Review I: Equation, MathML, and SVG domains

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1 Equation domain

The elements in the equation domain contain information that allows authors to identify, number, and format equations within a document This domain can be used independently of the MathML domain.

> **Comment by tammy-PCAS**
> There is a missing period after the first sentence and an extra space after the second sentence. Suggested rewrite: "The equation domain includes elements that authors can use to identify, ..."
>
> ---
>
> Kris Eberlein, 28 April 2023
>
> I agree with your comments and have implemented them.
>
> **Disposition: Completed**

> **Comment by Stan Doherty**
> In the first sentence, suggest "enumerate" over "number".
>
> ---
>
> Kris Eberlein, 07 April 2023
>
> I think number is the correct word. Authors are not enumerating equations, they are either specifying a specific number or indicating that they want an equation to be numbered.
>
> **Disposition: Rejected**

1.1 <equation-block>

The `<equation-block>` element represents an equation that is presented as a separate block within a text flow or an `<equation-figure>`

> **Comment by Stan Doherty**
> Missing period at the end of the <shortdesc>.
>
> ---
>
> Kris Eberlein, 28 April 2023
>
> Thanks for catching this. I've corrected it.
>
> **Disposition: Completed**

Usage information

When an `<equation-block>` element has multiple direct child elements, each child represents an alternative form of the equation.

> **Comment by Stan Doherty**
> Suggest "alternate" over "alternative" throughout.
>
> ---
>
> Kris Eberlein, 28 April 2023
>
> This is a gray area on which people do not agree. I'm choosing here to adopt the recommendations of Thesaurus.com, which states:

> Although *alternative* derives from *alternate*, and they both date back to the 1500s, these two words aren't completely synonymous and can't always be interchanged. Although both can refer to a different or backup option, typically *alternate* refers to an action of rotating or taking turns while *alternative* usually refers to another option or choice.

So, leaving the wording as-is.

Disposition: Rejected

Rendering expectations

Block equations can be numbered.

Comment by tammy-PCAS
How? And why?

Kris Eberlein, 04 April 2023

Most mathematical manuscripts will want equations to be numbered. Equations can be numbered by either of the two following ways (which is covered somewhere in these topics):

- Placing an equation within a <fig> element
- Using an <equation-number> element

Dawn: I actually recommend to my customers to use equation-figure which can then be numbered separately from <fig> but which is structured similarly so writers see the parallel approach.

Disposition: Closed

Comment by Zoë Lawson on 9 April 2023
Do we need to mention anything about using symbol/math capable fonts? Or does that not matter because you can just use an image of an equation?

Kris Eberlein, 28 April 2023

That would be useful information for a tutorial or a committee note, but I don't think we need it here in the spec.

Disposition: Closed

Processing expectations

When there are multiple forms of an equation, processors can choose the form or forms that they render. For example, if there is both an image and MathML markup, an HTML-generating processor could generate both the image reference and the MathML with appropriate HTML `@class` or `@id` values to enable dynamic rendering based on browser capability.

Comment by Stan Doherty
Hmm . . . processors do not really choose anything on their own. Wouldn't it be more accurate to say that we can configure processors to respond to markup prioritizing one form over another? Multiple instances of "choose".

Kris Eberlein, 28 April 2023

Specialization hierarchy

The `<equation-block>` element is specialized from `<div>`. It is defined in the equation domain module.

Attributes

The following attributes are available on this element: universal attributes.

Examples

This section contains examples of how the `<equation-block>` element can be used:

Comment by tammy-PCAS
I would end the above sentence with a period.

Kris Eberlein, 28 April 2023

Done.

Disposition: Completed

Comment by tammy-PCAS
Is there a reason for 3 examples? The last example with more explanatory text seems sufficient to me.

Kris Eberlein, 28 April 2023

Done.

Disposition: Completed

Figure 1: An equation block that contains native MathML markup

The following code sample shows how an `<equation-block>` element can contain MathML markup:

```
<equation-block>
  <mathml>
    <m:math>
      <m:semantics>
        <m:mrow>
          <m:msqrt>
            <m:mrow>
              <m:msup><m:mi>a</m:mi><m:mn>2</m:mn></m:msup>
              <m:mo>+</m:mo>
              <m:msup><m:mi>b</m:mi><m:mn>2</m:mn></m:msup>
            </m:mrow>
          </m:msqrt>
        </m:mrow>
      </m:semantics>
    </m:math>
```

```
    </mathml>
</equation-block>
```

Figure 2: An equation block that contains an image

The following code sample shows how tan `<equation-block>` element can contain an image:

> **Comment by Stan Doherty**
> Replace "tan" with "an" in previous sentence.
>
> ---
>
> Kris Eberlein, 28 April 2023
>
> Done.
>
> **Disposition: Completed**

```
<equation-block>
  <image keyref="equation-image-01">
    <alt>a squared plus b squared.</alt>
  </image>
</equation-block>
```

Figure 3: An equation block that contains two forms of an equation

The following code samples shows how an `<equation-block>` element can include two alternative forms of the same equation:

> **Comment by Stan Doherty**
> Replace "samples" with "sample" in previous sentence.
>
> ---
>
> Kris Eberlein, 28 April 2023
>
> Done.
>
> **Disposition: Completed**

```
<equation-block>
  <image keyref="equation-image-01">
    <alt>a squared plus b squared.</alt>
  </image>
  <mathml>
    <m:math>
      <m:semantics>
        <m:mrow>
          <m:msqrt>
            <m:mrow>
              <m:msup><m:mi>a</m:mi><m:mn>2</m:mn></m:msup>
              <m:mo>+</m:mo>
              <m:msup><m:mi>b</m:mi><m:mn>2</m:mn></m:msup>
            </m:mrow>
          </m:msqrt>
        </m:mrow>
      </m:semantics>
    </m:math>
  </mathml>
</equation-block>
```

1.2 <equation-figure>

The `<equation-figure>` element represents an equation that functions as a form of figure or display.

> **Comment by Zoë Lawson on 9 April 2023**

I'm not familiar with phrasing "as a form of figure or display". I just haven't heard of a "display equation". I wonder if this short description should be similar to the `<fig>`one, e.g. "The `<equation-figure>`is a container for equations and their supporting information."

Kris Eberlein, 28 April 2023

Done.

Disposition: Completed

Usage information

Display equations can have titles, descriptions, figure groups, and all other figure components. The direct children of `<equation-figure>` can be the equation content itself (for example, `<mathml>` or an image reference), or it can be one or more `<equation-block>` elements, along with other elements allowed within figures.

When an `<equation-figure>` element has multiple direct child `<mathml>`, `<equation-block>`, `<image>`, or `<pre>` elements, each child represents an alternative form of the equation.

Comment by tammy-PCAS
How are <pre> elements used?

WEK: You might use `<pre>` elements to include character renderings of math, such as accessible renderings of mathML.

Disposition: Closed

Comment by nancylph on 21 may 2021

I added equation-block as another direct child that could be used as a form, since that seems as though it can be the case.

Disposition: Closed

When the intent is to have equations combined with other commentary within an `<equation-figure>`, the recommended best practice is to use child `<equation-block>` elements to contain the equations and clearly distinguish them from the commentary.

Comment by Stan Doherty
Suggest "to contain the equations to clearly distinguish" over "to contain the equations and clearly distinguish" in previous paragraph.

Kris Eberlein, 28 April 2023

Done.

Disposition: Completed

Rendering expectations

Equation figures can be numbered, either through standard figure numbering, or through use of the `<equation-number>` element within `<equation-block>`.

Processing expectations

When there are multiple forms of an equation, processors can choose the form or forms that they render. For example, if there is both an image and MathML markup, an HTML-generating processor could generate both the image reference and the MathML with appropriate HTML `@class` or `@id` values to enable dynamic rendering based on browser capability.

Specialization hierarchy

The `<equation-figure>` element is specialized from `<fig>`. It is defined in the equation domain module.

Attributes

The following attributes are available on this element: display attributes and universal attributes.

Examples

This section contains examples of how the `<equation-figure>` element can be used.

Disposition: Completed

Figure 4: Equation figure with a title and MathML content

The following code sample shows how an `<equation-figure>` element can create a titled figure that contains MathML content:

```
<equation-figure>
  <title>An equation</title>
  <mathml>
    <m:math display='block'>
      <m:semantics>
        <m:mrow>
          <m:mfrac>
            <m:mrow><m:mi>n</m:mi><m:mo>!</m:mo></m:mrow>
            <m:mrow><m:mi>r</m:mi><m:mo>!</m:mo>
              <m:mrow>
                <m:mo>(</m:mo>
                <m:mrow><m:mi>n</m:mi><m:mo>&#x2212;</m:mo><m:mi>r</m:mi></m:mrow>
                <m:mo>)</m:mo>
              </m:mrow>
              <m:mo>!</m:mo>
            </m:mrow>
          </m:mfrac>
        </m:mrow>
      </m:semantics>
    </m:math>
  </mathml>
</equation-figure>
```

Figure 5: An equation figure that contains MathMl content and commentary

> **Comment by Stan Doherty**
> Replace "MathMl" with "MathML" in previous title.
> ───────────────────────────────
> Kris Eberlein, 28 April 2023
>
> Done.
>
> **Disposition: Completed**

The following code sample shows how an `<equation-figure>` element can contain both MathML content and commentary. The MathML content is contained with a nested `<equation-block>` element, and it is following by commentary that is contained in a nested `<p>` element.

> **Comment by Stan Doherty**
> Suggest "element and is followed by commentary" in previous paragraph.
> ───────────────────────────────
> Kris Eberlein, 28 April 2023
>
> Done.
>
> **Disposition: Completed**

```
<equation-figure>
 <title>An equation with commentary</title>
 <equation-block>
  <mathml>
   <m:math display='block'>
     <m:semantics>
       <m:mrow>
         <m:mfrac>
           <m:mrow><m:mi>n</m:mi><m:mo>!</m:mo></m:mrow>
           <m:mrow><m:mi>r</m:mi><m:mo>!</m:mo>
```

```
              <m:mrow>
                <m:mo>(</m:mo>
                <m:mrow><m:mi>n</m:mi><m:mo>&#x2212;</m:mo><m:mi>r</m:mi></m:mrow>
                <m:mo>)</m:mo>
              </m:mrow>
              <m:mo>!</m:mo>
            </m:mrow>
          </m:mfrac>
        </m:mrow>
      </m:semantics>
    </m:math>
  </mathml>
 </equation-block>
 <p>Where
   <equation-inline><mathml><m:math><m:mi>r</m:mi></m:math></mathml></equation-inline>
   is greater than 1.</p>
</equation-figure>
```

1.3 <equation-inline>

The `<equation-inline>` element represents an equation that is presented inline within a paragraph or similar context.

Usage information

Inline equations are not intended to be numbered.

When an `<equation-inline>` element has multiple direct child elements, each child represents an alternative form of the equation.

Processing expectations

> **Comment by robander on 21 May 2021**
> Realizing that this same language appears in equation block / figure / inline, we should crisp it up and move it to the TC reuse file.
>
> ---
>
> Kris Eberlein, 30 April 2023
>
> Done
>
> **Disposition: Completed**

> **Comment by Robert D Anderson on 4 April 2023**
> Suggest replacing "Processors are free to choose.." with "Processors can choose..."
>
> ---
>
> Kris Eberlein, 30 April 2023
>
> Done
>
> **Disposition: Completed**

Processors are free to choose the form or forms that they use in deliverables. For example, if there is both an image and MathML markup, an HTML-generating processor could generate both the image reference and the MathML with appropriate HTML `@class` or `@id` values to enable dynamic rendering based on browser capability.

Specialization hierarchy

The `<equation-inline>` element is specialized from `<ph>`. It is defined in the equation domain module.

Attributes

The following attributes are available on this element: universal attributes and `@keyref`.

Examples

This section contains examples of how the `<equation-inline>` element can be used.

Figure 6: An inline equation

The following code sample shows how a paragraph can contain an `<equation-inline>` element that holds MathML markup:

```
<p>Consider the following equation:
  <equation-inline>
    <mathml>
      <m:math display='inline'>
        <m:semantics>
          <m:mrow>
            <m:msqrt>
              <m:mrow>
                <m:msup><m:mi>a</m:mi><m:mn>2</m:mn></m:msup>
                <m:mo>+</m:mo>
                <m:msup><m:mi>b</m:mi><m:mn>2</m:mn></m:msup>
              </m:mrow>
            </m:msqrt>
          </m:mrow>
        </m:semantics>
      </m:math>
    </mathml>
  </equation-inline>
It is simple arithmetic that school children understand.</p>
```

> **Comment by dstevens73**
> is the display="inline"on the m:math element necessary if it is contained in an equation-inline element? which would take precedence?
>
> WEK: I would expect most tools that render MathML to only look at the m:math element and not take the DITA context into account--for example, the markup might be passed unchanged to the HTML for rendering in a browser.
>
> **Disposition: Closed**

Figure 7: An inline equation that is image-based

The following code sample shows how the `<equation-inline>` element can contain an image:

```
<p>The Pythagorean Theorem describes the relationship among the three sides of a
   right triangle. In any right triangle, the sum of the areas of the squares formed on the
   legs of the triangle equals the area of the square formed on the hypotenuse:
  <equation-inline>
    <image keyref="equation-image-01">
      <alt>a squared plus b squared.</alt>
    </image>
  </equation-inline>
</p>
```

> **Comment by dstevens73**
> If <image> had "break" specified, which would take precedence – the equation-inline or the image?
>
> ---
>
> WEK: I would expect the break value to be respected, if for no other reason than most processors will not have though to consider the containing context as well as the "The author asked for it, so do that" principle.
>
> I might have a presentation style or intent that the equation is rendered on a line by itself but within the paragraph and not get numbered, so in that case I would want placement="break" to be respected.
>
> **Disposition: Closed**

1.4 <equation-number>

The `<equation-number>` element indicates that a block equation is numbered. It optionally specifies the number to use for the block equation.

> **Comment by dstevens73**
> I honestly don't understand the use case for this element. If someone needs to explicitly specify numbers, why would it only be for equations? why wouldn't they need to explicitly specify figure or table numbers as well? what makes equations special that they would need this hard-coding capability?
>
> ---
>
> WEK: In a textbook context, for example, the numbering of equations may be ad-hoc or idiosyncratic or otherwise not automatable. There may also be cases where you have a block equation that you want to not number, so you use `<equation-number>` to indicate when you do want one. Textbooks can be particularly challenging because the author may do things that make no logical sense but because they're a Nobel lauriate the publisher has to do whatever they ask without question. So if they want three equations numbered "1" they get it. Many years ago we were working with a big textbook publisher and they talked about a case where a person's only job was to be at the end of a phone so the Nobel-winning physics professor author of a textbook could phone in his edits.
>
> ---
>
> Kris Eberlein, 28 April 2023
>
> Changed "is numbered" to "should be numbered".
>
> **Disposition: Completed**

Usage information

In normal usage, a block equation has a single number. However, the `<equation-number>` element can occur multiple times within the `<equation-block>` element. This enables the use of numbers with different (and exclusive) conditional properties.

> **Comment by Stan Doherty**
> Just checking. The contents of <equation-number> can be any arbitrary string. No data type validation. <equation-number>xyz - Go Bruins</equation-number>.
>
> ---
>
> Kris Eberlein, 07 April 2023
>
> Yes.
>
> **Disposition: Closed**

When the `<equation-figure>` element contains content, the content of the element should be the number value without any surrounding punctuation, for example, "3.2a" rather than "(3.2a)".

> **Comment by dstevens73**
> isn't this second paragraph up to the actual formatting preferences of the company and should just be specified as part of their plugin? If this should be kept, seems like it's a rendering expectation, not usage.
>
> ---
>
> Robert Anderson, 4 April 2023
>
> The guidance here is specifically for what should go in the element (it should only contain the number, not the full display version), which makes it more of a usage guide than a rendering thing; it could be reworded to make that clearer.
>
> I believe the intent here is for improved interchange, to keep the formatting part out of it – so that the equation in one document could be (3.2a) while another is [3.2a] or just 3.2a. Don't know how likely that is, but I think this is a guide for users rather than a mandate about rendering.
>
> ---
>
> WEK: That was exactly the intent of the wording: keep any rendition-specific formatting of numbers out of the content.
>
> ---
>
> Kris Eberlein, 28 April 2023
>
> Changed "any surrounding punctuation" to "any rendering-specific punctuation".
>
> **Disposition: Completed**

Rendering expectations

001 (25)   In this context, white-space content is considered equivalent to empty content. When the `<equation-number>` element has empty content, the equation number **SHOULD** be generated. When the `<equation-number>` element is not empty, the content **SHOULD** be used as the equation number. Processors **MAY** add punctuation or decoration to the number.

The details of equation numbering and number presentation are processor-specific. A common practice is to present the equation number to the right of the equation, centered vertically within the vertical extent of the block equation.

> **Comment by Stan Doherty**
> Screen shot?
>
> ---
>
> Kris Eberlein, 28 April 2023
>
> No. We are low on resources, and I think that the above wording is perfectly clear.
>
> **Disposition: Closed**

Specialization hierarchy

The `<equation-number>` element is specialized from `<ph>`. It is defined in the equation domain module.

Attributes

The following attributes are available on this element: universal attributes.

Examples

This section contains examples of how the `<equation-number>` element can be used:

Figure 8: An equation where the number will be generated

The following code sample shows how an `<equation-number>` element can be used to indicate to a processor that an equation number should be auto-generated:

```
<equation-block id="eq-001">
  <equation-number/>
  <image keyref="equation-image-01">
    <alt>a squared plus b squared.</alt>
  </image>
</equation-block>
```

Figure 9: An equation where the equation number is explicitly specified

The following code sample shows how an `<equation-number>` element can specify the value for an equation number:

```
<equation-block id="eq-3.2a">
  <equation-number>3.2a</equation-number>
  <image keyref="equation-image-01">
    <alt>a squared plus b squared.</alt>
  </image>
</equation-block>
```

2 MathML domain

The MathML domain elements enable direct use of MathML markup within DITA documents, as well as use-by-reference of MathML markup that is stored in separate, non-DITA documents. MathML is a W3C standard.

Comment by Stan Doherty
How s'bout ". . . elements enable embedded or referenced MathML markup. Referenced markup needs to be stored in a separate, non-DITA document."

Kris Eberlein, 30 April 2023

I've changed the shortdesc to read as follows: "The MathML domain elements enable the use of embedded or referenced MathML markup. Referenced MathML markup must be stored in separate, non-DITA XML documents. MathML is a W3C standard.

Disposition: Completed

For MathML markup that is stored directly in DITA documents that are validated using DTDs, the MathML elements must use a namespace prefix in order to avoid conflict with the DITA-defined elements of the same name. Documents validated using XSD or RELAX NG can default the MathML namespace on the MathML `<math>` element. MathML elements that are referenced using the `<mathmlref>` element do not need to have a namespace prefix, because they are parsed separately from the DITA documents that refer to them. By default, the MathML domain is configured to use the namespace prefix "m" for the MathML elements.

Comment by Stan Doherty
How s'bout "MathML markup that is embedded in DITA documents is validated using DTDs. The MathML elements . . . ".

Kris Eberlein, 30 April 2023

No, your wording implies that all MathML markup that is embedded in DIT documents uses DTDs. One can embed MathML markup and use RNG; however, unlike if you use DTDs, you do not need to use a namespace prefix.

That said, the fact that you found this confusing implies that we need to recast the paragraph. I've changed this to start with "When MathMLelements are embedded in DITA documents that are validated using DTDs" ...

Disposition: Completed

Related information
Mathematical Markup Language (MathML), Version 3.0

2.1 \<mathml>

The `<mathml>` element contains MathML markup or other content that contributes to a semantic equation.

Usage information

The `<mathml>` element can contain MathML elements, references to MathML elements held in separate, non-DITA documents, or `<data>` elements.

> **Comment by Stan Doherty**
> Suggest "stored"over "held" in previous paragraph.
>
> ---
>
> Kris Eberlein, 30 April 2023
>
> Agree, and I've made the change.
>
> **Disposition: Completed**

The `<mathml>` element is not intended to represent a semantic equation, only content that contributes to a semantic equation. Use the equation domain elements or their equivalent to represent equations semantically, for example, to enable numbering of equations.

The MathML markup must have a root element of `<math>` within the MathML namespace:`http://www.w3.org/1998/Math/MathML`

> **Comment by Stan Doherty**
> Insert space between colon and "http:" in previous paragraph. Insert period at the end of the sentence.
>
> ---
>
> Kris Eberlein, 30 April 2023
>
> Agree, and I've made the change.
>
> **Disposition: Completed**

Specialization hierarchy

The `<mathml>` element is specialized from `<foreign>`. It is defined in the MathML domain module.

Attributes

The following attributes are available on this element: universal attributes.

Example

The following code sample shows how to use a `<mathml>` element to include MathML content:

```
<equation-block>
  <mathml>
    <m:math>
      <m:semantics>
        <m:mrow>
          <m:msqrt>
            <m:mrow>
              <m:msup>
                <m:mi>a</m:mi>
                <m:mn>2</m:mn></m:msup>
```

```
            <m:mo>+</m:mo>
            <m:msup>
              <m:mi>b</m:mi>
              <m:mn>2</m:mn>
            </m:msup>
          </m:mrow>
        </m:msqrt>
      </m:mrow>
    </m:semantics>
  </m:math>
</mathml>
</equation-block>
```

2.2 <mathmlref>

The `<mathmlref>` element references a non-DITA XML document that contains MathML markup.

Usage information

The `<mathmlref>` element enables the use MathML markup by reference. The reference must be to a MathML `<math>` element. The reference can be one of the following:

- A URI that addresses an XML document; the XML document has a MathML `<math>` element as the root element
- A URI that addresses an XML document and contains a fragment identifier that is the XML ID of a `<math>` element within the document

---

Comment by Stan Doherty
Suggest a reorganization of the bullet list to make key-based referencing parallel to URI-based referencing. Other instances below.

Kris Eberlein, 30 April 2023

I left the organization as-is, since it is parallel to that in the <svgref> topic. I did add periods to the end of the list items.

Disposition: Completed

The reference can be direct, using the `@href` attribute, or indirect, using the `@keyref` attribute. For indirect referencing, only the key name should be specified. The ID of the `<mathml>` element must be specified as part of the value for the `@href` attribute on the key definition.

Comment by dstevens73
The svgref topic, which is largely parallel to this topic, provides an example of this guideline. I think a similar example is justified here.

WEK: I agree.

Kris Eberlein, 30 April 2023

Done.

Disposition: Completed

Processing expectations

Processors **SHOULD** process the MathML as though the `<m:math>` element occurs directly in the content of the containing `<mathml>` element.

Specialization hierarchy

The `<mathmlref>` element is specialized from `<include>`. It is defined in the MathML domain module.

Attributes

The following attributes are available on this element: inclusion attributes, universal attributes, `@format`, `@href`, `@keyref`, and `@scope`.

For this element:

- The `@format` attribute has a default value of "mml".
- The `@parse` attribute has a default value of "xml".

Comment by dstevens73

In svgref, there is another bullet item about the @href attribute. I wonder if a similar discussion would be applicable here as well.

Kris Eberlein, 30 April 2023

Done.

Disposition: Completed

Examples

This section contains examples of how the `<mathmlref>` element can be used.

Figure 10: Referencing a MathML <math> root element

The following code sample shows how a `<mathmlref>` element can be used to reference a MathML `<math>` element that is the root element of its containing document:

```
<equation-block>
  <mathml>
    <mathmlref href="../mathml-source/mathml-root-mathml.mml"/>
  </mathml>
</equation-block>
```

The `mathml-root-mathml.mml` file contains the following content. Note that the `<math>` element sets the MathML namespace as the default namespace, so there are no namespace prefixes on the MathML markup.

```
<?xml version="1.0" encoding="UTF-8"?>
<math xmlns="http://www.w3.org/1998/Math/MathML" xmlns:xlink="http://www.w3.org/1999/xlink">
  <mstyle displaystyle="false" scriptlevel="0">
    <mrow>
      <mfrac>
        <mrow>
          <mi mathcolor="gray">sin</mi>
          <mo rspace="verythinmathspace"/>
          <mi>θ</mi>
        </mrow>
        <mi>π</mi>
```

```
        </mfrac>
      </mrow>
    </mstyle>
</math>
```

Figure 11: Referencing a specific <math> element within a document

The following code sample shows how a `<mathmlref>` element can reference a specific `<math>` element in a containing XML file:

```
<equation-block>
  <mathml>
    <mathmlref href="../mathml-source/mathml-equation-library.xml#mathfrag-02"/>
  </mathml>
</equation-block>
```

The `mathml-equation-library.xml` file contains the following content:

```
<?xml version="1.0" encoding="UTF-8"?>
<root>
  <part>
    <math id="timeinday" xmlns="http://www.w3.org/1998/Math/MathML">
      <mi>x</mi>
    </math>
    <math id="mathfrag-02" xmlns="http://www.w3.org/1998/Math/MathML">
      <math>
        <mrow>
          <mi>y</mi>
          <mo>=</mo>
          <mn>5</mn>
          <mi>x</mi>
          <mo>+</mo>
          <mn>2</mn>
        </mrow>
      </math>
    </math>
  </part>
  <!-- ... -->
</root>
```

3 SVG domain

The SVG domain elements enable direct use of SVG markup within DITA documents, as well as use-by-reference of SVG markup that is stored in separate non-DITA documents. SVG is a W3C standard.

> **Comment by Stan Doherty**
> Suggest "SVG domain elements enable embedded or referenced SVG markup. The referenced SVG markup must be stored in a separate, non-DITA document."
>
> ---
>
> Kris Eberlein, 30 April 2023
>
> I've changed this to read "The SVG domain elements enable the use of embedded or referenced SVG markup. Referenced SVG markup must be stored in separate, non-DITA XML documents."
>
> **Disposition: Completed**

For SVG markup that is stored directly in DITA documents that are validated using DTDs, the SVG elements must use a namespace prefix in order to avoid conflict with DITA-defined elements of the same name. Documents validated using RELAX NG can default the SVG namespace on the SVG `<svg>` element. SVG elements that are referenced using the `<svgref>` element do not need to have a namespace prefix, because they are parsed separately from the DITA documents that refer to them. By default, the SVG domain is configured to use the namespace prefix "svg" for the SVG elements.

Related information
Scalable Vector Graphics (SVG) 1.1 (Second Edition)

3.1 <svg-container>

The `<svg-container>` element stores content that contributes to a scalable vector graphic (SVG).

Usage information

The `<svg-container>` element can contain SVG elements, references to SVG elements that are stored in separate, non-DITA documents, or `<data>` elements.

The SVG markup must have a root element of `<svg>` with the SVG namespace: "http://www.w3.org/2000/svg".

Specialization hierarchy

The `<svg-container>` is specialized from `<foreign>`. It is defined in the SVG domain module.

Attributes

The following attributes are available on this element: universal attributes.

Example

The following code sample shows how `<svg-container>` elements can be used in a DITA topic. It is used to generate both inline SVG markup and a titled figure that contains SVG markup:

```
<topic id="svg-test-topic-01">
  <title>SVG Domain Test: Namespace Prefixed SVG Elements</title>
    <body>
      <!-- SVG inline -->
      <svg-container>
        <svg:svg width="100" height="100">
          <svg:defs>
            <svg:filter id="f1" x="0" y="0">
              <svg:feGaussianBlur in="SourceGraphic" stdDeviation="15"/>
            </svg:filter>
          </svg:defs>
          <svg:rect width="90" height="90" stroke="green" stroke-width="3" fill="yellow"
                    filter="url(#f1)"/>
        </svg:svg>
      </svg-container>
      <!-- ... -->
      <svg-container>
        <svg:svg width="200" height="200">
          <svg:ellipse cx="100" cy="100" rx="80" ry="80" style="fill:blue;
                    stroke:rgb(0,0,100);stroke-width:2"/>
        </svg:svg>
      </svg-container>
```

> **Comment by**
> **Zoë Lawson on**
> **10 Apr 2023**
> In the spirit of keeping examples short, what is the purpose of this second inline <svg-container>? Is it necessary? Is this supposed show an svg-container as a block?
>
> ---
>
> Kris Eberlein, 30 April 2023
>
> I've removed it
>
> **Disposition: Completed**

```
      <fig>
        <title>Figure with SVG container</title>
        <svg-container>
          <svg:svg width="4in" height="6in" version="1.1">
            <svg:circle cx="150" cy="200" r="100" fill="url(#grad_blue)"/>
            <svg:rect x="70" y="320" height="40" width="80" fill="aqua"/>
            <svg:text x="90" y="350" font-size="30" fill="green">Go</svg:text>
          </svg:svg>
        </svg-container>
      </fig>
    </body>
</topic>
```

3.2 <svgref>

The `<svgref>` element references a non-DITA XML document that contains scalable vector graphic (SVG) markup.

Usage information

The `<svgref>` element enables the use of SVG markup by reference. The reference must be to a SVG `<svg>` element. The reference can be one of the following:

> **Comment by Stan Doherty**

- A URI that addresses an XML document which has a SVG `<svg>` element as the root element
- A URI that addresses an XML document and contains a fragment identifier that is the XML ID of a `<svg>` element within the document

The reference can be direct, using the `@href` attribute, or indirect, using the `@keyref` attribute. For indirect referencing, only the key name should be specified. The ID of the `<svg>` element must be specified as part of the value for the `@href` attribute on the key definition.

For example, to refer to the `<svg>` element with the `@id` of "svg-fragment-02" within a larger document using a key reference, you would define the key in the following way:

```
<keydef keys="svg-fragment-0002" href="svg/svg-library.xml#svg-fragment-02"/>
```

You reference this key by using just the key name:

```
<svg-container>
  <svgref keyref="svg-fragment-0002"/>
</svg-container>
```

Processing information

003 (25) Processors **SHOULD** process the SVG as though the `<svg>` element occurs directly in the content of the containing `<svg-container>` element.

Specialization hierarchy

The `<svgref>` is specialized from `<include>`. It is defined in the SVG domain module.

Attributes

The following attributes are available on this element: inclusion attributes, link-relationship attributes, universal attributes, and `@keyref`.

For this element:

- The `@format` attribute has a default value of "svg".
- The `@href` attribute is a reference to an SVG document or SVG element. If the `<svg>` element is the root element of the referenced resource, then no fragment identifier is required. Otherwise, a fragment identifier must be specified, where the fragment identifier is the XML ID of the `<svg>` element .
- The `@parse` attribute has a default value of "xml" .

Examples

This section contains examples of how the `<svgref>` element can be used.

Figure 12: Referencing an SVG that is a root element

The following code sample shows how an `<svgref>` element can be used to reference an `<svg>` element that is the root element of its containing document:

```
<fig>
  <title>Figure with an SVG container</title>
  <svg-container>
    <svgref href="media/svg/svg-graphic-01.xml"/>
  </svg-container>
</fig>
```

The `svg-graphic-01.xml` file contains the following content. Note that the `<svg>` element sets the SVG namespace as the default namespace, so there are no namespace prefixes on the SVG markup.

```
<?xml version="1.0" encoding="UTF-8"?>
<svg xmlns="http://www.w3.org/2000/svg" width="100" height="100">
  <defs>
    <filter id="f1" x="0" y="0">
      <feGaussianBlur in="SourceGraphic" stdDeviation="15"/>
    </filter>
  </defs>
  <rect width="90" height="90" stroke="green" stroke-width="3" fill="yellow"
        filter="url(#f1)"/>
</svg>
```

Figure 13: Referencing a specific SVG within a document

The following code sample shows an `<svgref>` element can be used to reference a specific `<svg>` element in a containing XML file:

```
<fig>
  <title>Figure with SVG container</title>
  <svg-container>
    <svgref href="media/svg/svg-library.xml#frag-0001" />
  </svg-container>
</fig>
```

The `svg-library.xml` file contains the following content:

```
<?xml version="1.0" encoding="UTF-8"?>
<root>
  <part>
    <svg id="frag-0001" xmlns="http://www.w3.org/2000/svg" width="100" height="100">
      <defs>
        <filter id="f1" x="0" y="0">
          <feGaussianBlur in="SourceGraphic" stdDeviation="15"/>
        </filter>
      </defs>
      <rect width="90" height="90" stroke="green" stroke-width="3" fill="yellow"
            filter="url(#f1)"/>
```

```
      </svg>
      <!-- ... -->
   </part>
</root>
```

A Aggregated RFC-2119 statements

This appendix contains all the normative statements from the DITA for Technical Content 2.0 specification. They are aggregated here for convenience in this non-normative appendix.

Item	Conformance statement
001 (13)	In this context, white-space content is considered equivalent to empty content. When the `<equation-number>` element has empty content, the equation number **SHOULD** be generated. When the `<equation-number>` element is not empty, the content **SHOULD** be used as the equation number. Processors **MAY** add punctuation or decoration to the number.
002 (18)	Processors **SHOULD** process the MathML as though the `<m:math>` element occurs directly in the content of the containing `<mathml>` element.
003 (22)	Processors **SHOULD** process the SVG as though the `<svg>` element occurs directly in the content of the containing `<svg-container>` element.

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