

Top-Level Schema

This Quick Reference primarily describes ISO Schematron. See the “Difference” panel for Schamatron 1.5 and 1.6.

```
<schema id="ID" icon="URI" see="URI"
  fpi="FORMAL-PUBLIC-ID" xml:lang="LANG"
  xml:space="{ 'preserve' | 'default' }"
  schemaVersion="VERSION"
  defaultPhase="IDREF"
  queryBinding="BINDING-NAME"
  xmlns=
    "http://purl.oclc.org/dsdl/schematron">
  <title>?, <ns>*, <p>*, <let>*, <phase>*,
    <pattern>+, <p>*, <diagnostics>?, plus
    interspersed <include>
</schema>
```

```
<ns name="NAME" uri="URI"/>
```

All namespaces used in validated documents, and referenced in the schema, must be declared using `<ns>`.

```
<let name="NAME" value="VALUE"/>
```

```
<include href="URI"/>
```

Patterns

```
<pattern abstract="false" id="ID"
  icon="URI" see="URI"
  fpi="FORMAL-PUBLIC-ID" xml:lang="LANG"
  xml:space="{ 'preserve' | 'default' }"
  <p>*, <let>*, <rule>*, plus interspersed
  <include>
</pattern>
```

Within each pattern, only the first non-abstract `<rule>` whose **@context** matches is used.

Abstract patterns

```
<pattern abstract="true" id="ID"
  icon="URI" see="URI"
  fpi="FORMAL-PUBLIC-ID" xml:lang="LANG"
  xml:space="{ 'preserve' | 'default' }"
  <p>*, <let>*, <rule>*, plus interspersed
  <include>
</pattern>
```

Using abstract patterns

```
<pattern abstract="false" is-a="IDREF" id="ID"
  icon="URI" see="URI"
  fpi="FORMAL-PUBLIC-ID" xml:lang="LANG"
  xml:space="{ 'preserve' | 'default' }"
  <p>*, <param>*, and interspersed <include>
</pattern>
```

```
<param name="NCNAME" value="VALUE"/>
@value must be non-empty-string
```

Phases

```
<phase id="ID" icon="URI" see="URI"
  fpi="FORMAL-PUBLIC-ID" xml:lang="LANG"
  xml:space="{ 'preserve' | 'default' }"
  <p>*, <let>*, <active>*, plus interspersed
  <include>
</phase>
```

```
<active pattern="IDREF">
  any number of text, <dir>, <emph> and
  <span>
</active>
```

Rules, Assertions and Reports

```
<rule flag="NAME" abstract="false"
  context="PATH" id="ID" icon="URI"
  fpi="FORMAL-PUBLIC-ID" xml:lang="LANG"
  xml:space="{ 'preserve' | 'default' }"
  see="URI" role="ROLE" subject="PATH">
  any number of <let>, followed by any number
  (at least one) of <assert>, <report> and
  <extends>, plus interspersed <include>
</rule>
```

```
<extends rule="IDREF"/>
plus any foreign attributes
```

```
<assert test="EXPR" flag="NAME" id="ID"
  diagnostics="IDREFS" icon="URI" see="URI"
  fpi="FORMAL-PUBLIC-ID" xml:lang="LANG"
  xml:space="{ 'preserve' | 'default' }"
  role="ROLE" subject="PATH">
  any number of text, <name>, <value-of>,
  <emph>, <dir> and <span>
</assert>
```

```
<report test="EXPR" flag="NAME" id="ID"
  diagnostics="IDREFS" icon="URI" see="URI"
  fpi="FORMAL-PUBLIC-ID" xml:lang="LANG"
  xml:space="{ 'preserve' | 'default' }"
  role="ROLE" subject="PATH">
  any number of text, <name>, <value-of>,
  <emph>, <dir> and <span>
</report>
```

Abstract rules (used to `<extends>` others)

```
<rule flag="NAME" abstract="true"
  id="ID" icon="URI"
  fpi="FORMAL-PUBLIC-ID" xml:lang="LANG"
  xml:space="{ 'preserve' | 'default' }"
  see="URI" role="ROLE" subject="PATH">
  any number of <let>, followed by any number
  (at least one) of <assert>, <report> and
  <extends>, plus interspersed <include>
</rule>
```

XSL-List:

<http://www.mulberrytech.com/xsl/xsl-list>

Diagnostics

```
<diagnostics>
  any number of <diagnostic> and <include>
</diagnostics>
```

```
<diagnostic id="ID" icon="URI" see="URI"
  fpi="FORMAL-PUBLIC-ID" xml:lang="LANG"
  xml:space="{ 'preserve' | 'default' }"
  any number of text, <value-of>, <emph>,
  <dir> and <span>
</diagnostic>
```

Formatting Output

```
<title>
  any number of <dir> and text
</title>
```

```
<p id="ID" class="CLASS" icon="URI">
  any number of text, <dir>, <emph> and
  <span>
</p>
```

```
<dir value="{ltr | rtl}">
  text
</dir>
```

```
<emph>
  text
</emph>
```

```
<span class="CLASS">
  text
</span>
```

```
<value-of select="PATH"/>
```

```
<name path="PATH"/>
```

If **@path** not specified, `<name>` returns the name of the current node.

Attribute Specification Options

```
{ }          alternate allowed values
bold =     required attribute
non-bold = optional attribute
```

W3C XSLT 1.0 Specification:
<http://www.w3.org/TR/xslt>

W3C XPath 1.0 Specification:
<http://www.w3.org/TR/xpath>

W3C XSLT 2.0 Specification:
<http://www.w3.org/TR/xslt20>

W3C XPath 2.0 Specification:
<http://www.w3.org/TR/xpath20>

Which Patterns Are Used?

All non-abstract `<pattern>`s are used if:

- there’s no `<phase>` in the `<schema>`,
- there’s no `<phase>` selected by its `@id` attribute, or
- the `<schema>` is invoked with the `#ALL` option.

If there’s a **@defaultPhase**, and the `<schema>` is invoked with the `#DEFAULT` option, then all `<pattern>`s referenced in the `<active>` children of the default `<phase>` are used.

If the implementation selects a `<phase>` using its **@id** attribute, then all `<pattern>`s referenced in the `<active>` children of that `<phase>` are used.

How `#ALL`, `#DEFAULT` and named phases are specified is implementation-determined.

More About Attributes

@abstract indicates whether a `<pattern>` or `<rule>` is to be used as-is (if “false”) or by another `<pattern>` or `<rule>` (if “true”).

@defaultPhase (on `<schema>`) indicates which `<phase>` is used to determine which `<pattern>`s are selected by the `#DEFAULT` option.

@flag on a fired `<rule>`, on a failing `<assert>` or on a succeeding `<report>` sets a flag for further processing.

@fpi is a public identifier associated with the element it appears on.

@icon is the URI of the location of a graphic.

@queryBinding (on `<schema>`) indicates which query language is to be used. The default is “xslt” — for XSLT/XPath 1.0. Other appropriate values are: “stx”, “xslt1.1”, “exslt”, “xslt2”, “xpath”, “xpath2”, “xquery”.

@role is a name classifying the `<rule>`, `<assert>` or `<report>`, or the **@subject**, if any.

@see is the URI of information about the schema itself.

@subject is a path describing related elements and/or attributes, if other than the context of the current `<rule>`.

Foreign Elements and Attributes

Schema elements can have “foreign” attributes, and non-empty schema elements can contain “foreign” child elements. Foreign attributes and elements are those in a namespace other than “<http://purl.oclc.org/dsdl/schematron>”.

Schematron 1.5

Schematron 1.5 differs from ISO Schematron in the following ways:

Overall:

- The namespace for Schematron 1.5 is: "http://www.ascc.net/xml/schematron"
- <let> and <include> elements are not supported.
- <key> element is supported:

```
<key name="NAME" path="PATH" icon="URI"/>
```

<key> is allowed anywhere in the content of <rule>. (In ISO Schematrons implementations supporting the use of XSLT "foreign" elements, <xsl:key> can be used in place of Schematron 1.5's <key>.)
- Abstract <pattern>s are not supported.
- Attribute pattern/@name used to name <pattern>s rather than @id. It's a required attribute.

Unsupported Attributes:

- These attributes are not supported anywhere: @xml:space, @flag.
- These attributes are not supported on <rule>: @see, @xml:lang, @icon, @fpi, @subject.
- These attributes are not supported on <diagnostics>: @see, @fpi.
- In addition, attribute @see is not supported on <schema>, <assert> or <report>.

Other Differences:

- <value-of> isn't allowed as a child of <assert> or <report>.
- Attribute @version is allowed on <schema>. (Default value is "1.5".)
- The following attributes are optional: ns/@uri, dir/@value and span/@class.

Schematron 1.6

Schematron 1.6 differs from Schematron 1.5 in supporting most ISO Schematron features, including <let>, <include>, abstract <pattern>s and <value-of> in <assert> and <report>.

Schematron 1.5/1.6 Resources:

<http://xml.ascc.net/schematron/>

Schematron Validation Report Language

The Schematron Validation Report Language is the standard for the output of an ISO Schematron processor. It can be post-processed to produce more readable output, if required.

```
<schematron-output title="TEXT"
  phase="NMTOKEN" schemaVersion="TEXT"
  xmlns="http://purl.oclc.org/dsdl/svrl">
  <text>*, <ns-prefix-in-attribute-values>*,
  (<active-pattern>, (<fired-rule>,
  (<failed-assert> |
  <successful-report>)*))+
</schematron-output>
```

```
<ns-prefix-in-attribute-values
  prefix="NMTOKEN" uri="TEXT"/>
```

Only namespaces from <ns> need to be reported.

```
<active-pattern id="ID" name="TEXT"
  role="NMTOKEN"/>
```

Only active <pattern>s are reported.

```
<fired-rule id="ID" context="TEXT"
  role="NMTOKEN" flag="NMTOKEN"/>
```

Only <rule>s that are fired are reported.

```
<diagnostic-reference
  diagnostic="NMTOKEN">
  <text>
  </diagnostic-reference>
```

Only references are reported, not the <diagnostic>.

```
<failed-assert id="ID" location="TEXT"
  test="TEXT" role="NMTOKEN"
  flag="NMTOKEN">
  <diagnostic-reference>*, <text>
  </failed-assert>
```

Only failed <assert>s are reported.

```
<successful-report id="ID" location="TEXT"
  test="TEXT" role="NMTOKEN"
  flag="NMTOKEN">
  <diagnostic-reference>*, <text>
  </successful-report>
```

Only successful <report>s are reported.

```
<text>
  text
  </text>
```

See other Quick References for at:

<http://www.mulberrytech.com/quickref>

ISO Schematron Quick Reference

Sam Wilmott
sam@wilmott.ca
<http://www.wilmott.ca>

and

Mulberry Technologies, Inc.
17 West Jefferson Street, Suite 207
Rockville, MD 20850 USA
Phone: +1 301/315-9631
Fax: +1 301/315-8285
info@mulberrytech.com
<http://www.mulberrytech.com>



© 2009 Sam Wilmott and
Mulberry Technologies, Inc.

ISO Schematron Examples

Checking a document for good practice:

```
<schema xmlns=
  "http://purl.oclc.org/dsdl/schematron"
  queryBinding="xslt2">
  <pattern>
  <title>Check paragraphs and titles for
  content</title>
  <rule context="title">
  <report test="*">A title can only contain
  text.</report>
  <assert test="normalize-space()">A title
  must have content.</assert>
  </rule>
  <rule context="p">
  <assert test="* or normalize-space()">A
  p must have content.</assert>
  </rule>
  </pattern>
  <pattern>
  <title>Report use of HTML formatting
  elements.</title>
  <rule context="b | i">
  <report test="true()">HTML <name/>
  elements shouldn't be used (found
  in<name path=".."/>).</report>
  </rule>
  </pattern>
  <pattern>
  <title>Check that titles precede
  something.</title>
  <rule context="title">
  <assert test=
  "following-sibling::*[1][not(self::title)]"
  >A title should be followed by a
  non-title element.</assert>
  </rule>
  </pattern>
</schema>
```

ISO Schematron:

Go to:

<http://www.iso.org/PubliclyAvailableStandards>
and search for "Schematron".

Other Schematron resources:

<http://www.schematron.com>