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Pro HTML5 Programming

Powerful APIs for Richer Internet
Application Development

Use HTML5 to create cutting-edge web applications

Peter Lubbers, Brian Albers,
and Frank Salim

Foreword by Paul Irish, Google

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Application Development



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Pro HTML5 Programming: Powerful APIs for Richer Internet Application Development

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CHAPTER 3

Working with HTML5 Audio and Video

In this chapter, we'll explore what you can do with two important HTML5 elements—*audio* and *video*—and we'll show you how they can be used to create compelling applications. The audio and video elements add new media options to HTML5 applications that allow you to use audio and video without plugins while providing a common, integrated, and scriptable API.

First, we'll discuss audio and video container files and codecs, and why we ended up with the codecs supported today. We'll go on to describe lack of common codec support—the most important drawback for using the media elements—and we'll discuss how we hope that this won't be such a big issue in the future. We'll also show you a mechanism for switching to the most appropriate type of content for the browser to display.

Next, we'll show you how you can use control audio and video programmatically using the APIs and finally we'll explore the use of the HTML5 Audio and Video in your applications.

Overview of HTML5 Audio and Video

In the following sections, we'll discuss some of the key concepts related to HTML5 audio and video: containers and codecs.

Video Containers

An audio or video file is really just a *container* file, similar to a ZIP archive file that contains a number of files. Figure 3-1 shows how a video file (a video container) contains audio tracks, video tracks, and additional metadata. The audio and video tracks are combined at runtime to play the video. The metadata contains information about the video such as cover art, title and subtitle, captioning information, and so on.

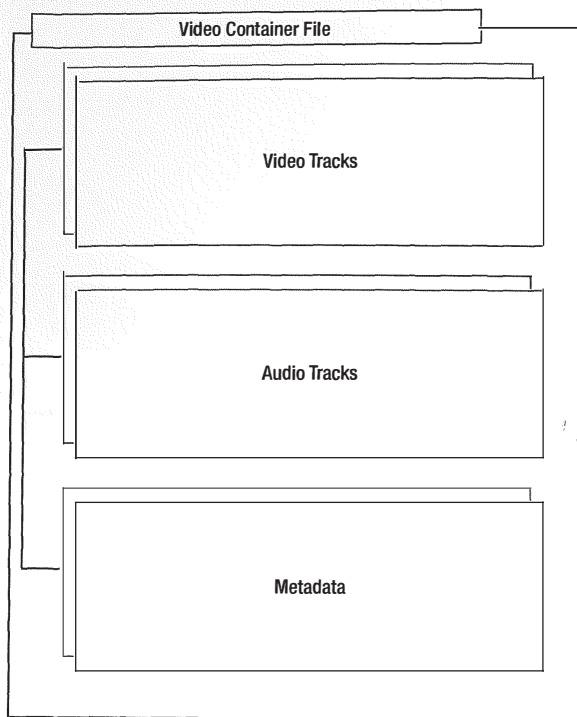


Figure 3-1. Overview of the video container

Some of the popular video container formats include the following:

- Audio Video Interleave (.avi)
- Flash Video (.flv)
- MPEG 4 (.mp4)
- Matroska (.mkv)
- Ogg (.ogv)

Audio and Video Codecs

Audio and video *coders/decoders* (*codecs*) are algorithms used to encode and decode a particular audio or video stream so that they can be played back. Raw media files are enormous, so without encoding, a video or audio clip would consist of tremendous amounts of data that could be too large to transmit across the Internet in a reasonable amount of time. Without a decoder, the recipient would not be able to reconstitute the original media source from the encoded form. A codec is able to understand a specific container format and decodes the audio and video tracks that it contains.

Some example audio codecs are the following:

- AAC
- MPEG-3
- Ogg Vorbis

Example video codecs are the following:

- H.264
- VP8
- Ogg Theora

The Codec Wars and the Tentative Truce

Some of the codecs are patent-encumbered, while others are freely available. For example, the Vorbis audio codec and the Theora video codec are freely available, while the use of the MPEG-4 and H.264 codecs are subject to license fees.

Originally, the HTML5 specification was going to require that certain codecs were supported. However, some vendors did not wish to include Ogg Theora as it was not part of their existing hardware and software stacks. Apple's iPhone, for example, includes hardware accelerated decoding for h264 video but not Theora. Free systems, on the other hand, cannot include proprietary for-pay codecs without hurting downstream distribution. On top of that, the performance that certain proprietary codecs provide is a factor in the browser uptake of free codecs. This situation has led to a stalemate; there does not appear to be a single codec that all browser vendors are willing to implement.

For now, the codec requirement has been dropped from the specification. However, this decision may be revisited in the future. For now, understand the current browser support and understand that you may need to re-encode your media for different environments. (You should probably be doing this already.)

We do expect that support for different codecs will increase and converge over time, making the choice of common media types easy and ubiquitous. It is also possible that one codec will grow to be the de facto standard codec for the Web. Additionally, the media tags have a built in mechanism for switching to the most appropriate type of content for the browser to display to make supporting different environments easy.

HERE COMES WEBM

Frank says: "Google introduced the WebM video format in May 2010. WebM is a new format for audio and video intended to clear up the murky media format situation on the Web. WebM files have the .webm extension and consist of VP8 video and Ogg Vorbis audio in a container based on Matroska. Google released the WebM specification and software under permissive licenses covering source code and patent rights. As a high quality format that is free for both implementers and publishers, WebM represents a significant development in the codec landscape.

As far as browsers go, at least Firefox, Opera, and Chrome will support WebM natively. Opera 10.60 is already shipping with WebM support. Mozilla and Google have committed to shipping WebM in the next versions of their browsers."

Audio and Video Restrictions

There are a few things that are not supported in the HTML5 audio and video specification:

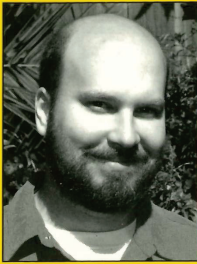
- *Streaming* audio and video. That is, there is currently no standard for bitrate switching in HTML5 video; only full media files are supported by current implementations. However, there are aspects of the spec that are designed to support streaming media in the future once the formats are supported.
- Media is restricted by HTTP cross-origin resource sharing. See Chapter 5 for more information about cross-origin resource sharing.
- Full-screen video is not scriptable because it could be considered a security violation to let a scriptable element take over the full screen. However, browsers have the option of letting users choose to view videos in full screen through additional controls.
- Accessibility for audio and video elements is not fully specified yet. Work is underway on a specification called WebSRT for subtitle support based on the popular SRT format.

Browser Support for HTML5 Audio and Video

As shown in Table 3-1, HTML5 audio and video elements are already supported in many browsers at the time of this writing. The table also shows the supported codecs.



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Pro HTML5 Programming

Dear Reader,

HTML5 is here, and with it, web applications can achieve unprecedented power, scalability, and responsiveness. In this book, you will learn how to unlock that power and use the latest cutting-edge HTML5 web technology to build modern web applications that tap the full potential of modern browsers.

This book explains the new HTML5 APIs. It provides practical, real-world examples of HTML5 features and shows which ones are supported in which browsers. We cover a selection of the most useful and powerful HTML5 APIs to get you up to speed quickly. You will learn how to develop WebApps using HTML5 features such as Geolocation, Web Storage, WebSockets, Web Workers, Canvas, Audio, and Video. You will see how these features can be combined and made to work seamlessly with other standard web technologies.

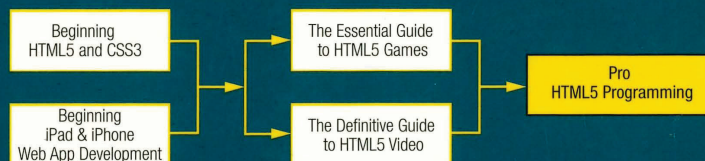
With HTML5, complex functionality that used to take pages of script or nonstandard plugins can be performed today with just a few lines of markup. Crack open your favorite text editor, download one of the many free HTML5-compliant browsers, and try your hand incorporating the new communication and interaction methods built into HTML5 programming.

We wrote this book to share our enthusiasm about this emerging standard with you, the Web professional. We've been working with, developing, and teaching HTML5 technologies for more than two years and can claim with certainty that adoption of the new standards is accelerating at breakneck speed. We hope this book will inspire you to use the HTML5 APIs in creative new ways, and we look forward to seeing your code on the Web!

Sincerely,

Peter Lubbers, Brian Albers, and Frank Salim

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