

Preface

SMIL 3.0: Multimedia for the Web, Mobile Devices and Daisy Talking Books is a revised introduction to — and resource guide for — the W3C SMIL language. It covers all aspects of the SMIL specification and covers all of SMIL’s implementation profiles, from the desktop through the world of mobile SMIL devices. Based on the first version of the book, which covered SMIL 2.0, this edition has been updated with information from the past two releases of the SMIL language. We have benefitted from comments and suggestions from many readers of the first edition, and have produced what we feel is the most comprehensive guide to SMIL available anywhere.

Motivation for this Book

While we were working on various phases of the SMIL recommendations, it became clear to us that the richness of the SMIL language could easily overwhelm many Web authors and designers. In the 500+ pages that the SYMM working group needed to describe the 30+ SMIL elements and the 150+ SMIL attributes, there was not much room for background information or extensive examples. The focus of the specification was on implementation aspects of the SMIL language, not on the rationale or the potential uses of SMIL’s declarative power.

In spite of SMIL’s broad acceptance in the mobile and server-side worlds, the existing literature on SMIL is not extensive. Other books published on aspects of the SMIL language are neither complete nor always correct in their handling of SMIL concepts or the various SMIL implementations. The documentation provided by major vendors of SMIL players is also not geared to the development of a complete picture of what SMIL can do — and what it can’t do! The academic literature, while often containing a thoughtful analysis of SMIL, is inaccessible to most of SMIL’s users.

We wrote this book to bridge the gap between the theory and practice of creating SMIL presentations for multiple platforms and multiple profiles. In so doing, we hope that the use of SMIL’s facilities and features beyond the trivial and enters the mainstream of Web multimedia.

Should You Read This Book?

We wrote this book for three communities:

- *Existing SMIL authors*: many existing SMIL users need and want more information on the language so that they can create better presentations, for more profiles, with less effort.
- *New SMIL authors*: SMIL is currently available on millions desktop, mobile and speciality devices. Designers and authors who want to exploit the potential of SMIL need to have a solid introduction to the language and to have a wealth of examples that can help them get started.
- *Developers and students of multimedia technology*: The SMIL standard is a complex document. For researchers, developers and students of internet media technology, it is easy to lose sight of the big picture when architecting delivery systems for SMIL technology. We have done our best to de-mystify SMIL and to make its basic concepts clear and accessible.

This book is intended to augment the documentation provided by individual SMIL player vendors. We have decided to focus our efforts on explaining SMIL technology; together with authoring guidelines and documentation provided and maintained by the W3C, RealNetworks, Microsoft, Oratrix, Apple and other player vendors, we are confident that you will be able to create, maintain, and debug a complete range of SMIL presentations, for a complete range of SMIL players.

Now that a number of open-source SMIL players are available, we also expect that this book will provide a comprehensive guide for designers and implementers of new or enhanced SMIL players.

Structure of the Book

This book is divided into four sections. *Part One* provides a general introduction to the SMIL language and a reader's guide to a (complex) SMIL example. It also contains background information on Web multimedia technology that, while not limited to SMIL, is useful for users who are new to networked multimedia. *Part Two* provides an overview of the basic elements and attributes used by all implementations of SMIL. It covers each of the functional groups of SMIL technology, from structure to transitions. *Part Three* contains a discussion of advanced SMIL features. These are elements and attributes that are either profile or player specific, or that make use of esoteric SMIL features. *Part Four* contains reference information on the composition of five of SMIL's profile implementations.

We expect that many current SMIL authors will want to jump directly to the element and attribute definitions in each chapter; these provide detailed information that can answer questions quickly and (relatively!) painlessly about the structure of the language and the permissible attribute values. For new SMIL users, the example sub-section provides a host of easy-to-digest uses of the technology; often starting here will give a good idea of what SMIL can do in the

functional group covered by that chapter. For readers interested in not only the *how* of SMIL but also the *why*, the background information in each chapter provides the motivations and limitations of SMIL technology.

Each chapter is structured to meet the needs of the three target readership groups defined above. An XML-like structure of each chapter is given below:

```
<chapter>
  <BackgroundInformation />
  <ElementsAndAttributes>
    <ElementDefinitions />
    <AttributeDefinitions />
    <SpecialValuesDefinitions />
  </ElementsAndAttributes>
  <Examples/>
</chapter>
```

Note that for chapters that explain lots of elements and/or attributes, the examples are presented in the context of the definition of the constructs. For chapters covering many concepts, the chapter structure is sometimes repeated as a local sub-structure instance.

Notational Conventions
In order to provide a predictable presentation of SMIL constructs, this book adopts the following simple notational conventions:

- *Element definitions:* SMIL's XML elements are displayed in a colored monospace font, together with their angle brackets. Examples are: **<body>**, **<transition>**, **<switch>**. Unless used in the content of an example, a trailing '/' is not used.
- *Attribute names:* SMIL's XML attributes are displayed in a colored monospace font. Examples are: **clipBegin**, **dur**, **begin**.
- *Attribute values:* SMIL's XML attribute value definitions are displayed in a non-colored monospace font. Examples are: `indefinite`, `media`, `auto`.
- *Code examples:* The code examples in the book are set in separate areas and have a colored background. (See the XML-like code above for an example.) When code fragments are embedded in a sentence, the fragment is set in a single colored mono-space font. An example: `src="snarf.mpg"`.

In order to facilitate the search for constructs in the text, each first definition of an element, attribute or special value is highlighted with a separate heading. These definitions are placed in the Index as the primary reference for the element, attribute or value construct.

Element and Attribute Tables

Most chapters in *Part Two* and *Part Three* of this book contain element and attribute tables. These tables define either an element structure or a set of values for complex SMIL attributes.

An example of an element table is given below.

| | <seq> | <par> |
|--------------------|--------------------------|---------|
| attributes | <i>general timing</i> | |
| | | endsync |
| | <i>media description</i> | |
| | region | |
| | <i>test</i> | |
| | <i>core</i> | |
| parents | <body> | |
| | <priorityClass> | |
| parents & children | <seq>, <par> | |
| | <excl> | |
| | <switch> | |
| | <a> | |
| children | <i>media object</i> | |
| | <i>animation</i> | |

The table gives the name of the element and defines the major attributes, parents and children for that construct. In order to improve readability, each of the groups of attributes and structure information (such as XML parents and children) is colored coded.

Each attribute can take a range of values in SMIL. These values have been summarized in the attribute table, an example of which is shown below.

| attribute | value | elements |
|-----------|---|----------------------------------|
| min | | <prefetch> |
| max | <i>clock value</i> | <a>, <area> |
| | | <i>animation</i> |
| endsync | "last" , "first" , "all" | <body>, <seq>, <par>, <excl> |
| | | <i>media object</i> , <brush> |

In each table, the default values for an attribute are shown in bold. The table also identifies the names of the elements that use each of the attributes. Together, the tables provide a quick reference to SMIL features. Each of the ele-

ments and attributes contain a background color code that defines the functional area to which they belong. When appropriate, a distinction is made between basic and advanced attributes by giving basic attributes a lighter tint.

The color coding is:

| Functional Area | |
|----------------------|--------------------------|
| <i>Structure</i> | <i>Meta-Information</i> |
| <i>Timing</i> | <i>Time Manipulation</i> |
| <i>Linking</i> | <i>Content Control</i> |
| <i>Media Objects</i> | <i>Layout</i> |
| <i>Animation</i> | <i>Transitions</i> |
| <i>SmilText</i> | <i>SmilState</i> |

In this edition, we have simplified the structure of these complex tables by removing associations with specific SMIL profiles. Instead, in the reference tables in Part Four, we indicate with language feature can be expected to be supported by a representative media player in one of SMIL target deployment areas.

Throughout the book, the Ambulant player has been used as the basis for testing code fragments, unless the functionality described was not available in the Ambulant SMIL implementation.

Quick Tips

In addition to being a reader's guide to the SMIL specification, our book is geared to helping you create SMIL presentations. Each section contains a number of *Quick Tips* that can be useful when you first work with SMIL. These tips, together with the examples, will get you started with multimedia on the Web in the shortest possible time.

| |
|--|
| Quick Tip |
| This is the format of a Quick Tip block. |

On-Line Information

We maintain a Web site for this book at <http://www.XmediaSMIL.net/>. This site contains versions of many of the examples used in our book (unless there are media redistribution restrictions), plus links to various sites of interest. It will also contain a corrections and errata section that contains fixes for errors that inadvertently made their way into this publication.

About the Authors



Dick Bulterman is head of the Distributed Multimedia Languages and Infrastructures research group at the *Centrum Wiskunde & Informatica* (CWI), the Dutch national center for mathematics and computer science in Amsterdam. He is also professor of computer science at the *Vrije Universiteit* in Amsterdam. From 1998-2001, he was managing director and CTO of Oratrix Development, a CWI spin-off company specializing in full-featured SMIL authoring systems and SMIL player engines.

Bulterman received a Ph.D. in computer science from Brown University in 1981. Before joining CWI, he was on the faculty of the division of Engineering at Brown, where he worked on computer architecture and high-speed signal processing networks. He holds an undergraduate degree in economics and mathematics from Hope College.

Dick Bulterman joined the W3C's Structured Multimedia (SYMM) working group in 1996. He was an active member of the SMIL 1.0 and SMIL 2.0 design teams, and was chair of the SYMM working group throughout the SMIL 3.0 development effort. He lives in Amsterdam with his wife and two children.



Lloyd Rutledge is an assistant professor with the Open Universiteit Nederland, where he specializes in Web technologies. Previously, he was a researcher with the Semantic Media Interfaces group at CWI. His research areas are Semantic Web user interaction, recommender systems and the semi-automatic generation of interactive multimedia presentations. He received his Sc.D in computer science from the University of Massachusetts Lowell in 1996. Like Dr. Bulterman, Lloyd Rutledge was part of the SYMM working group of the W3C, participating the development of SMIL 1.0 and 2.0. He lives with his wife and two children in Amsterdam.