



# Namespaces in XML

## 1.0 (Third Edition)

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#### Abstract

XML namespaces provide a simple method for qualifying element and attribute names used in Extensible Markup Language documents by associating them with namespaces identified by URI references.

#### Status of this document

*This section describes the status of this document at the time of its publication. Other documents may supersede this document. A list of current W3C publications and the latest revision of this technical report can be found in the W3C technical reports index at <http://www.w3.org/TR/>.*

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This document is a product of the XML Core Working Group as part of the W3C XML Activity. The English version of this specification is the only normative version. However, for translations of this document, see <http://www.w3.org/2003/03/Translations/byTechnology?technology=xml-names> .

Known implementations are documented in the Namespaces 1.1 implementation report (all known Namespaces 1.1 implementations also support Namespaces 1.0) . A test suite is also available via the XML Test Suite page.

This third edition incorporates all known errata as of the publication date. It supersedes the previous edition of 16 August 2006.

This edition has been widely reviewed. Only minor editorial changes have been made since the 6 August 2009 Proposed Edited Recommendation.

Please report errors in this document to [xml-names-editor@w3.org](mailto:xml-names-editor@w3.org); public archives are available. The errata list for this document is available at <http://www.w3.org/XML/2009/xml-names-errata> .

This document has been reviewed by W3C Members, by software developers, and by other W3C groups and interested parties, and is endorsed by the Director as a W3C Recommendation. It is a stable document and may be used as reference material or cited from another document. W3C's role in making the Recommendation is to draw attention to the specification and to promote its widespread deployment. This enhances the functionality and interoperability of the Web.

W3C maintains a public list of any patent disclosures made in connection with the deliverables of the group; that page also includes instructions for disclosing a patent. An individual who has actual knowledge of a patent which the individual believes contains Essential Claim(s) must disclose the information in accordance with section 6 of the W3C Patent Policy.

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# 1. Motivation and Summary

We envision applications of Extensible Markup Language (XML) where a single XML document may contain elements and attributes (here referred to as a "markup vocabulary") that are defined for and used by multiple software modules. One motivation for this is modularity: if such a markup vocabulary exists which is well-understood and for which there is useful software available, it is better to re-use this markup rather than re-invent it.

Such documents, containing multiple markup vocabularies, pose problems of recognition and collision. Software modules need to be able to recognize the elements and attributes which they are designed to process, even in the face of "collisions" occurring when markup intended for some other software package uses the same element name or attribute name.

These considerations require that document constructs should have names constructed so as to avoid clashes between names from different markup vocabularies. This specification describes a mechanism, *XML namespaces*, which accomplishes this by assigning [expanded names](#) to elements and attributes.

## 1.1. A Note on Notation and Usage

Where *EMPHASIZED*, the key words *MUST*, *MUST NOT*, *REQUIRED*, *SHOULD*, *SHOULD NOT*, *MAY* in this document are to be interpreted as described in [[Keywords](#)].

Note that many of the nonterminals in the productions in this specification are defined not here but in the XML specification [[XML](#)]. When nonterminals defined here have the same names as nonterminals defined in the XML specification, the productions here in all cases match a subset of the strings matched by the corresponding ones there.

In this document's productions, the NSC is a "Namespace Constraint", one of the rules that documents conforming to this specification *MUST* follow.

# 2. XML Namespaces

## 2.1. Basic Concepts

An *XML namespace* is identified by a URI reference [[RFC3986](#)]; element and attribute names may be placed in an XML namespace using the mechanisms described in this specification.

An *expanded name* is a pair consisting of a [namespace name](#) and a [local name](#). For a name *N* in a namespace identified by a URI *I*, the *namespace name* is *I*. For a name *N* that is not in a namespace, the *namespace name* has no value. In either case the *local name* is *N*. It is this combination of the universally managed URI namespace with the vocabulary's local names that is effective in avoiding name clashes.

URI references can contain characters not allowed in names, and are often inconveniently long, so expanded names are not used directly to name elements and attributes in XML documents. Instead [qualified names](#) are used. A *qualified name* is a name subject to namespace interpretation. In documents conforming to this specification, element and attribute names appear as qualified names. Syntactically, they are either or . An attribute-based declaration syntax is provided to bind prefixes to namespace names and to bind a default namespace that applies to unprefixed element names; these declarations are scoped by the elements on which they appear so that different bindings may apply in different parts of a document. Processors conforming to this specification *MUST* recognize and act on these declarations and prefixes.

## 2.2. Use of URIs as Namespace Names

The empty string, though it is a legal URI reference, cannot be used as a namespace name.

The use of relative URI references, including same-document references, in namespace declarations is deprecated.

 This deprecation of relative URI references was decided on by a W3C XML Plenary Ballot [[Relative URI deprecation](#)]. It also declares that "later specifications such as DOM, XPath, etc. will define no interpretation for them".

## 2.3. Comparing URI References

URI references identifying namespaces are compared when determining whether a name belongs to a given namespace, and whether two names belong to the same namespace. The two URIs are treated as strings, and they are *identical* if and only if the strings are identical, that is, if they are the same sequence of characters. The comparison is case-sensitive, and no %-escaping is done or undone.

A consequence of this is that URI references which are not identical in this sense may resolve to the same resource. Examples include URI references which differ only in case or %-escaping, or which are in external entities which have different base URIs (but note that relative URIs are deprecated as namespace names).

In a namespace declaration, the URI reference is the normalized value of the attribute, so replacement of XML character and entity references has already been done before any comparison.

Examples:

The URI references below are all different for the purposes of identifying namespaces, since they differ in case:

- `http://www.example.org/wine`
- `http://www.Example.org/wine`
- `http://www.example.org/Wine`

The URI references below are also all different for the purposes of identifying namespaces:

- `http://www.example.org/~wilbur`
- `http://www.example.org/%7ewilbur`
- `http://www.example.org/%7Ewilbur`

Because of the risk of confusion between URIs that would be equivalent if dereferenced, the use of %-escaped characters in namespace names is strongly discouraged.

## 3. Declaring Namespaces

A namespace (or more precisely, a namespace binding) is *declared* using a family of reserved attributes. Such an attribute's name must either be `xmlns` or begin `xmlns:`. These attributes, like any other XML attributes, may be provided directly or by default.





An example of a qualified name serving as an attribute name:

```
<x xmlns:edi='http://ecommerce.example.org/schema'>
  <!-- the 'taxClass' attribute's namespace is http://ecommerce.example.org/schema
-->
  <lineItem edi:taxClass="exempt">Baby food</lineItem>
</x>
```

### Namespace Constraint: Prefix Declared

The namespace prefix, unless it is `xml` or `xmlns`, *MUST* have been declared in a [namespace declaration](#) attribute in either the start-tag of the element where the prefix is used or in an ancestor element (i.e., an element in whose content the prefixed markup occurs).

### Namespace Constraint: No Prefix Undeclaring

In a [namespace declaration](#) for a (i.e., where the is a ), the attribute value *MUST NOT* be empty.

This constraint may lead to operational difficulties in the case where the namespace declaration attribute is provided, not directly in the XML document entity, but via a default attribute declared in an external entity. Such declarations may not be read by software which is based on a non-validating XML processor. Many XML applications, presumably including namespace-sensitive ones, fail to require validating processors. If correct operation with such applications is required, namespace declarations *MUST* be provided either directly or via default attributes declared in the internal subset of the DTD.

Element names and attribute names are also given as qualified names when they appear in declarations in the DTD:

### Qualified Names in Declarations

- [14] doctypedecl ::= '<!DOCTYPE' [S QName](#) ([S ExternalID](#))? [S](#)? ('[' ([markupdecl](#) | [PEReference](#) | [S](#))\* ']' [S](#)?)? '>'
- [15] elementdecl ::= '<!ELEMENT' [S QName](#) [S contentspec](#) [S](#)? '>'
- [16] cp ::= ([QName](#) | [choice](#) | [seq](#)) ('?' | '\*' | '+')?
- [17] Mixed ::= '(' [S](#)? '#PCDATA' ([S](#)? '|' [S](#)? [QName](#))\* [S](#)? ')'\*  
| '(' [S](#)? '#PCDATA' [S](#)? ')'
- [18] AttlistDecl ::= '<!ATTLIST' [S QName](#) [AttDef](#)\* [S](#)? '>'
- [19] AttDef ::= [S](#) ([QName](#) | [NSAttName](#)) [S AttType](#) [S DefaultDecl](#)

Note that DTD-based validation is not namespace-aware in the following sense: a DTD constrains the elements and attributes that may appear in a document by their uninterpreted names, not by (namespace name, local name) pairs. To validate a document that uses namespaces against a DTD, the same prefixes must be used in the DTD as in the instance. A DTD may however indirectly constrain the namespaces used in a valid document by providing `#FIXED` values for attributes that declare namespaces.

## 6. Applying Namespaces to Elements and Attributes

### 6.1. Namespace Scoping

The scope of a namespace declaration declaring a prefix extends from the beginning of the start-tag in which it appears to the end of the corresponding end-tag, excluding the scope of any inner declarations with the same NSAttName part. In the case of an empty tag, the scope is the tag itself.

Such a namespace declaration applies to all element and attribute names within its scope whose prefix matches that specified in the declaration.

The [expanded name](#) corresponding to a prefixed element or attribute name has the URI to which the is bound as its [namespace name](#), and the as its [local name](#).

```
<?xml version="1.0"?>
<html:html xmlns:html='http://www.w3.org/1999/xhtml'>

  <html:head><html:title>Frobnostication</html:title></html:head>
  <html:body><html:p>Moved to
    <html:a href='http://frob.example.com'>here.</html:a></html:p></html:body>
</html:html>
```

Multiple namespace prefixes can be declared as attributes of a single element, as shown in this example:

```
<?xml version="1.0"?>
<!-- both namespace prefixes are available throughout -->
<bk:book xmlns:bk='urn:loc.gov:books'
  xmlns:isbn='urn:ISBN:0-395-36341-6'>
  <bk:title>Cheaper by the Dozen</bk:title>
  <isbn:number>1568491379</isbn:number>
</bk:book>
```

### 6.2. Namespace Defaulting

The scope of a [default namespace](#) declaration extends from the beginning of the start-tag in which it appears to the end of the corresponding end-tag, excluding the scope of any inner default namespace declarations. In the case of an empty tag, the scope is the tag itself.

A default namespace declaration applies to all unprefixed element names within its scope. Default namespace declarations do not apply directly to attribute names; the interpretation of unprefixed attributes is determined by the element on which they appear.

If there is a default namespace declaration in scope, the [expanded name](#) corresponding to an unprefixed element name has the URI of the [default namespace](#) as its [namespace name](#). If there is no default namespace declaration in scope, the namespace name has no value. The namespace name for an unprefixed attribute name always has no value. In all cases, the [local name](#) is (which is of course the same as the unprefixed name itself).

```
<?xml version="1.0"?>
<!-- elements are in the HTML namespace, in this case by default -->
<html xmlns='http://www.w3.org/1999/xhtml'>
  <head><title>Frobnostication</title></head>
```

```
<body><p>Moved to
  <a href='http://frob.example.com'>here</a>.</p></body>
</html>
```

```
<?xml version="1.0"?>
<!-- unprefix element types are from "books" -->
<book xmlns='urn:loc.gov:books'
  xmlns:isbn='urn:ISBN:0-395-36341-6'>
  <title>Cheaper by the Dozen</title>
  <isbn:number>1568491379</isbn:number>
</book>
```

A larger example of namespace scoping:

```
<?xml version="1.0"?>
<!-- initially, the default namespace is "books" -->
<book xmlns='urn:loc.gov:books'
  xmlns:isbn='urn:ISBN:0-395-36341-6'>
  <title>Cheaper by the Dozen</title>
  <isbn:number>1568491379</isbn:number>
  <notes>
    <!-- make HTML the default namespace for some commentary -->
    <p xmlns='http://www.w3.org/1999/xhtml'>
      This is a <i>funny</i> book!
    </p>
  </notes>
</book>
```

The attribute value in a default namespace declaration *MAY* be empty. This has the same effect, within the scope of the declaration, of there being no default namespace.

```
<?xml version='1.0'?>
<Beers>
  <!-- the default namespace inside tables is that of HTML -->
  <table xmlns='http://www.w3.org/1999/xhtml'>
    <th><td>Name</td><td>Origin</td><td>Description</td></th>
    <tr>
      <!-- no default namespace inside table cells -->
      <td><brandName xmlns="">Huntsman</brandName></td>
      <td><origin xmlns="">Bath, UK</origin></td>
      <td>
        <details xmlns=""><class>Bitter</class><hop>Fuggles</hop>
          <pro>Wonderful hop, light alcohol, good summer beer</pro>
          <con>Fragile; excessive variance pub to pub</con>
        </details>
      </td>
    </tr>
```

```

</table>
</Beers>

```

### 6.3. Uniqueness of Attributes

#### Namespace Constraint: Attributes Unique

In XML documents conforming to this specification, no tag may contain two attributes which:

1. have identical names, or
2. have qualified names with the same [local part](#) and with [prefixes](#) which have been bound to [namespace names](#) that are [identical](#).

This constraint is equivalent to requiring that no element have two attributes with the same [expanded name](#).

For example, each of the bad empty-element tags is illegal in the following:

```

<!-- http://www.w3.org is bound to n1 and n2 -->
<x xmlns:n1="http://www.w3.org"
  xmlns:n2="http://www.w3.org" >
  <bad a="1"      a="2" />
  <bad n1:a="1"  n2:a="2" />
</x>

```

However, each of the following is legal, the second because the default namespace does not apply to attribute names:

```

<!-- http://www.w3.org is bound to n1 and is the default -->
<x xmlns:n1="http://www.w3.org"
  xmlns="http://www.w3.org" >
  <good a="1"      b="2" />
  <good a="1"      n1:a="2" />
</x>

```

## 7. Conformance of Documents

This specification applies to XML 1.0 documents. To conform to this specification, a document *MUST* be well-formed according to the XML 1.0 specification [[XML](#)].

In XML documents which conform to this specification, element and attribute names *MUST* match the production for [QName](#) and *MUST* satisfy the "Namespace Constraints". All other tokens in the document which are *REQUIRED*, for XML 1.0 well-formedness, to match the XML production for [Name](#) *MUST* match this specification's production for [NCName](#).

A document is *namespace-well-formed* if it conforms to this specification.

It follows that in a namespace-well-formed document:

- All element and attribute names contain either zero or one colon;
- No entity names, processing instruction targets, or notation names contain any colons.

In addition, a namespace-well-formed document may also be namespace-valid.

A namespace-well-formed document is *namespace-valid* if it is valid according to the XML 1.0 specification, and all tokens other than element and attribute names which are *REQUIRED*, for XML 1.0 validity, to match the XML production for [Name](#) match this specification's production for **NCName**.

It follows that in a namespace-valid document:

- No attributes with a declared type of ID, IDREF(S), ENTITY(IES), or NOTATION contain any colons.

## 8. Conformance of Processors

To conform to this specification, a processor *MUST* report violations of namespace well-formedness, with the exception that it is not *REQUIRED* to check that namespace names are URI references [[RFC3986](#)].

A validating XML processor that conforms to this specification is *namespace-validating* if in addition it reports violations of namespace validity.

## Appendix A. Normative References

### Keywords

[RFC 2119: Key words for use in RFCs to Indicate Requirement Levels](#), S. Bradner, ed. IETF (Internet Engineering Task Force), March 1997. Available at <http://www.rfc-editor.org/rfc/rfc2119.txt>

### RFC2141

[RFC 2141: URN Syntax](#), R. Moats, ed. IETF (Internet Engineering Task Force), May 1997. Available at <http://www.rfc-editor.org/rfc/rfc2141.txt>.

### RFC3986

[RFC 3986: Uniform Resource Identifier \(URI\): Generic Syntax](#), T. Berners-Lee, R. Fielding, and L. Masinter, eds. IETF (Internet Engineering Task Force), January 2005. Available at <http://www.rfc-editor.org/rfc/rfc3986.txt>

### RFC3629

[RFC 3629: UTF-8, a transformation format of ISO 10646](#), F. Yergeau, ed. IETF (Internet Engineering Task Force), November 2003. Available at <http://www.rfc-editor.org/rfc/rfc3629.txt>

### XML

[Extensible Markup Language \(XML\) 1.0](#), Tim Bray, Jean Paoli, C. M. Sperberg-McQueen, Eve Maler, and François Yergeau eds. W3C (World Wide Web Consortium). Available at <http://www.w3.org/TR/REC-xml/>.

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## Appendix B. Other references (Non-Normative)

### 1.0 Errata

[Namespaces in XML Errata](http://www.w3.org/XML/xml-names-19990114-errata). W3C (World Wide Web Consortium). Available at <http://www.w3.org/XML/xml-names-19990114-errata>.

### 1.0 2e Errata

[Namespaces in XML \(Second Edition\) Errata](http://www.w3.org/XML/2006/xml-names-errata). W3C (World Wide Web Consortium). Available at <http://www.w3.org/XML/2006/xml-names-errata>.

### Relative URI deprecation

[Results of W3C XML Plenary Ballot on relative URI References In namespace declarations 3-17 July 2000](http://www.w3.org/2000/09/xppa), Dave Hollander and C. M. Sperberg-McQueen, 6 September 2000. Available at <http://www.w3.org/2000/09/xppa>.

## Appendix C. The Internal Structure of XML Namespaces (Non-Normative)

This appendix has been deleted.

## Appendix D. Changes since version 1.0 (Non-Normative)

This version incorporates the errata as of 20 July 2009 [[1.0 Errata](#)] [[1.0 2e Errata](#)].

There are several editorial changes, including a number of terminology changes and additions intended to produce greater consistency. The non-normative appendix "The Internal Structure of XML Namespaces" has been removed. The BNF has been adjusted to interconnect properly with all editions of XML 1.0, including the fifth edition.

## Appendix E. Acknowledgements (Non-Normative)

This work reflects input from a very large number of people, including especially the participants in the World Wide Web Consortium XML Working Group and Special Interest Group and the participants in the W3C Metadata Activity. The contributions of Charles Frankston of Microsoft were particularly valuable.

## Appendix F. Orphaned Productions (Non-Normative)

The following two productions are modified versions of ones which were present in the first two editions of this specification. They are no longer used, but are retained here to satisfy cross-references to undated versions of this specification.

Because the Letter production of XML 1.0, originally used in the definition of `NCNameStartChar`, is no longer the correct basis for defining names since XML 1.0 Fifth Edition, the `NCNameStartChar`

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production has been modified to give the correct results against any edition of XML, by defining `NCNameStartChar` in terms of `NCName`.

[20] `NCNameChar ::= NameChar - ':' /* An XML NameChar, minus the ":" */`

[21] `NCNameStartChar ::= NCName - ( Char Char Char* ) /* The first letter of an NCName */`



Production `NC-NCNameStartChar` takes advantage of the fact that a single-character `NCName` is necessarily an `NCNameStartChar`, and works by subtracting from the set of `NCNames` of all lengths the set of all strings of two or more characters, leaving only the `NCNames` which are one character long.

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