child element of <address> (Section 2.2).

Content model: only text content.

2.15. <eref>

Represents an "external" link (as specified in the "target" attribute).

If the element has no text content, the value of the "target" attribute will be inserted in angle brackets (as described in Appendix C of [RFC3986]) and, depending on the capabilities of the output format, hyperlinked.

Otherwise, the text content will be used (and potentially hyperlinked). Depending on output format and formatter, additional text might be inserted (such as a "URI" counter, and a "URIs" section in the back of the document). Avoid this variant when consistent rendering across formats and formatters is desired.

This element appears as a child element of <annotation> (Section 2.3), <c> (Section 2.8), <postamble> (Section 2.28), <preamble> (Section 2.29), and <t> (Section 2.38).

Content model: only text content.

2.15.1. "target" Attribute (Mandatory)

URI of the link target (see Section 3 of [RFC3986]).

2.16. <facsimile>

Represents the phone number of a fax machine.

The value is expected to be the scheme-specific part of a "tel" URI (so does not include the prefix "tel:"), using the "global numbers" syntax. See Section 3 of [RFC3966] for details.

This element appears as a child element of <address> (Section 2.2).

Content model: only text content.

2.17. <figure>

This element is used to represent a figure, consisting of an optional preamble, the actual figure, an optional postamble, and an optional title.

This element appears as a child element of <section> (Section 2.34) and <t> (Section 2.38).

Content model:

In this order:

1. Optional <iref> elements (Section 2.20)
2. One optional <preamble> element (Section 2.29)
3. One <artwork> element (Section 2.5)
4. One optional <postamble> element (Section 2.28)

2.17.1. "align" Attribute

Used to change the alignment of <preamble> and <postamble>.

Note: does not affect title or <artwork> alignment.

Allowed values:

- o "left" (default)
- o "center"
- o "right"

2.17.2. "alt" Attribute

Duplicates functionality available on <artwork>; avoid it.

2.17.3. "anchor" Attribute

Document-wide unique identifier for this figure.

Furthermore, the presence of this attribute causes the figure to be numbered.

The value needs to be a valid XML "Name" (Section 2.3 of [XML]).

2.17.4. "height" Attribute

Duplicates functionality available on <artwork>; avoid it.

2.17.5. "src" Attribute

Duplicates functionality available on <artwork>; avoid it.

2.17.6. "suppress-title" Attribute

Figures that have an "anchor" attribute will automatically get an autogenerated title (such as "Figure 1"), even if the "title" attribute is absent. Setting this attribute to "true" will prevent this.

Allowed values:

- o "true"
- o "false" (default)

2.17.7. "title" Attribute

The title for the figure; this usually appears on a line after the figure.

2.17.8. "width" Attribute

Duplicates functionality available on <artwork>; avoid it.

2.18. <format>

Provides a link to an additional format variant for a reference.

Note that these additional links are neither used in published RFCs nor supported by all tools. If the goal is to provide a single URI for a reference, the "target" attribute on <reference> can be used instead.

This element appears as a child element of <reference> (Section 2.30).

Content model: this element does not have any contents.

2.18.1. "octets" Attribute

Octet length of linked-to document.

2.18.2. "target" Attribute

URI of document.

2.18.3. "type" Attribute (Mandatory)

The type of the linked-to document, such as "TXT", "HTML", or "PDF".

2.19. <front>

Represents the "front matter": metadata (such as author information), the Abstract, and additional notes.

This element appears as a child element of <reference> (Section 2.30) and <rfc> (Section 2.33).

Content model:

In this order:

1. One <title> element (Section 2.40)
2. One or more <author> elements (Section 2.6)
3. One <date> element (Section 2.13)
4. Optional <area> elements (Section 2.4)
5. Optional <workgroup> elements (Section 2.44)
6. Optional <keyword> elements (Section 2.21)
7. One optional <abstract> element (Section 2.1)
8. Optional <note> elements (Section 2.24)

2.20. <iref>

Provides terms for the document's index.

Index entries can be either regular entries (when just the "item" attribute is given) or nested entries (by specifying "subitem" as well), grouped under a regular entry.

In this document, for instance, every element definition appears as a regular index entry ("iref element 2.20"). In addition, for each use of that element inside another parent element, a nested entry was added ("iref element 2.20, ... inside annotation 2.3").

Index entries generally refer to the exact place where the <iref> element occurred. An exception is the occurrence as a child element of <section>, in which case the whole section is considered to be relevant for that index entry. In some formats, index entries of this type might be displayed as ranges.

This element appears as a child element of <annotation> (Section 2.3), <c> (Section 2.8), <figure> (Section 2.17), <postamble> (Section 2.28), <preamble> (Section 2.29), <section> (Section 2.34), and <t> (Section 2.38).

Content model: this element does not have any contents.

2.20.1. "item" Attribute (Mandatory)

The item to include.

2.20.2. "primary" Attribute

Setting this to "true" declares the occurrence as "primary", which might cause it to be highlighted in the index.

Allowed values:

- o "true"
- o "false" (default)

2.20.3. "subitem" Attribute

The subitem to include.

2.21. <keyword>

Specifies a keyword applicable to the document.

Note that each element should only contain a single keyword; for multiple keywords, the element can simply be repeated.

Keywords are used both in the RFC Index and in the metadata of generated documents.

This element appears as a child element of <front> (Section 2.19).

Content model: only text content.

2.22. <list>

Delineates a text list.

Each list item is represented by a <t> element. The vocabulary currently does not directly support list items consisting of multiple paragraphs; if this is needed, <vspace> (Section 2.43) can be used as a workaround.

This element appears as a child element of <t> (Section 2.38).

Content model:

One or more <t> elements (Section 2.38)

2.22.1. "counter" Attribute

This attribute holds a token that serves as an identifier for a counter. The intended use is continuation of lists, where the counter will be incremented for every list item, and there is no way to reset the counter.

Note that this attribute functions only when the "style" attribute is using the "format..." syntax (Section 2.22.3); otherwise, it is ignored.

2.22.2. "hangIndent" Attribute

For list styles with potentially wide labels, this attribute can override the default indentation level, measured in number of characters.

Note that it only affects styles with variable-width labels ("format..." and "hanging"; see below), and it may not affect formats in which the list item text appears below the label.

2.22.3. "style" Attribute

This attribute is used to control the display of a list.

The value of this attribute is inherited by any nested lists that do not have this attribute set. It may be set to:

"empty"

For unlabeled list items; it can also be used for indentation purposes (this is the default value when there is an enclosing list where the style is specified).

"hanging"

For lists where the items are labeled with a piece of text.

The label text is specified in the "hangText" attribute of the <t> element (Section 2.38.2).

"letters"

For ordered lists using letters as labels (lowercase letters followed by a period; after "z", it rolls over to a two-letter format). For nested lists, processors usually flip between uppercase and lowercase.

"numbers"

For ordered lists using numbers as labels.

"symbols"

For unordered (bulleted) lists.

The style of the bullets is chosen automatically by the processor (some implementations allow overriding the default using a Processing Instruction).

And finally:

"format ..."

For lists with customized labels, consisting of fixed text and an item counter in various formats.

The value is a free-form text that allows counter values to be inserted using a "percent-letter" format. For instance, "[REQ%d]" generates labels of the form "[REQ1]", where "%d" inserts the item number as a decimal number.

The following formats are supported:

%c lowercase letters (a, b, c, etc.)

%C uppercase letters (A, B, C, etc.)

%d decimal numbers (1, 2, 3, etc.)

%i lowercase Roman numerals (i, ii, iii, etc.)

%I uppercase Roman numerals (I, II, III, etc.)

%% represents a percent sign

Other formats are reserved for future use.

2.23. <middle>

Represents the main content of the document.

This element appears as a child element of <rfc> (Section 2.33).

Content model:

One or more <section> elements (Section 2.34)

2.24. <note>

Creates an unnumbered section that appears after the Abstract.

It is usually used for additional information to reviewers (working group information, mailing list, ...), or for additional publication information such as "IESG Notes".

This element appears as a child element of <front> (Section 2.19).

Content model:

One or more <t> elements (Section 2.38)

2.24.1. "title" Attribute (Mandatory)

The title of the note.

2.25. <organization>

Specifies the affiliation (Section 4.1.2 of [RFC7322]) of an author.

This information appears both in the "Author's Address" section and on the front page (see Section 4.1.1 of [RFC7322] for more information). If the value is long, an abbreviated variant can be specified in the "abbrev" attribute.

This element appears as a child element of <author> (Section 2.6).

Content model: only text content.

2.25.1. "abbrev" Attribute

Abbreviated variant.

2.26. <phone>

Represents a phone number.

The value is expected to be the scheme-specific part of a "tel" URI (so does not include the prefix "tel:"), using the "global numbers" syntax. See Section 3 of [RFC3966] for details.

This element appears as a child element of <address> (Section 2.2).

Content model: only text content.

2.27. <postal>

Contains child elements providing postal information.

Note that at least one <street> element needs to be present; however, formatters will handle empty values just fine.

This element appears as a child element of <address> (Section 2.2).

Content model:

In this order:

1. One or more <street> elements (Section 2.37)
2. In any order:
 - * <city> elements (Section 2.9)
 - * <region> elements (Section 2.32)
 - * <code> elements (Section 2.10)
 - * <country> elements (Section 2.11)

2.28. <postamble>

Gives text that appears at the bottom of a figure or table.

This element appears as a child element of <figure> (Section 2.17) and <texttable> (Section 2.39).

Content model:

In any order:

- o Text
- o <xref> elements (Section 2.45)
- o <eref> elements (Section 2.15)
- o <iref> elements (Section 2.20)
- o <cref> elements (Section 2.12)
- o <spanx> elements (Section 2.36)

2.29. <preamble>

Gives text that appears at the top of a figure or table.

This element appears as a child element of <figure> (Section 2.17) and <texttable> (Section 2.39).

Content model:

In any order:

- o Text
- o <xref> elements (Section 2.45)
- o <eref> elements (Section 2.15)
- o <iref> elements (Section 2.20)
- o <cref> elements (Section 2.12)
- o <spanx> elements (Section 2.36)

2.30. <reference>

Represents a bibliographical reference.

This element appears as a child element of <references> (Section 2.31).

Content model:

In this order:

1. One <front> element (Section 2.19)
2. Optional <seriesInfo> elements (Section 2.35)
3. Optional <format> elements (Section 2.18)
4. Optional <annotation> elements (Section 2.3)

2.30.1. "anchor" Attribute (Mandatory)

Document-wide unique identifier for this reference. Usually, this will be used both to "label" the reference in the "References" section, and as an identifier in links to this reference entry.

The value needs to be a valid XML "Name" (Section 2.3 of [XML]), additionally constrained to US-ASCII characters [USASCII]. Thus, the character repertoire consists of "A-Z", "a-z", "0-9", "_", "-", ".", and ":", where "0-9", ".", and "-" are disallowed as start characters.

2.30.2. "target" Attribute

Holds the URI for the reference.

Note that, depending on the <seriesInfo> element, a URI might not be needed and might not be desirable, as it can be automatically generated (for instance, for RFCs).

2.31. <references>

Contains a set of bibliographical references.

In the early days of the RFC series, there was only one "References" section per RFC. This convention was later changed to group references into two sets -- "Normative" and "Informative" -- as described in Section 4.8.6 of [RFC7322]. This vocabulary supports the split with the "title" attribute.

By default, the order of references is significant. Processors, however, can be instructed to sort them based on their anchor names.

This element appears as a child element of <back> (Section 2.7).

Content model:

One or more <reference> elements (Section 2.30)

2.31.1. "title" Attribute

Provides the title for the "References" section (defaulting to "References").

In general, the title should be either "Normative References" or "Informative References".

2.32. <region>

Provides the region name in a postal address.

This element appears as a child element of <postal> (Section 2.27).

Content model: only text content.

2.33. <rfc>

This is the root element of the xml2rfc vocabulary.

Processors distinguish between RFC mode ("number" attribute being present) and Internet-Draft mode ("docName" attribute being present): it is invalid to specify both. Setting neither "number" nor "docName" can be useful for producing other types of documents but is out of scope for this specification.

Content model:

In this order:

1. One <front> element (Section 2.19)
2. One <middle> element (Section 2.23)
3. One optional <back> element (Section 2.7)

2.33.1. "category" Attribute

Document category (see Appendix A.1).

Allowed values:

- o "std"
- o "bcp"
- o "info"
- o "exp"
- o "historic"

2.33.2. "consensus" Attribute

Affects the generated boilerplate.

See [RFC5741] for more information.

Allowed values:

- o "no"
- o "yes"

2.33.3. "docName" Attribute

For Internet-Drafts, this specifies the draft name (which appears below the title).

A processor should give an error if both the "docName" and "number" attributes are given in the <rfc> element.

Note that the file extension is not part of the draft, so in general it should end with the current draft number ("-", plus two digits).

Furthermore, it is good practice to disambiguate current editor copies from submitted drafts (for instance, by replacing the draft number with the string "latest").

See Section 7 of [IDGUIDE] for further information.

2.33.4. "ipr" Attribute

Represents the Intellectual Property status of the document. See Appendix A.2 for details.

Allowed values:

- o "full2026"
- o "noDerivativeWorks2026"
- o "none"
- o "full3667"
- o "noModification3667"
- o "noDerivatives3667"
- o "full3978"
- o "noModification3978"
- o "noDerivatives3978"
- o "trust200811"
- o "noModificationTrust200811"
- o "noDerivativesTrust200811"
- o "trust200902"
- o "noModificationTrust200902"
- o "noDerivativesTrust200902"
- o "pre5378Trust200902"

2.33.5. "iprExtract" Attribute

Identifies a single section within the document (by its "anchor" attribute) for which extraction "as is" is explicitly allowed (this is only relevant for historic values of the "ipr" attribute).

2.33.6. "number" Attribute

The number of the RFC to be produced.

A processor should give an error if both the "docName" and "number" attributes are given in the <rfc> element.

2.33.7. "obsoletes" Attribute

A comma-separated list of RFC `_numbers_` or Internet-Draft names.

Processors ought to parse the attribute value, so that incorrect references can be detected and, depending on output format, hyperlinks can be generated. Also, the value ought to be reformatted to insert whitespace after each comma if not already present.

2.33.8. "seriesNo" Attribute

Number within a document series.

The document series is defined by the "category" attribute; "seriesNo" is only applicable to the values "info" ("FYI" series), "std" ("STD" series), and "bcp" ("BCP" series).

2.33.9. "submissionType" Attribute

The document stream.

See Section 2 of [RFC5741] for details.

Allowed values:

- o "IETF" (default)
- o "IAB"
- o "IRTF"
- o "independent"

2.33.10. "updates" Attribute

A comma-separated list of RFC `_numbers_` or Internet-Draft names.

Processors ought to parse the attribute value, so that incorrect references can be detected and, depending on output format, hyperlinks can be generated. Also, the value ought to be reformatted to insert whitespace after each comma if not already present.

2.33.11. "xml:lang" Attribute

The natural language used in the document (defaults to "en").

See Section 2.12 of [XML] for more information.

2.34. <section>

Represents a section (when inside a <middle> element) or an appendix (when inside a <back> element).

Subsections are created by nesting <section> elements inside <section> elements.

This element appears as a child element of <back> (Section 2.7), <middle> (Section 2.23), and <section> (Section 2.34).

Content model:

In this order:

1. In any order:

- * <t> elements (Section 2.38)
- * <figure> elements (Section 2.17)
- * <texttable> elements (Section 2.39)
- * <iref> elements (Section 2.20)

2. Optional <section> elements (Section 2.34)

2.34.1. "anchor" Attribute

Document-wide unique identifier for this section.

The value needs to be a valid XML "Name" (Section 2.3 of [XML]).

2.34.2. "title" Attribute (Mandatory)

The title of the section.

2.34.3. "toc" Attribute

Determines whether the section is included in the Table of Contents.

The processor usually has defaults for whether a Table of Contents will be produced at all, and sections of which maximal depth will be included (frequently: 3). "include" and "exclude" allow overriding the processor's default behavior for the element they are specified on (they do not affect either nested or parent elements).

Allowed values:

- o "include"
- o "exclude"
- o "default" (default)

2.35. <seriesInfo>

Specifies the document series in which this document appears, and also specifies an identifier within that series.

This element appears as a child element of <reference> (Section 2.30).

Content model: this element does not have any contents.

2.35.1. "name" Attribute (Mandatory)

The name of the series.

Some series names might trigger specific processing (such as for autogenerating links, inserting descriptions such as "work in progress", or additional functionality like reference diagnostics). Examples for IETF-related series names are "BCP", "FYI", "Internet-Draft", "RFC", and "STD".

2.35.2. "value" Attribute (Mandatory)

The identifier within the series specified by the "name" attribute.

For BCPs, FYIs, RFCs, and STDs, this is the number within the series.

For Internet-Drafts, it is the full draft name (ending with the two-digit version number).

2.36. <spanx>

Wraps a piece of text, indicating special formatting styles.

When generating plain text, processors usually emulate font changes using characters such as "*" and "_".

The following styles are defined:

`emph` Simple emphasis (this is the default).

`strong` Strong emphasis.

`verb` "Verbatim" text (usually displayed using a monospaced font face).

This element appears as a child element of `<annotation>` (Section 2.3), `<c>` (Section 2.8), `<postamble>` (Section 2.28), `<preamble>` (Section 2.29), and `<t>` (Section 2.38).

Content model: only text content.

2.36.1. "style" Attribute

The style to be used (defaults to "emph").

2.36.2. "xml:space" Attribute

Determines whitespace handling.

According to the DTD, the default value is "preserve". However, tests show that it doesn't have any effect on processing; thus, this attribute will be removed in future versions of the vocabulary.

See also Section 2.10 of [XML].

Allowed values:

- o "default"
- o "preserve" (default)

2.37. <street>

Provides a street address.

This element appears as a child element of <postal> (Section 2.27).

Content model: only text content.

2.38. <t>

Contains a paragraph of text.

This element appears as a child element of <abstract> (Section 2.1), <list> (Section 2.22), <note> (Section 2.24), and <section> (Section 2.34).

Content model:

In any order:

- o Text
- o <list> elements (Section 2.22)
- o <figure> elements (Section 2.17)
- o <xref> elements (Section 2.45)
- o <eref> elements (Section 2.15)
- o <iref> elements (Section 2.20)
- o <cref> elements (Section 2.12)
- o <spanx> elements (Section 2.36)
- o <vspace> elements (Section 2.43)

2.38.1. "anchor" Attribute

Document-wide unique identifier for this paragraph.

The value needs to be a valid XML "Name" (Section 2.3 of [XML]).

2.38.2. "hangText" Attribute

Holds the label ("hanging text") for items in lists using the "hanging" style (see Section 2.22.3).

2.39. <texttable>

Contains a table, consisting of an optional preamble, a header line, rows, an optional postamble, and an optional title.

The number of columns in the table is determined by the number of <ttcol> elements. The number of rows in the table is determined by the number of <c> elements divided by the number of columns. There is no requirement that the number of <c> elements be evenly divisible by the number of columns.

This element appears as a child element of <section> (Section 2.34).

Content model:

In this order:

1. One optional <preamble> element (Section 2.29)
2. One or more <ttcol> elements (Section 2.41)
3. Optional <c> elements (Section 2.8)
4. One optional <postamble> element (Section 2.28)

2.39.1. "align" Attribute

Determines the horizontal alignment of the table.

Allowed values:

- o "left"
- o "center" (default)
- o "right"

2.39.2. "anchor" Attribute

Document-wide unique identifier for this table.

Furthermore, the presence of this attribute causes the table to be numbered.

The value needs to be a valid XML "Name" (Section 2.3 of [XML]).

2.39.3. "style" Attribute

Selects which borders should be drawn, where

- o "all" means borders around all table cells,
- o "full" is like "all", except no horizontal lines between table rows (except below the column titles),
- o "headers" adds just a separator between column titles and rows, and
- o "none" means no borders at all.

Allowed values:

- o "all"
- o "none"
- o "headers"
- o "full" (default)

2.39.4. "suppress-title" Attribute

Tables that have an "anchor" attribute will automatically get an autogenerated title (such as "Table 1"), even if the "title" attribute is absent. Setting this attribute to "true" will prevent this.

Allowed values:

- o "true"
- o "false" (default)

2.39.5. "title" Attribute

The title for the table; this usually appears on a line below the table body.

2.40. <title>

Represents the document title.

When this element appears in the <front> element of the current document, the title might also appear in page headers or footers. If it's long (~40 characters), the "abbrev" attribute is used to specify an abbreviated variant.

This element appears as a child element of <front> (Section 2.19).

Content model: only text content.

2.40.1. "abbrev" Attribute

Specifies an abbreviated variant of the document title.

2.41. <ttcol>

Contains a column heading in a table.

This element appears as a child element of <texttable> (Section 2.39).

Content model: only text content.

2.41.1. "align" Attribute

Determines the horizontal alignment within the table column.

Allowed values:

- o "left" (default)
- o "center"
- o "right"

2.41.2. "width" Attribute

The desired column width (as integer 0..100 followed by "%").

2.42. <uri>

Contains a web address associated with the author.

The contents should be a valid URI (see Section 3 of [RFC3986]).

This element appears as a child element of <address> (Section 2.2).

Content model: only text content.

2.43. <vspace>

This element can be used to force the inclusion of a single line break or multiple blank lines.

Note that this is a purely presentational element; thus, its use ought to be avoided, except within a <list> as discussed in Section 2.22.

This element appears as a child element of <t> (Section 2.38).

Content model: this element does not have any contents.

2.43.1. "blankLines" Attribute

Number of blank lines to be inserted, where "0" indicates a single line break (defaults to "0").

For paged output formats, no additional blank lines should be generated after a page break.

2.44. <workgroup>

This element is used to specify the Working Group (IETF) or Research Group (IRTF) from which the document originates, if any. The recommended format is the official name of the Working Group (with some capitalization).

In Internet-Drafts, this is used in the upper left corner of the boilerplate, replacing the default "Network Working Group" string. Formatting software can append the words "Working Group" or "Research Group", depending on the "submissionType" property of the <rfc> element (Section 2.33.9).

This element appears as a child element of <front> (Section 2.19).

Content model: only text content.

2.45. <xref>

Inserts a cross-reference to a different part of a document.

The generated text depends on (1) whether the <xref> is empty (in which case the processor will try to generate a meaningful text fragment), (2) the "format" attribute, and (3) the nature (XML element type) of the referenced document part.

Any element that allows the "anchor" attribute can be referenced; however, there are restrictions with respect to the text content being generated. For instance, a <t> can be a reference target; however, because paragraphs are not (visibly) numbered, the author will have to make sure that the combination of prose and contained text content is sufficient for a reader to understand what is being referred to.

This element appears as a child element of <annotation> (Section 2.3), <c> (Section 2.8), <postamble> (Section 2.28), <preamble> (Section 2.29), and <t> (Section 2.38).

Content model: only text content.

2.45.1. "format" Attribute

This attribute is used to control the format of the generated reference text.

"counter"

Inserts a counter, such as the number of a section, figure, table, or list item.

For targets that are not inherently numbered, such as references or comments, it uses the anchor name instead.

"default"

Inserts a text fragment that describes the referenced part completely, such as "Section 2", "Table 4", or "[XML]".

"none"

There will be no autogenerated text.

"title"

Inserts a title for the referenced element (usually obtained from the referenced element's "title" attribute; some processors also use the <title> child element or a <reference> target).

Not all combinations of text content, "format" attribute, and type of referenced part lead to predictable results across different formatters. In case this matters, the following combinations need to be avoided:

- o Non-empty text content with any format other than "none".
- o Empty text content with format "counter" for any target that isn't inherently numbered.
- o Empty text content with format "title" for any target that doesn't have a title.

Allowed values:

- o "counter"
- o "title"
- o "none"
- o "default" (default)

2.45.2. "pageno" Attribute

Unused.

It's unclear what the purpose of this attribute is; processors seem to ignore it, and it never was documented.

Allowed values:

- o "true"
- o "false" (default)

2.45.3. "target" Attribute (Mandatory)

Identifies the document component being referenced.

The value needs to match the value of the "anchor" attribute of another element in the document.

3. Escaping for Use in XML

Text in XML cannot use the literal characters "<" and "&", as they have special meaning to the XML processor (starting entities, elements, etc.). Usually, these characters will need to be substituted by "<" and "&" (see Section 4.6 of [XML]).

">" does not require escaping, unless it appears in the sequence "]]>" (which indicates the end of a CDATA section; see below).

Escaping the individual characters can be a lot of work (when done manually) and also messes up alignment in artwork. Another approach to escaping is to use CDATA sections (Section 2.7 of [XML]). Within these, no further escaping is needed, except when the "end-of-CDATA" marker needs to be used (in that case, the CDATA section needs to be closed, and a new one needs to be started).

4. Special Unicode Code Points

Although the current RFC format does not allow non-ASCII Unicode characters [UNICODE], some of them can be used to enforce certain behaviors of formatters.

For instance:

non-breaking space (U+00A0)

Represents a space character where no line break should happen. This is frequently used in titles (by excluding certain space characters from the line-breaking algorithm, the processor will use the remaining whitespace occurrences for line breaks).

non-breaking hyphen (U+2011)

Similarly, this represents a hyphen character where no line breaking ought to occur.

word joiner (U+2060)

Also called "zero width non-breaking space" -- can be used to disallow line breaking between two non-whitespace characters.

Note that in order to use these characters by name, they need to be declared in either the Document Type Definition (DTD) or the "internal subset" (Section 2.8 of [XML]), like this:

```
<?xml version="1.0"?>

<!DOCTYPE rfc [

    <!-- declare nbsp and friends -->
    <!ENTITY nbsp      "&#xa0;">
    <!ENTITY nbhy      "&#x2011;">
    <!ENTITY wj        "&#x2060;">
]>
```

5. Including Files

This version of the vocabulary does not support an inclusion mechanism on its own -- thus, a document always needs to be self-contained.

That being said, some processors do support file inclusion using Processing Instructions (Section 2.6 of [XML] and Section 4.1.2 of [TCLReadme]).

Furthermore, XML itself allows inclusion of external content using the "internal subset" (Section 2.8 of [XML]). Unfortunately, this requires declaring the external data in the DTD upfront.

For instance:

```
<?xml version="1.0"?>

<!DOCTYPE rfc [

    <!-- allow later RFC 2629 reference using "&rfc2629;" -->
    <!-- the data will be fetched from xml2rfc.ietf.org -->
    <!ENTITY rfc2629 PUBLIC
        "http://xml2rfc.ietf.org/public/rfc/bibxml/reference.RFC.2629.xml">
]>
```

...declares the entity "rfc2629", which then can be used in the "References" section:

```
<references>
    &rfc2629;
</references>
```

Note that this mechanism only works for well-formed XML fragments; thus, any plain text that would need to be escaped in XML can't be included as is.

6. Internationalization Considerations

This format is based on [XML] and thus does not have any issues representing arbitrary Unicode [UNICODE] characters in text content.

However, the current canonical RFC format is restricted to US-ASCII characters (see [USASCII] and Section 3 of [RFC2223]). It is possible that this rule will be relaxed in future revisions of the RFC format (for instance, to allow non-ASCII characters in examples and contact information). In that case, it is expected that the vocabulary will be extended accordingly.

7. Security Considerations

The "name" attribute of the <artwork> element (Section 2.5.4) can be used to derive a filename for saving to a local file system. Trusting this kind of information without pre-processing is a known security risk; see Section 4.3 of [RFC6266] for more information.

Furthermore, the nature of XML, plus vocabulary features such as typed artwork, make it attractive to extract content from documents for further processing, such as for the purpose of checking syntax or computing/verifying examples. In the latter case, care needs to be taken that only trusted content is processed.

All security considerations related to XML processing are relevant as well (see Section 7 of [RFC3470]).

8. IANA Considerations

8.1. Internet Media Type Registration

IANA maintains the registry of Internet Media Types [BCP13] at <<http://www.iana.org/assignments/media-types>>.

This document serves as the specification for the Internet Media Type "application/rfc+xml". The following has been registered with IANA.

Type name: application

Subtype name: rfc+xml

Required parameters: There are no required parameters.

Optional parameters: "charset": This parameter has identical semantics to the charset parameter of the "application/xml" Media Type specified in Section 9.1 of [RFC7303].

Encoding considerations: Identical to those of "application/xml" as described in Section 9.1 of [RFC7303].

Security considerations: As defined in Section 7. In addition, as this media type uses the "+xml" convention, it inherits the security considerations described in Section 10 of [RFC7303].

Interoperability considerations: Some aspects of this vocabulary currently cannot be used interoperably; among the reasons for this are that they weren't precisely defined in the first place, that they have been added in an ad hoc fashion later on, or that they are specific to certain output formats. This specification attempts to identify these cases in the description of the individual elements/attributes.

Published specification: This specification.

Applications that use this media type: Applications that transform xml2rfc to output formats such as plain text or HTML, plus additional analysis tools.

Fragment identifier considerations: The "anchor" attribute is used for assigning document-wide unique identifiers that can be used as shorthand pointers, as described in Section 3.2 of [XPOINTER].

Additional information:

Deprecated alias names for this type: None.

Magic number(s): As specified for "application/xml" in Section 9.1 of [RFC7303].

File extension(s): .xml or .rfcxml when disambiguation from other XML files is needed.

Macintosh file type code(s): TEXT

Person & email address to contact for further information: See the Author's Address section of RFC 7749.

Intended usage: COMMON

Restrictions on usage: None.

Author: See the Author's Address section of RFC 7749.

Change controller: RFC Series Editor (rse@rfc-editor.org)

9. References

9.1. Normative References

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Appendix A. Front-Page ("Boilerplate") Generation

A.1. The "category" Attribute

For RFCs, the "category" attribute (Section 2.33.1) determines the "maturity level" (see Section 4 of [RFC2026]). The allowed values are "std" for "Standards Track", "bcp" for "BCP", "info" for "Informational", "exp" for "Experimental", and "historic" for "Historic".

For Internet-Drafts, the "category" attribute is not needed; when supplied, it will appear as "Intended Status". Supplying this information can be useful to reviewers.

A.2. The "ipr" Attribute

This attribute value can take a long list of values, each of which describes an IPR policy for the document (Section 2.33.4). The values are not the result of a grand design, but they remain simply for historic reasons. Of these values, only a few are currently in use; all others are supported by various tools for backwards compatibility with old source files.

**Note:* some variations of the boilerplate are selected based on the document's date; therefore, it is important to specify the "year", "month", and "day" attributes of the <date> element when archiving the XML source of an Internet-Draft on the day of submission.

Disclaimer: THIS ONLY PROVIDES IMPLEMENTATION INFORMATION.
IF YOU NEED LEGAL ADVICE, PLEASE CONTACT A LAWYER.
For further information, refer to
<<http://trustee.ietf.org/docs/IETF-Copyright-FAQ.pdf>>.

For the current "Status of This Memo" text, the "submissionType" attribute (Section 2.33.9) determines whether a statement about "Code Components" is inserted (which is the case for the value "IETF", which is the default). Other values, such as "independent", suppress this part of the text.

A.2.1. Current Values: "*trust200902"

The name for these values refers to the IETF Trust's "Legal Provisions Relating to IETF Documents", sometimes simply called the "TLP", which went into effect on February 15, 2009 [TLP2.0]. Updates to this document were published on September 12, 2009 [TLP3.0] and on December 28, 2009 [TLP4.0], modifying the license for code components (see <http://trustee.ietf.org/license-info/> for further information). The actual text is located in Section 6 ("Text to Be Included in IETF Documents") of these documents.

Formatters will automatically produce the "correct" text, depending on the document's date information (see above):

+-----+-----+-----+-----+-----+-----+	
TLP	starting with publication date
+-----+-----+-----+-----+-----+-----+	
[TLP3.0]	2009-11-01
[TLP4.0]	2010-04-01
+-----+-----+-----+-----+-----+-----+	

The TLP was again updated in March 2015 ([TLP5.0]), but the changes made in that version do not affect the boilerplate text.

A.2.1.1. trust200902

This value should be used unless one of the more specific "*trust200902" values is a better fit. It produces the text in Sections 6.a and 6.b of the TLP.

A.2.1.2. noModificationTrust200902

This produces additional text from Section 6.c.i of the TLP:

This document may not be modified, and derivative works of it may not be created, except to format it for publication as an RFC or to translate it into languages other than English.

***Note:** this clause is incompatible with RFCs that are published on the Standards Track.

A.2.1.3. noDerivativesTrust200902

This produces the additional text from Section 6.c.ii of the TLP:

This document may not be modified, and derivative works of it may not be created, and it may not be published except as an Internet-Draft.

Note: this clause is incompatible with RFCs.

A.2.1.4. pre5378Trust200902

This produces the additional text from Section 6.c.iii of the TLP, frequently called the "pre-5378 escape clause" (referring to changes introduced in [RFC5378]):

This document may contain material from IETF Documents or IETF Contributions published or made publicly available before November 10, 2008. The person(s) controlling the copyright in some of this material may not have granted the IETF Trust the right to allow modifications of such material outside the IETF Standards Process. Without obtaining an adequate license from the person(s) controlling the copyright in such materials, this document may not be modified outside the IETF Standards Process, and derivative works of it may not be created outside the IETF Standards Process, except to format it for publication as an RFC or to translate it into languages other than English.

See Section 4 of
<<http://trustee.ietf.org/docs/IETF-Copyright-FAQ.pdf>>
for further information about when to use this value.

Note: this text appears under "Copyright Notice", unless the document was published before November 2009, in which case it appears under "Status of This Memo".

A.2.2. Historic Values

A.2.2.1. Historic Values: "*trust200811"

The attribute values "trust200811", "noModificationTrust200811", and "noDerivativesTrust200811" are similar to their "trust200902" counterparts, except that they use text specified in [TLP1.0].

A.2.2.2. Historic Values: "*3978"

The attribute values "full3978", "noModification3978", and "noDerivatives3978" are similar to their counterparts above, except that they use text specified in Section 5 of [RFC3978].

A.2.2.3. Historic Values: "*3667"

The attribute values "full3667", "noModification3667", and "noDerivatives3667" are similar to their counterparts above, except that they use text specified in Section 5 of [RFC3667].

A.2.2.4. Historic Values: "*2026"

The attribute values "full2026" and "noDerivativeWorks2026" are similar to their counterparts above, except that they use text specified in Section 10 of [RFC2026].

The special value "none" was also used back then; it denied the IETF any rights beyond publication as an Internet-Draft.

A.3. The "submissionType" Attribute

The RFC Editor publishes documents from different document streams, of which the IETF stream is the most prominent. Other streams are the independent stream (used for things such as discussion of Internet-related technologies that are not part of the IETF agenda), the IAB stream (Internet Architecture Board) and the IRTF stream (Internet Research Task Force).

The values for the attribute are "IETF" (the default value), "independent", "IAB", and "IRTF".

Historically, this attribute did not affect the final appearance of RFCs, except for subtle differences in copyright notices. Nowadays (as of [RFC5741]), the stream name appears in the first line of the front page, and it also affects the text in the "Status of This Memo" section.

For current documents, setting the "submissionType" attribute will have the following effect:

- o For RFCs, the stream name appears in the upper left corner of the first page (in Internet-Drafts, this is either "Network Working Group" or the value of the <workgroup> element).
- o For RFCs, it affects the whole "Status of This Memo" section (see Section 3.2.2 of [RFC5741]).
- o For all RFCs and Internet-Drafts, it determines whether the "Copyright Notice" mentions the copyright on Code Components (see Section 6 of the TLP ("Text to Be Included in IETF Documents")).

A.4. The "consensus" Attribute

For some of the publication streams (see Appendix A.3), the "Status of This Memo" section depends on whether there was a consensus to publish (again, see Section 3.2.2 of [RFC5741]).

The "consensus" attribute ("yes"/"no", defaulting to "yes") can be used to supply this information. The effect for the various streams is:

- o "independent" and "IAB": none.
- o "IETF": mention that there was an IETF consensus.
- o "IRTF": mention that there was a research group consensus (where the name of the research group is extracted from the <workgroup> element).

Appendix B. Changes from RFC 2629 ("v1")

B.1. Removed Elements

The <appendix> element has been removed; to generate an appendix, place a <section> inside <back>.

B.2. Changed Defaults

Many attributes have lost their "default" value; this is to avoid having document semantics differ based on whether a DTD was specified and evaluated. Processors will handle absent values the way the default value was specified before.

B.3. Changed Elements

`<artwork>`: Has a set of new attributes: "name", "type", "src", "align", "alt", "width", and "height". (Section 2.5)

`<author>`: The `<organization>` element is now optional. The "role" attribute was added. (Section 2.6)

`<country>`: The requirement to use ISO 3166 codes was removed. (Section 2.11)

`<date>`: All attributes are now optional. (Section 2.13)

`<figure>`: Has a set of new attributes: "suppress-title", "src", "align", "alt", "width", and "height". (Section 2.17)

`<ieref>`: Has a new "primary" attribute. (Section 2.20)

`<list>`: The "style" attribute isn't restricted to a set of enumerated values anymore. The "hangIndent" and "counter" attributes have been added. (Section 2.22)

`<reference>`: `<annotation>` allows adding prose to a reference. The "anchor" attribute has been made mandatory. (Section 2.30)

`<references>`: Can now appear multiple times and can carry a "title" attribute (so that normative and informative references can be split). (Section 2.31)

`<rfc>`: The "ipr" attribute has gained additional values. The attributes "consensus", "iprExtract", "submissionType", and "xml:lang" have been added. (Section 2.33)

`<section>`: The new "toc" attribute controls whether it will appear in the Table Of Contents. `<ieref>` can now appear as a direct child element. (Section 2.34)

`<t>`: The "anchor" attribute can now be used as well; however, there are restrictions on how they can be referred to. (Section 2.38)

B.4. New Elements

The following elements have been added: `<annotation>` (Section 2.3), `<c>` (Section 2.8), `<cref>` (Section 2.12), `<format>` (Section 2.18), `<spanx>` (Section 2.36), `<texttable>` (Section 2.39), and `<ttcol>` (Section 2.41).

Appendix C. RELAX NG Schema

```
namespace a = "http://relaxng.org/ns/compatibility/annotations/1.0"
```

```
rfc =
  element rfc {
    attribute number { text }?,
    [ a:defaultValue = "" ] attribute obsoletes { text }?,
    [ a:defaultValue = "" ] attribute updates { text }?,
    attribute category {
      "std" | "bcp" | "info" | "exp" | "historic"
    }?,
    attribute consensus { "no" | "yes" }?,
    attribute seriesNo { text }?,
    attribute ipr {
      "full2026"
      | "noDerivativeWorks2026"
      | "none"
      | "full3667"
      | "noModification3667"
      | "noDerivatives3667"
      | "full3978"
      | "noModification3978"
      | "noDerivatives3978"
      | "trust200811"
      | "noModificationTrust200811"
      | "noDerivativesTrust200811"
      | "trust200902"
      | "noModificationTrust200902"
      | "noDerivativesTrust200902"
      | "pre5378Trust200902"
    }?,
    attribute iprExtract { xsd:IDREF }?,
    [ a:defaultValue = "IETF" ]
    attribute submissionType {
      "IETF" | "IAB" | "IRTF" | "independent"
    }?,
    attribute docName { text }?,
    [ a:defaultValue = "en" ] attribute xml:lang { text }?,
    front,
    middle,
    back?
  }
```

```
front =
  element front {
    title,
    author+,
    date,
    area*,
    workgroup*,
    keyword*,
    abstract?,
    note*
  }

title =
  element title {
    attribute abbrev { text }?,
    text
  }

author =
  element author {
    attribute initials { text }?,
    attribute surname { text }?,
    attribute fullname { text }?,
    attribute role { "editor" }?,
    organization?,
    address?
  }

organization =
  element organization {
    attribute abbrev { text }?,
    text
  }

address =
  element address { postal?, phone?, facsimile?, email?, uri? }

postal =
  element postal { street+, (city | region | code | country)* }

street = element street { text }

city = element city { text }

region = element region { text }

code = element code { text }
```

```
country = element country { text }

phone = element phone { text }

facsimile = element facsimile { text }

email = element email { text }

uri = element uri { text }

date =
  element date {
    attribute day { text }?,
    attribute month { text }?,
    attribute year { text }?,
    empty
  }

area = element area { text }

workgroup = element workgroup { text }

keyword = element keyword { text }

abstract = element abstract { t+ }

note =
  element note {
    attribute title { text },
    t+
  }

middle = element middle { section+ }

section =
  element section {
    attribute anchor { xsd:ID }?,
    attribute title { text },
    [ a:defaultValue = "default" ]
    attribute toc { "include" | "exclude" | "default" }?,
    (t | figure | texttable | iref)*,
    section*
  }
```

```
t =
  element t {
    attribute anchor { xsd:ID }?,
    attribute hangText { text }?,
    (text
     | \list
     | figure
     | xref
     | eref
     | iref
     | cref
     | spanx
     | vspace)*
  }

\list =
  element list {
    attribute style { text }?,
    attribute hangIndent { text }?,
    attribute counter { text }?,
    t+
  }

xref =
  element xref {
    attribute target { xsd:IDREF },
    [ a:defaultValue = "false" ]
    attribute pageno { "true" | "false" }?,
    [ a:defaultValue = "default" ]
    attribute format { "counter" | "title" | "none" | "default" }?,
    text
  }

eref =
  element eref {
    attribute target { text },
    text
  }

iref =
  element iref {
    attribute item { text },
    [ a:defaultValue = "" ] attribute subitem { text }?,
    [ a:defaultValue = "false" ]
    attribute primary { "true" | "false" }?,
    empty
  }
```

```
cref =
  element cref {
    attribute anchor { xsd:ID }?,
    attribute source { text }?,
    text
  }

spanx =
  element spanx {
    [ a:defaultValue = "preserve" ]
    attribute xml:space { "default" | "preserve" }?,
    [ a:defaultValue = "emph" ] attribute style { text }?,
    text
  }

vspace =
  element vspace {
    [ a:defaultValue = "0" ] attribute blankLines { text }?,
    empty
  }

figure =
  element figure {
    attribute anchor { xsd:ID }?,
    [ a:defaultValue = "" ] attribute title { text }?,
    [ a:defaultValue = "false" ]
    attribute suppress-title { "true" | "false" }?,
    attribute src { text }?,
    [ a:defaultValue = "left" ]
    attribute align { "left" | "center" | "right" }?,
    [ a:defaultValue = "" ] attribute alt { text }?,
    [ a:defaultValue = "" ] attribute width { text }?,
    [ a:defaultValue = "" ] attribute height { text }?,
    iref*,
    preamble?,
    artwork,
    postamble?
  }

preamble =
  element preamble { (text | xref | eref | iref | cref | spanx)* }
```

```

artwork =
  element artwork {
    [ a:defaultValue = "preserve" ]
    attribute xml:space { "default" | "preserve" }?,
    [ a:defaultValue = "" ] attribute name { text }?,
    [ a:defaultValue = "" ] attribute type { text }?,
    attribute src { text }?,
    [ a:defaultValue = "left" ]
    attribute align { "left" | "center" | "right" }?,
    [ a:defaultValue = "" ] attribute alt { text }?,
    [ a:defaultValue = "" ] attribute width { text }?,
    [ a:defaultValue = "" ] attribute height { text }?,
    text*
  }

postamble =
  element postamble { (text | xref | eref | iref | cref | spanx)* }

texttable =
  element texttable {
    attribute anchor { xsd:ID }?,
    [ a:defaultValue = "" ] attribute title { text }?,
    [ a:defaultValue = "false" ]
    attribute suppress-title { "true" | "false" }?,
    [ a:defaultValue = "center" ]
    attribute align { "left" | "center" | "right" }?,
    [ a:defaultValue = "full" ]
    attribute style { "all" | "none" | "headers" | "full" }?,
    preamble?,
    ttcol+,
    c*,
    postamble?
  }

ttcol =
  element ttcol {
    attribute width { text }?,
    [ a:defaultValue = "left" ]
    attribute align { "left" | "center" | "right" }?,
    text
  }

c = element c { (text | xref | eref | iref | cref | spanx)* }

back = element back { references*, section* }

```

```
references =
  element references {
    [ a:defaultValue = "References" ] attribute title { text }?,
    reference+
  }

reference =
  element reference {
    attribute anchor { xsd:ID },
    attribute target { text }?,
    front,
    seriesInfo*,
    format*,
    annotation*
  }

seriesInfo =
  element seriesInfo {
    attribute name { text },
    attribute value { text },
    empty
  }

format =
  element format {
    attribute target { text }?,
    attribute type { text },
    attribute octets { text }?,
    empty
  }

annotation =
  element annotation { (text | xref | eref | iref | cref | spanx)* }

start = rfc
```

(This schema was derived from version 1.3.6 of the xml2rfc DTD ("Document Type Definition") (Section 2.8 of [XML]), available from <<http://svn.tools.ietf.org/svn/tools/xml2rfc/vocabulary/v2/03/xml2rfcv2.dtd>>.)

C.1. Checking Validity

The validity of XML files can be checked with any tool that supports RELAX NG [RNC]. The reference implementation is the Java-based, open-sourced "Jing" [JING].

To use Jing, download the latest ZIP file from the "downloads" page (currently <<https://code.google.com/p/jing-trang/downloads/detail?name=jing-20091111.zip>>), extract the archive, copy "jing.jar" from the "bin" folder, and make sure Java is installed.

To check a file "test.xml" using the RNC file "schema.rnc", run (from a command-line prompt):

```
java -jar jing.jar -c schema.rnc test.xml
```

In good Unix tradition, no output means the file is valid.

IAB Members at the Time of Approval

Jari Arkko (IETF Chair)
Mary Barnes
Marc Blanchet
Ralph Droms
Ted Hardie
Joe Hildebrand
Russ Housley
Erik Nordmark
Robert Sparks
Andrew Sullivan
Dave Thaler
Brian Trammell
Suzanne Woolf

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Index

A

Attributes

- abbrev 21, 34
- align 7, 14, 32, 34
- alt 7, 15
- anchor 11, 15, 23, 28, 31-32
- blankLines 35
- category 25
- consensus 25
- counter 18
- day 12
- docName 25
- format 36
- fullname 9
- hangIndent 18
- hangText 31
- height 7, 15
- initials 9
- ipr 26
- iprExtract 26
- item 17
- month 12
- name 7, 29
- number 27
- obsoletes 27
- octets 16
- pageno 37
- primary 17
- role 9
- seriesNo 27
- source 12
- src 7, 15
- style 19, 30, 32
- subitem 17
- submissionType 27
- suppress-title 15, 33
- surname 10
- target 13, 16, 23, 37
- title 15, 21, 24, 28, 33
- toc 28
- type 8, 16
- updates 27
- value 29
- width 8, 15, 34

- xml:lang 28
- xml:space 8, 30
- year 13
- abbrev attribute
 - in organization element 21
 - in title element 34
- abstract element 4, 50
 - inside front 16
- address element 4, 50
 - inside author 9
- align attribute
 - in artwork element 7
 - in figure element 14
 - in texttable element 32
 - in ttable element 34
- alt attribute
 - in artwork element 7
 - in figure element 15
- anchor attribute
 - in cref element 11
 - in figure element 15
 - in reference element 23
 - in section element 28
 - in t element 31
 - in texttable element 32
- annotation element 5, 50
 - inside reference 23
- application/rfc+xml Media Type 40
- area element 5, 50
 - inside front 16
- artwork element 6, 50
 - align attribute 7
 - alt attribute 7
 - height attribute 7
 - inside figure 14
 - name attribute 7
 - src attribute 7
 - type attribute 8
 - width attribute 8
 - xml:space attribute 8
- author element 8, 50
 - fullname attribute 9
 - initials attribute 9
 - inside front 16
 - role attribute 9
 - surname attribute 10

B

back element 10, 50
 inside rfc 25
blankLines attribute
 in vspace element 35

C

c element 10, 50
 inside texttable 32
category attribute
 in rfc element 25
city element 11, 50
 inside postal 22
code element 11, 50
 inside postal 22
consensus attribute
 in rfc element 25
counter attribute
 in list element 18
country element 11, 50
 inside postal 22
cref element 11, 50
 anchor attribute 11
 inside annotation 5
 inside c 10
 inside postamble 22
 inside preamble 23
 inside t 31
 source attribute 12

D

date element 12, 50
 day attribute 12
 inside front 16
 month attribute 12
 year attribute 13
day attribute
 in date element 12
docName attribute
 in rfc element 25

E

Elements
 abstract 4, 16
 address 4, 9
 annotation 5, 23
 area 5, 16
 artwork 6, 14
 author 8, 16
 back 10, 25
 c 10, 32

city 11, 22
code 11, 22
country 11, 22
cref 5, 10-11, 22-23, 31
date 12, 16
email 5, 13
eref 5, 10, 13, 22-23, 31
facsimile 5, 14
figure 14, 28, 31
format 15, 23
front 16, 23, 25
iref 5, 10, 14, 17, 22-23, 28, 31
keyword 16, 18
list 18, 31
middle 20, 25
note 17, 20
organization 9, 21
phone 5, 21
postal 5, 21
postamble 14, 22, 32
preamble 14, 22, 32
reference 23-24
references 10, 24
region 22, 24
rfc 24
section 10, 20, 28
seriesInfo 23, 29
spanx 5, 10, 22-23, 29, 31
street 21, 30
t 4, 18, 20, 28, 31
texttable 28, 31
title 16, 33
ttcol 32, 34
uri 5, 34
vspace 31, 34
workgroup 16, 35
xref 5, 10, 22, 31, 35
email element 13, 50
 inside address 5
eref element 13, 50
 inside annotation 5
 inside c 10
 inside postamble 22
 inside preamble 23
 inside t 31
 target attribute 13

F

- facsimile element 14, 50
 - inside address 5
- figure element 14, 50
 - align attribute 14
 - alt attribute 15
 - anchor attribute 15
 - height attribute 15
 - inside section 28
 - inside t 31
 - src attribute 15
 - suppress-title attribute 15
 - title attribute 15
 - width attribute 15
- format attribute
 - in xref element 36
- format element 15, 50
 - inside reference 23
 - octets attribute 16
 - target attribute 16
 - type attribute 16
- front element 16, 50
 - inside reference 23
 - inside rfc 25
- fullname attribute
 - in author element 9

H

- hangIndent attribute
 - in list element 18
- hangText attribute
 - in t element 31
- height attribute
 - in artwork element 7
 - in figure element 15

I

- initials attribute
 - in author element 9
- ipr attribute
 - "*2026" 48
 - "*3667" 48
 - "*3978" 47
 - "*trust200811" 47
 - "*trust200902" 46
 - "noDerivativesTrust200902" 47
 - "noModificationTrust200902" 46
 - "pre5378Trust200902" 47
 - "trust200902" 46
 - in rfc element 26

- iprExtract attribute
 - in rfc element 26
- iref element 17, 50
 - inside annotation 5
 - inside c 10
 - inside figure 14
 - inside postamble 22
 - inside preamble 23
 - inside section 28
 - inside t 31
 - item attribute 17
 - primary attribute 17
 - subitem attribute 17
- item attribute
 - in iref element 17
- K
 - keyword element 18, 50
 - inside front 16
- L
 - list element 18, 50
 - counter attribute 18
 - hangIndent attribute 18
 - inside t 31
 - style attribute 19
 - list styles
 - empty 19
 - format ... 20
 - hanging 19
 - letters 19
 - numbers 19
 - symbols 19
- M
 - Media Type
 - application/rfc+xml 40
 - middle element 20, 50
 - inside rfc 25
 - month attribute
 - in date element 12
- N
 - name attribute
 - in artwork element 7
 - in seriesInfo element 29
 - note element 20, 50
 - inside front 17
 - title attribute 21
 - number attribute
 - in rfc element 27

O

- obsoletes attribute
 - in rfc element 27
- octets attribute
 - in format element 16
- organization element 21, 50
 - abbrev attribute 21
 - inside author 9

P

- pageno attribute
 - in xref element 37
- phone element 21, 50
 - inside address 5
- postal element 21, 50
 - inside address 5
- postamble element 22, 50
 - inside figure 14
 - inside texttable 32
- preamble element 22, 50
 - inside figure 14
 - inside texttable 32
- primary attribute
 - in iref element 17

R

- reference element 23, 50
 - anchor attribute 23
 - inside references 24
 - target attribute 23
- references element 24, 50
 - inside back 10
 - title attribute 24
- region element 24, 50
 - inside postal 22
- rfc element 24, 50
 - category attribute 25
 - consensus attribute 25
 - docName attribute 25
 - ipr attribute 26
 - iprExtract attribute 26
 - number attribute 27
 - obsoletes attribute 27
 - seriesNo attribute 27
 - submissionType attribute 27
 - updates attribute 27
 - xml:lang attribute 28
- role attribute
 - in author element 9

S

- section element 28, 50
 - anchor attribute 28
 - inside back 10
 - inside middle 20
 - inside section 28
 - title attribute 28
 - toc attribute 28
- seriesInfo element 29, 50
 - inside reference 23
 - name attribute 29
 - value attribute 29
- seriesNo attribute
 - in rfc element 27
- source attribute
 - in cref element 12
- spanx element 29, 50
 - inside annotation 5
 - inside c 10
 - inside postamble 22
 - inside preamble 23
 - inside t 31
 - style attribute 30
 - xml:space attribute 30
- src attribute
 - in artwork element 7
 - in figure element 15
- street element 30, 50
 - inside postal 21
- style attribute
 - in list element 19
 - in spanx element 30
 - in texttable element 32
- subitem attribute
 - in iref element 17
- submissionType attribute
 - in rfc element 27
- suppress-title attribute
 - in figure element 15
 - in texttable element 33
- surname attribute
 - in author element 10

T

- t element 31, 50
 - anchor attribute 31
 - hangText attribute 31
 - inside abstract 4
 - inside list 18
 - inside note 20
 - inside section 28
- target attribute
 - in eref element 13
 - in format element 16
 - in reference element 23
 - in xref element 37
- texttable element 31, 50
 - align attribute 32
 - anchor attribute 32
 - inside section 28
 - style attribute 32
 - suppress-title attribute 33
 - title attribute 33
- title attribute
 - in figure element 15
 - in note element 21
 - in references element 24
 - in section element 28
 - in texttable element 33
- title element 33, 50
 - abbrev attribute 34
 - inside front 16
- toc attribute
 - in section element 28
- ttcol element 34, 50
 - align attribute 34
 - inside texttable 32
 - width attribute 34
- type attribute
 - in artwork element 8
 - in format element 16

U

- updates attribute
 - in rfc element 27
- uri element 34, 50
 - inside address 5

V

- value attribute
 - in seriesInfo element 29
- vspace element 34, 50
 - blankLines attribute 35
 - inside t 31

W

- width attribute
 - in artwork element 8
 - in figure element 15
 - in ttcol element 34
- workgroup element 35, 50
 - inside front 16

X

- xml:lang attribute
 - in rfc element 28
- xml:space attribute
 - in artwork element 8
 - in spanx element 30
- xref element 35, 50
 - format attribute 36
 - inside annotation 5
 - inside c 10
 - inside postamble 22
 - inside preamble 22
 - inside t 31
 - pageno attribute 37
 - target attribute 37
- xref formats
 - counter 36
 - default 36
 - none 36
 - title 36

Y

- year attribute
 - in date element 13

Author's Address

Julian F. Reschke
greenbytes GmbH
Hafenweg 16
Muenster, NW 48155
Germany

Email: julian.reschke@greenbytes.de
URI: <http://greenbytes.de/tech/webdav/>

