



# XHTML+SMIL Profile

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## Editors:

Debbie Newman ([debbien@microsoft.com](mailto:debbien@microsoft.com)), Microsoft

Aaron Patterson, ([a-apatt@microsoft.com](mailto:a-apatt@microsoft.com)), Microsoft

Patrick Schmitz ([cogit@ludicrum.org](mailto:cogit@ludicrum.org)), Invited Expert

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## Abstract

The XHTML+SMIL profile defines a set of XHTML abstract modules that support a subset of the SMIL 2.0 specification. It includes functionality from SMIL 2.0 modules providing support for animation, content control, media objects, timing and synchronization, and transition effects. The profile also integrates SMIL 2.0 features directly with XHTML and CSS, describing how SMIL can be used to manipulate XHTML and CSS features. Additional semantics are defined for some XHTML elements and CSS properties.

The profile is designed for Web clients that support XHTML+SMIL markup validating to this profile's implementation DTD. The document type definition (DTD) and XML Schema [[XSCHEMA](#)] are implemented using SMIL modules as defined in "Modularization of SMIL" [[SMIL-MOD-NOTE](#)], and "The SMIL 20 Modules" [[SMIL20-MOD](#)].

## Status of this document

*This section describes the status of this document at the time of its publication. Other documents may supersede this document. The latest status of this document series is maintained at the W3C.*

This document is a Note submitted to the W3C with the intention that it be used as a basis to further the work of integrating SMIL functionality into XHTML.

This Note has been produced by the [SYMM Working Group](#) ([members only](#)), and reflects

the opinions of some members of that Working Group.

This specification is a revision of the W3C Working Draft [XHTML+SMIL Profile](#) available in the early phase but removed from the SMIL2.0 specification.

The authors welcome comments on this document, but they do not guarantee a reply or any further action. Please send comments to [www-smil@w3.org](mailto:www-smil@w3.org). The archive of public comments is available at <http://lists.w3.org/Archives/Public/www-smil/>. This document may be updated or added to based on implementation experience, but no commitment is made by the W3C, or any of its members, regarding future updates.

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## 1-Introduction

This section is *informative*.

This profile describes the SMIL modules that are added to XHTML, and details the integration issues, including the application of integrated SMIL modules to CSS styles [\[CSS20\]](#). Language integration is accomplished with a set of XHTML modules using the semantics defined in XHTML Modularization [\[XMOD\]](#). The XHTML+SMIL Profile adds timing, animation and multimedia functionality to these XHTML elements. XHTML elements that make up the modules defined in XHTML Modularization [\[XMOD\]](#) are described in the W3C Recommendation for HTML 4 [\[HTML4\]](#).

The document type defined by the XHTML+SMIL profile is [XHTML Host language document type](#) conformant.

### 1.1-Motivation and applications

Using the SMIL timing extensions, any XHTML element on which timing functionality is supported can be set to appear at a given time, to last for a specified duration, and to repeat (i.e. loop). Basic timing and synchronization and functionality is supported with a

simple syntax, and more complex timing constructs can be described. Event-based interactive timing is also supported.

The Animation and Transition modules provide additional support for authors to define presentation content that includes motion, style animation, transition effects and other features commonly found in presentation/multimedia authoring tools and runtimes.

In order to easily integrate time-based media (e.g. video and audio), the SMIL media elements are included. SMIL Content control provides elements and attributes to control alternative (including accessible and internationalized) content.

## 1.2-Design Rationale

This section explains why certain modules of SMIL 2.0 [\[SMIL20\]](#) are not included. The general philosophy is to use XHTML modules where appropriate, and to include the SMIL modules when they provide essential enhancements.

**Layout Module:** The [SMIL 2.0 layout module](#) is not included. The XHTML/CSS layout model provides layout functionality.

**Linking Module:** The [SMIL 2.0 linking module](#) is not included, as XHTML provides linking functionality.

**Structure Module:** The [SMIL 2.0 structure module](#) is not included, as the XHTML document is defined to be the host language, and so provides the equivalent elements and semantics.

**Metainformation Module:** The [SMIL 2.0 Metainformation module](#) is not included, as XHTML provides metadata functionality.

## 2- Normative Definition of XHTML+SMIL

This section is *normative*.

### 2.1-Document Conformance

A *conforming* XHTML+SMIL document is a document that requires only the facilities described as mandatory in this specification. Such a document must meet all of the following criteria:

1. It must validate against the XML DTD found in [Appendix A](#)
2. The root element of the document must be html.
3. The name of the default namespace on the root element must be the XHTML namespace name: `http://www.w3.org/1999/xhtml`.
4. If a DOCTYPE declaration is present and includes a public identifier, the DOCTYPE declaration must reference the DTD found in [Appendix A](#) using its Formal Public Identifier. The system identifier may be modified appropriately.

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML+SMIL //EN" "http://www.w3.org/2001
```

### 2.2-User Agent Conformance

The user agent must conform to the "[User Agent Conformance](#)" section of the XHTML specification ([XHTML10](#)), section 3.2), the "[XHTML Family User Agent Conformance section of XHTML Modularization](#)" ([XMOD](#)), section 3.5). and the conformance requirements detailed in the SMIL modules ([SMIL20](#)) supported by the integration profile.

The user agent must conform to the following additional user agent rule:

1. When the user agent claims to support facilities defined within the SMIL 2.0 specifications or required by this specification through normative reference, it must do so in ways consistent with the facilities' definition.

## 2.3-XHTML Namespace Integration

The default XML namespace of an XHTML+SMIL document is XHTML. SMIL elements are included through an additional SMIL namespace declaration:

```
<html xmlns="http://www.w3.org/1999/xhtml"
      xmlns:smil="http://www.w3.org/2001/SMIL20">
```

The name of the unique identifier for the namespace within the document (in this example, 'smil') is left to the discretion of the document author.

## 2.4-XHTML+SMIL Profile

The XHTML functionality in the XHTML+SMIL document type is based upon the XHTML modules defined in XHTML Modularization [XMOD](#), and the Ruby Annotation module as defined in [RUBY](#). In addition, the XHTML+SMIL document type supports the timeline-centric multimedia features defined by SMIL 2.0. The formal definition of the modules is not repeated here, but only the extensions introduced with timing. The notation, terms and document conventions used here are borrowed from XHTML Modularization [XMOD](#).

The profile includes the XHTML modules defined in [XMOD](#) and the following SMIL 2.0 modules:

- **[Animation](#) Functionality**  
[BasicAnimation Module](#), [SplineAnimation Module](#)
- **[Content Control](#) Functionality**  
[BasicContentControl Module](#)
- **[Media Object](#) Functionality**  
[BasicMedia Module](#), [MediaClipping Module](#)
- **[Timing and Synchronization](#) Functionality**  
[BasicInlineTiming Module](#), [BasicTimeContainers Module](#), [EventTiming Module](#), [ExclTimeContainers Module](#), [MultiArcTiming Module](#), [RepeatTiming Module](#), [RestartTiming Module](#), [SyncBehavior Module](#), [SyncbaseTiming Module](#), [SyncMaster Module](#), [TimeContainerAttributes Module](#), [WallclockTiming Module](#).
- **[Time Manipulations](#) Functionality**

## [TimeManipulations Module](#)

- [Transition Effects](#) **Functionality**  
[InlineTransitions Module](#)

In the module descriptions below, reference is made to the "Common" attribute set and content sets defined in XHTML Modularization [\[XMOD\]](#).

## 2.5-Animation Module

The [Animation Module](#) provides a framework for incorporating animation onto a timeline (a timing model) and a mechanism for composing the effects of multiple animations (a composition model). The [Animation Module](#) defines semantics for the [animate](#), [set](#), [animateMotion](#), and [animateColor](#) elements, as well as where these elements may be used.

The syntactic conventions used in this document to describe additions and modifications to element content sets are borrowed from [\[XMOD\]](#). In particular, the ampersand (&) is used to denote that a module modifies an element or set of elements with the addition of new attributes or content model arguments. Additionally, the asterisk (\*) is used to denote that new arguments may be used in an existing element's content model.

Elements	Attributes	Content Model
<a href="#">animate</a>	<a href="#">Common</a> , <a href="#">Timing</a> , <a href="#">attributeName</a> , <a href="#">attributeType</a> , <a href="#">additive</a> , <a href="#">accumulate</a> , <a href="#">calcMode</a> , <a href="#">values</a> , <a href="#">keyTimes</a> , <a href="#">keySplines</a> , <a href="#">from</a> , <a href="#">to</a> , <a href="#">by</a> , <a href="#">targetElement</a>	none
<a href="#">set</a>	<a href="#">Common</a> , <a href="#">Timing</a> , <a href="#">attributeName</a> , <a href="#">attributeType</a> , <a href="#">to</a> , <a href="#">targetElement</a>	none
<a href="#">animateMotion</a>	<a href="#">Common</a> , <a href="#">Timing</a> , <a href="#">additive</a> , <a href="#">accumulate</a> , <a href="#">calcMode</a> , <a href="#">values</a> , <a href="#">keyTimes</a> , <a href="#">keySplines</a> , <a href="#">from</a> , <a href="#">to</a> , <a href="#">by</a> , <a href="#">path</a> , <a href="#">origin</a> , <a href="#">targetElement</a>	none
<a href="#">animateColor</a>	<a href="#">Common</a> , <a href="#">Timing</a> , <a href="#">attributeName</a> , <a href="#">attributeType</a> , <a href="#">additive</a> , <a href="#">accumulate</a> , <a href="#">calcMode</a> , <a href="#">values</a> , <a href="#">keyTimes</a> , <a href="#">keySplines</a> , <a href="#">from</a> , <a href="#">to</a> , <a href="#">by</a> , <a href="#">targetElement</a>	none
<a href="#">par</a> &, <a href="#">seq</a> &, <a href="#">excl</a> &, <a href="#">Basic Text</a> &, <a href="#">Hypertext</a> &, <a href="#">List</a> &, <a href="#">Presentation</a> &, <a href="#">Tables</a> &, <a href="#">Image</a> &, <a href="#">Object</a> &, <a href="#">Legacy</a> &		<a href="#">animate</a> *, <a href="#">set</a> *, <a href="#">animateMotion</a> *, <a href="#">animateColor</a> *
<a href="#">Applet</a> &, <a href="#">Edit</a> &, <a href="#">Client-side Image Map</a> &, <a href="#">Server-side Image Map</a> &		<a href="#">animate</a> *, <a href="#">set</a> *, <a href="#">animateColor</a> *
<a href="#">Forms</a> &, <a href="#">IFrame</a> &		<a href="#">animateMotion</a> *

This module defines the following content sets (element groups for the purpose of defining content models):

### BasicAnimation

[animate](#) | [animateColor](#) | [set](#) | [animateMotion](#) (not including spline support from the [SplineAnimation Module](#))

### AllAnimation

BaseAnimation (plus the spline support from the [SplineAnimation Module](#))

## Specifying the target element of the animation

This profile uses the [targetElement](#) attribute to identify the element to be affected by animation elements. As recommended in the [BasicAnimation Module](#) when the [targetElement](#) attribute is supported, the profile excludes the XLink [\[XLINK\]](#) attributes [href](#), [type](#), [actuate](#), and [show](#) from the [animate](#), [set](#), [animateMotion](#), and [animateColor](#) elements.

Animation is allowed on all elements included in XHTML modules defined by XHTML Modularization [\[XMOD\]](#) unless exempted by this list:

- head, title, style, meta, base, link
- script
- [param](#)
- [par](#), [seq](#), [excl](#)
- [switch](#)
- [animate](#), [set](#), [animateMotion](#) , [animateColor](#)
- frameset, frame, noframes

Certain animation elements are restricted to targeting only the following elements with the [targetElement](#) attribute:

Elements	Valid targets
<a href="#">animate</a> , <a href="#">set</a>	body, noscript, font, s, strike, u, area, map, object, <a href="#">Basic Text</a> , <a href="#">Presentation</a> , <a href="#">Edit</a> , <a href="#">Bi-directional Text</a> , <a href="#">Hypertext</a> , <a href="#">List</a> , <a href="#">Forms</a> , <a href="#">Tables</a> , <a href="#">Image</a> , <a href="#">IFrame</a>
<a href="#">animateMotion</a>	address, blockquote, cite, code, dfn, div, em, h1, h2, h3, h4, h5, h6, kbd, p, pre, q, samp, span, strong, var, font, s, strike, u, object, form, input, select, textarea, button, fieldset, label, legend, table, <a href="#">Presentation</a> , <a href="#">Hypertext</a> , <a href="#">List</a> , <a href="#">Image</a> , <a href="#">IFrame</a>
<a href="#">animateColor</a>	address, blockquote, cite, code, dfn, div, em, h1, h2, h3, h4, h5, h6, kbd, p, pre, q, samp, span, strong, var, font, s, strike, u, form, input, select, option, textarea, button, fieldset, label, legend, optgroup, <a href="#">Presentation</a> , <a href="#">Hypertext</a> , <a href="#">List</a> , <a href="#">Tables</a> , <a href="#">IFrame</a>

## Specifying the target attribute name of the animation

The target attributes of the animation are a subset of the attributes of the allowed target elements. For the elements on which animation is allowed, the following attributes may be animated:

align, bgcolor, border, cellalign, cellpadding, cellspacing, cellvalign, checked, class, clear, color, cols, dir, disabled, face, frame, frameborder, height, href, marginwidth, marginheight, rows, rules, selected, noshade, size, style, title, valign, value, width.

## Positioning model and constraints for the `animateMotion` element

The `origin` attribute of the [animateMotion](#) element defines the relative origin of the values specified.

**`origin` = ( parent | element )**

Specifies the origin of the values specified in the [animateMotion](#) element.

**element**

The motion animation is defined relative to the target element's position.

This is the default.

**parent**

The motion animation is defined relative to the parent container of the target element.

The [origin](#) attribute controls the interaction of the animation function values with the layout position of the target element. The CSS attributes `position`, `top`, and `left` determine the layout position of the element. In effect, [origin](#) determines whether to add the element position to the result of the animation function to obtain the element position in the container coordinate space.

### *Origin and Absolute Positioning*

The following example illustrates element relative motion:

```
<div style="position:absolute; top:100px; left:100px" >  
  <animateMotion dur="5" from="50,50" to="150,150" origin="element" />  
</div>
```

The layout position of the target div is (100,100). The effect is to add the layout position of the target element to each value of the animation function. The target moves from position (150, 150) to (250, 250) in the container coordinate space.

The following example illustrates parent relative motion:

```
<div style="position:absolute; top:100; left:100" >  
  <animateMotion dur="5" from="50,50" to="150,150" origin="parent" />  
</div>
```

The layout position of the target div again is (100,100). The effect is to ignore the layout position when computing the animation function values. The target moves from position (50, 50) to (150, 150) in the container coordinate space.

## Constraints for the `animateColor` element

The [BasicAnimation Module](#) expresses the attribute upon which the animation should act using the [attributeName](#) attribute. The only valid target attribute names for the [animateColor](#) element are the CSS2 color properties.



## Argument value syntax for numeric animation

The [SMIL 2.0 Animation module](#) defines clamping values for certain numeric attributes. The calculation of these attributes shall be performed in floating point.

## 2.6-Content Control Module

The [SMIL2.0 Content Control Module](#) provides a framework for selecting content based on a set of test attributes. The [Content Control Module](#) defines semantics for the [switch](#) element, adds the [switch](#) element to the Flow content set of the XHTML Basic Text module, and adds the Test attributes set to the elements in the Flow content set of the [XHTML Basic Text Module](#).

Elements	Attributes	Content Model
<a href="#">switch</a>	<a href="#">Common</a> , <a href="#">Timing</a>	<a href="#">Flow</a>
<a href="#">Flow</a> &	<a href="#">Test</a>	N/A

The [Content Control Module](#) defines the Attribute set "[Test](#)".

Collection Name	Attributes in Collection
Test	<a href="#">systemBitrate</a> (Number), <a href="#">systemCaptions</a> (on off), <a href="#">systemLanguage</a> (CDATA), <a href="#">systemRequired</a> (URI), <a href="#">systemScreenDepth</a> (CDATA), <a href="#">systemScreenSize</a> (CDATA), <a href="#">systemAudioDesc</a> (on off), <a href="#">systemCPU</a> (NMOKEN), <a href="#">systemComponent</a> (CDATA), <a href="#">systemOperatingSystem</a> (CDATA), <a href="#">systemOverdubOrSubtitle</a> (overdub subtitle)

## 2.7-Media Object Module

The [SMIL2.0 Media Object Module](#) provides a framework for declaring media. The [Media Object Module](#) defines semantics for the [ref](#), [animation](#), [audio](#), [img](#), [iframe](#) (additional to semantics defined by XHTML), [video](#), [text](#) and [textstream](#) elements. XHTML defines [img](#) and [iframe](#) elements, and so the integration of the Media module extends the semantics and content model of these elements.

This profile adds the [ref](#), [animation](#), [audio](#), [img](#), [iframe](#), [video](#), [text](#) and [textstream](#) elements to the content model of the [par](#), [seq](#), and [excl](#) elements of the [Timing and Synchronization Module](#). It also adds these elements to the Inline content set of the [Basic Text Module](#).

Elements	Attributes	Content Model
<a href="#">ref</a> , <a href="#">animation</a> , <a href="#">audio</a> , <a href="#">img</a> &, <a href="#">iframe</a> &, <a href="#">video</a> , <a href="#">text</a> , <a href="#">textstream</a>	<a href="#">Common</a> , <a href="#">Test</a> , <a href="#">Timing</a> , <a href="#">timeContainer</a> , <a href="#">clipBegin</a> , <a href="#">clipEnd</a> , <a href="#">src</a> , <a href="#">mediaType</a>	<a href="#">AllAnimation</a> , <a href="#">timeContainer</a> , <a href="#">area</a> , <a href="#">param</a>



<a href="#">par</a> &, <a href="#">seq</a> &, <a href="#">excl</a> &, Inline&	<a href="#">ref</a> *, <a href="#">animation</a> *, <a href="#">audio</a> *, <a href="#">img</a> *, <a href="#">iframe</a> *, <a href="#">video</a> *, <a href="#">text</a> *, <a href="#">textstream</a> *
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## Additional integration issues for the Media Object Module

This profile adds media object properties to the XHTML `img` and `iframe` elements. While implementation rules for the `img` element remain unchanged, the following issues must be taken into consideration when supporting a SMIL-enabled `iframe`:

- When the `iframe` contains timed content, including SMIL documents, additional XHTML+SMIL content, or timed multimedia, the timeline of the nested object should not begin until the `iframe` element begins.
- The timeline on an object contained inside an `iframe` element should restart each time the `iframe` element begins or repeats. If applicable, a reset event should be fired on the root element of the document hosted by the `iframe`.

## 2.8-Timing and Synchronization Module

The [SMIL2.0 Timing and Synchronization Module](#) provides a framework for describing timing structure, timing control properties, and temporal relationships between elements.

The [Timing and Synchronization Module](#) defines the elements [par](#), [seq](#), and [excl](#). It adds the [par](#), [seq](#), and [excl](#) elements to the Inline content set of the Basic Text, Hypertext and Tables Modules.

This profile adds the [Timing](#) and [RuntimeSync](#) attribute sets from the [Timing and Synchronization Module](#) to the elements in the [Media Object Module](#), and adds the [Timing](#) attribute set to the Flow content set of the Basic Text Module. In addition, the [Timing](#) attribute set is added to the body element in the XHTML Structure module.

Elements	Attributes	Content Model
<a href="#">par</a>	<a href="#">Common</a> , <a href="#">Test</a> , <a href="#">Timing</a> , <a href="#">RuntimeSync</a> , timeAction (CDATA)	<a href="#">par</a> , <a href="#">seq</a> , <a href="#">excl</a> , <a href="#">Flow</a>
<a href="#">seq</a>	<a href="#">Common</a> , <a href="#">Test</a> , <a href="#">Timing</a> , <a href="#">RuntimeSync</a> , timeAction (CDATA)	<a href="#">par</a> , <a href="#">seq</a> , <a href="#">excl</a> , <a href="#">Flow</a>
<a href="#">excl</a>	<a href="#">Common</a> , <a href="#">Test</a> , <a href="#">Timing</a> , <a href="#">RuntimeSync</a> , timeAction (CDATA)	<a href="#">par</a> , <a href="#">seq</a> , <a href="#">excl</a> , <a href="#">Flow</a>
Inline&		<a href="#">par</a> *, <a href="#">seq</a> *, <a href="#">excl</a> *
Media	<a href="#">Timing</a> , <a href="#">RuntimeSync</a>	
body, <a href="#">Flow</a>	<a href="#">Timing</a>	

The [Timing and Synchronization Module](#) defines the Attribute sets "[Timing](#)" and "[RuntimeSync](#)".

Collection Name	Attributes in Collection
Timing	<a href="#">begin</a> (CDATA), <a href="#">dur</a> (CDATA), <a href="#">repeatCount</a> (CDATA), <a href="#">repeatDur</a> (CDATA), <a href="#">end</a> (CDATA), <a href="#">endsync</a> (CDATA), <a href="#">fill</a> (CDATA), <a href="#">restart</a> (always whenNotActive never), <a href="#">timeAction</a> ( <a href="#">TimeActions</a> ), onBegin (Script), onEnd (Script), onRepeat (Script)
RuntimeSync	<a href="#">syncBehavior</a> (locked canSlip independent), <a href="#">syncTolerance</a> (CDATA), <a href="#">syncMaster</a> (true false)

In addition to the data types defined by XHTML Modularization, the XHTML+SMIL profile defines the TimeActions data type and its semantics, described in the following table:

Data type	Description
TimeActions	<p>Authors may use the following recognized time actions, listed here with their interpretations.</p> <p><b>none</b> Specifies that no action is performed on the element when it is active. This allows the author to introduce a new time space without affecting the document presentation. It is only legal on the time container elements and the XHTML elements <code>img</code> and <code>iframe</code>.</p> <p><b>visibility</b> Specifies that the CSS "visibility" property is to be manipulated over time. When the element is neither active nor frozen, the property is set to "hidden". When it is active, the original value is used. If the original value is "hidden", the time action will have no effect (i.e. the element will remain hidden). See also <a href="#">[CSS2]</a></p> <p><b>display</b> Specifies that the CSS "display" property is to be manipulated over time. When the element is neither active nor frozen, the property is set to "none". When it is active, the original value is used. If the original value is "none", the time action will have no effect (i.e. the element will remain out of view and layout). See also <a href="#">[CSS2]</a></p> <p><b>style</b> Specifies that the CSS inline style attribute "style" is to be removed and applied over time. When the element is neither active nor frozen, the inline stylesheet is cleared (so no style modification is made). When it is active, the original value (i.e. the string attribute value specified for the "style" attribute) is used. If there is no inline style attribute on the element, the time action will have no effect. See also <a href="#">[CSS2]</a>.</p> <p><b>class:classname</b> Specifies that the name "<i>[classname]</i>" will be <i>removed from</i> and <i>added to</i> the value of the "class" attribute over time. When the element is neither active nor frozen, the specified string (i.e. whatever the author specifies for "<i>classname</i>") is removed from the value of the class attribute (if it was included). When the element is active, the specified string is added to the value of the class</p>

	<p>attribute. Note that any other values specified in the class attribute are not affected. Note also that the application of any associated style must be specified in a stylesheets for the document. Note finally that the application of styles depends not upon the order of names in the class attribute, but rather on the order of the rules in the stylesheets for the document. See also <a href="#">[CSS2]</a>.</p>
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## TimeContainer and timeAction

As part of the integration of timing and synchronization functionality with XHTML, this profile defines the timeContainer and timeAction attributes. This profile adds the timeContainer and timeAction attributes to the elements of the Flow content set of the Basic Text Module (as modified by all included modules). In addition, the timeContainer and timeAction attributes are added to the body element in the XHTML Structure module. The default value of the timeContainer attribute for body is "par". The timeContainer attribute is not allowed on the time container elements [par](#), [seq](#), and [excl](#).

The timeAction attribute defines the behavior that is controlled by the timing model. The default depends upon the type of element. The default value is "none" when used with the time container elements. The default value of the timeAction attribute for body is "none".

The following table presents the default time actions. Those modules and elements that are not included do not have a defined time behavior, and cannot legally support timing attributes, or participate in the time model.

Certain elements have a notion of intrinsic behavior that can be controlled over time. This is generally some presentation or behavioral effect, such as the font style controls of the b and strong elements, and the click sensitivity of the a and area elements. One way to logically model the control of intrinsic behavior is to replace the element with a span when it is neither active nor frozen, and to use the original element when it is active or frozen.

Many other elements simply contain content and so default to controlling the "visibility" property for the element. In some cases, an element may have a presentational effect (e.g. the Ruby module elements), but be modeled as a content element. The decision is based upon the usefulness in common authoring scenarios of controlling the presentational behavior in isolation.

For those elements that default to controlling "visibility", setting timeAction to any other value *overrides* this, and will *only control* the specified timeAction (and not the visibility). For all other elements, the timeAction will control the default (intrinsic) behavior *as well as* the indicated timeAction behavior.

In addition, for those elements that default to "visibility", when they are children of a sequence time container seq or an element with "timeContainer=seq", the default timeAction is "display". This more closely matches the expected behavior of the SMIL Language profile.

## Element default timeActions

Module	Elements	Default time action
Structure	body	"none"
Media	(all)	<i>schedule for playback and render</i>
Timing	(all)	"none"
Text	em, kbd, strong, var	<i>intrinsic behavior</i>
Text	(all others)	"visibility"
Hypertext	a	<i>link sensitivity</i>
Lists	(all)	"visibility"
Applet	applet	"visibility"
Presentational	(all)	<i>intrinsic behavior</i>
Edit	(all)	<i>intrinsic behavior</i>
Forms	(all)	"visibility"
Tables	(all)	"visibility"
Image Map	area	<i>link sensitivity</i>
Object	object	"visibility"
Iframe	iframe	<i>intrinsic behavior (schedule for display and render)</i>
Ruby	(all)	"visibility"
Legacy	(all)	<i>intrinsic behavior</i>
Timing	<a href="#">par</a> , <a href="#">seq</a> , <a href="#">excl</a>	"none"

All modules not listed in the table, and all Structure module elements except body do not support timing.

### Events supported by XHTML+SMIL

The XHTML+SMIL Language profile specifies events that can be used in conjunction with the SMIL elements defined by the profile. Additionally, DOM 2 dynamic events [DOMLevel2Events](#) can also be used.

Event	Description
beginEvent	This event is raised when the timeline starts on an element (see the definition of <code>beginEvent</code> in the SMIL <a href="#">Timing and Synchronization Module</a> )

Event	Description
endEvent	This event is raised when the timeline stops on an element. (see the definition of <code>endEvent</code> in the SMIL <a href="#">Timing and Synchronization Module</a> )
mediacomplete	This event is raised when the element's associated media finishes loading. This event may be raised before the media begins playing, when the element is associated with streaming media.
mediaerror	This event is raised when any error is caused by the media file. Errors caused by the media file may include an attempt to load a media file with an invalid path, or if problems with the media file (such as file corruption or an invalid media type) prevent it from loading and playing.
outofsync	This event is raised when the element loses synchronization with its associated timeline. This includes the interruption of an element's ability to play its associated media, or any other circumstance where synchronization is lost.
pause	This event is raised when the timeline on an element is paused. It may be raised in the case that the timeline is paused by a DOM method.
repeat	This event is raised when the timeline repeats on an element, beginning with the second iteration (see the definition of the <code>repeat</code> event in the SMIL <a href="#">Timing and Synchronization Module</a> ).
reset	This event is raised when the timeline state is reset to the value of the <code>begin</code> attribute and playback is commenced from the beginning of the timeline. It may be raised in the case that the timeline is reset by a DOM method.
resume	This event is raised when an element's timeline resumes from a paused state. It may be raised in the case that timeline playback is resumed by a DOM method.
reverse	This event is raised when the timeline on an element begins to play backward. It may be raised both in the course of normal timeline play, as well as in the case that element playback was reversed with a DOM method.
seek	This event is raised whenever a seek operation is performed on the element. It may be raised in the case that the seek operation is executed by a DOM method.
syncrestored	This event is raised whenever an outofsync event is raised and synchronization is restored. Specifically, the syncrestored event is raised when synchronization is resumed between the element and its associated timeline.
timeerror	This event is raised whenever a time-specific error occurs as a result of setting an invalid value for a SMIL attribute. The timeerror event is

Event	Description
	raised when any attribute defined by the XHTML+SMIL profile is set to an invalid value, either in the course of normal playback or by a DOM method.

## Additional integration conformance issues with Timing

The [Timing and Synchronization Module](#) defines the following additional conformance definition requirements for the language integration profile:

- The XHTML+SMIL document is presented when it is displayed on the screen.
- The document begins when it has been completely received by the client, loaded by the user agent, and presented.
- The document ends when the user agent ceases to present it, through switching to another document or exiting.

## 2.9-Time Manipulations Module

The [SMIL2.0 Time Manipulations Module](#) provides attributes for the manipulation of SMIL element timelines.

The [Time Manipulations Module](#) defines the [accelerate](#), [decelerate](#), [autoReverse](#), and [speed](#) attributes. These attributes are added to the elements that support timing in the XHTML+SMIL profile, including the elements in the [Media Object Module](#), the SMIL animation, time container and transition elements, the XHTML elements `img`, `iframe`, `body` and the XHTML [Flow](#) element set.

Elements	Attributes
<a href="#">animate</a> &, <a href="#">set</a> &, <a href="#">animateMotion</a> &, <a href="#">animateColor</a> &	<a href="#">accelerate</a> , <a href="#">decelerate</a> , <a href="#">autoReverse</a> , <a href="#">speed</a>
Media&	<a href="#">accelerate</a> , <a href="#">decelerate</a> , <a href="#">autoReverse</a> , <a href="#">speed</a>
<a href="#">par</a> &, <a href="#">seq</a> &, <a href="#">excl</a> &	<a href="#">accelerate</a> , <a href="#">decelerate</a> , <a href="#">autoReverse</a> , <a href="#">speed</a>
<a href="#">transitionFilter</a> &	<a href="#">accelerate</a> , <a href="#">decelerate</a> , <a href="#">autoReverse</a> , <a href="#">speed</a>
<code>img</code> &, <code>iframe</code> &, <code>body</code> , <a href="#">Flow</a>	<a href="#">accelerate</a> , <a href="#">decelerate</a> , <a href="#">autoReverse</a> , <a href="#">speed</a>

## 2.10-Transition Effects Module

The [Transition Effects Module](#) defines a taxonomy of transition effects as well as semantics and syntax for integrating these effects into XHTML documents. The XHTML+SMIL profile includes the functionality of the [InlineTransitions](#) module, which defines the [transitionFilter](#) element.

In an XHTML document, [transitionFilter](#) elements have the following attributes and content model:

Elements	Attributes	Content Model
<a href="#">transitionFilter</a>	<a href="#">Common</a> , <a href="#">Timing</a> , <a href="#">type</a> , <a href="#">subtype</a> , <a href="#">mode</a> , <a href="#">fadeColor</a> , <a href="#">targetElement</a> , <a href="#">additive</a> , <a href="#">accumulate</a> , <a href="#">calcMode</a> , <a href="#">values</a> , <a href="#">keyTimes</a> , <a href="#">keySplines</a> , <a href="#">from</a> , <a href="#">to</a> , <a href="#">by</a>	param

A [transitionFilter](#) element may contain one or more XHTML param elements describing extended transition functionality, as described in the [Transition Effects Module \(specific section\)](#).

The [transitionFilter](#) element is added to the content model of the elements in the [Media Object Module](#), and XHTML elements that support rendered content.

The specific XHTML elements that will support [transitionFilter](#) needs further attention.

Elements	Content Model
Media&, img&, ???	<a href="#">transitionFilter</a>

### 3-Extending the XHTML+SMIL Language Profile

This section is *normative*.

In the future, XHTML+SMIL Language may be extended by other W3C recommendations, or by private extensions. For these extensions, the following rules must be obeyed:

- All elements introduced in extensions must have a skip-content attribute if it should be possible that their content is processed by XHTML+SMIL user agents.
- Private extensions must be introduced by defining a new XML namespace.

Conformant XHTML+SMIL user agents are prepared to handle documents containing extensions that obey these two rules.

## Appendix A: Document Type Definition

This section is *normative*.

TBD.

## Appendix B: References

### [CSS2]

"Cascading Style Sheets, level 2", Bert Bos, Håkon Wium Lie, Chris Lilley, Ian Jacobs. W3C Recommendation 12 May 1998,



Available at <http://www.w3.org/TR/REC-CSS2>

#### **[HTML4]**

"HTML 4.01 Specification" D. Raggett, A. Le Hors, I. Jacobs. W3C Recommendation 24 December 1999,

Available at <http://www.w3.org/TR/html401/>

#### **[DOMLevel2Events]**

"Document Object Model Level 2 Events Specification", Tom Pixley. W3C Recommendation 13 November, 2000

Available at <http://www.w3.org/TR/DOM-Level-2-Events/>

#### **[RUBY]**

"Ruby Annotation". W3C Recommendation 31 May 2001.

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#### **[SMIL20]**

"Synchronized Multimedia Integration Language (SMIL 2.0) Specification". W3C Recommendation 07 August 2001,

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"The SMIL 2.0 Modules", W3C Recommendation 07 August 2001,

Available at <http://www.w3.org/TR/smil20/smil-modules.html>

#### **[SMIL-MOD-NOTE]**

"Synchronized Multimedia Modules based upon SMIL 1.0", Patrick Schmitz, Ted Wugofski and Warner ten Kate. W3C Note 23 February 1999,

Available at <http://www.w3.org/TR/NOTE-SYMM-modules>. Superseded by [\[SMIL20-MOD\]](#) .

#### **[XHTML10]**

"The Extensible HyperText Markup Language: A Reformulation of HTML 4.0 in XML 1.0". W3C Recommendation 26 January 2000,

Available at <http://www.w3.org/TR/xhtml1/>

#### **[XLINK]**

"XML Linking Language (XLink)", S. DeRose, E. Maler, D. Orchard and B. Trafford. W3C Recommendation 27 June 2001,

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#### **[XMOD]**

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**[XSCHEMA]**

"XML Schema, XML Schema Part 1: Structures". W3C Recommendation 2 May 2001,  
Available at <http://www.w3.org/TR/xmlschema-1/>