

HTML5 Media

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“Learn with Passion!”



Topics

- What is and Why HTML5 Audio/Video support?
- Video containers and Codec's
- `<video>` element
- `<track>` sub-element (of `<video>` element)
- JavaScript control of `<video>`
- Advanced features
- Future features
- Libraries and frameworks

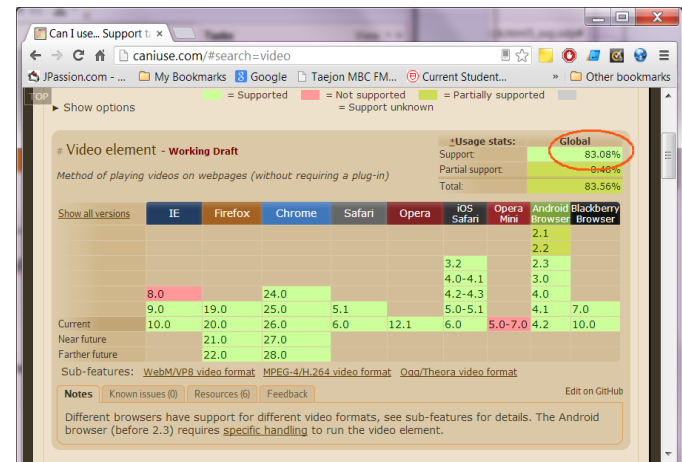
Acknowledgment

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What is & Why HTML5 Audio/Video Support?

History of Video Support in Browsers

- ~2000
 - > Browsers have to install multiple plug-in's: RealPlayer, Quicktime, Windows Media player
- ~2004 – 2008
 - > Flash becomes the dominant video plug-in
- ~2009
 - > HTML5 enables native video support in the browser
- ~2013
 - > HTML5 has ~80% user support
 - > <http://caniuse.com/#search=video>



Why HTML5 Video?

- Runs native in the browser
 - > No external plug-in required
- Simpler coding
 - > No need to have different coding for different formats and for different browsers
- Can be manipulated just like any other DOM element
 - > Transformation (moving, resizing) & styling can be performed
- It is the standard
 - > Future proof
 - > No vendor lock-in
 - > Wide-adoption
- iOS devices do not support flash

<audio>/<video>

- HTML5 defines new elements which specify a standard way to embed an audio/video file on a web page
 - > <audio>
 - > <video>

Video Containers & Codec's

Video Containers

- An video file is “container” file, which contains
 - > Video stream
 - > Audio stream
 - > Meta data
- The video and audio streams are combined to play video
- The meta data includes
 - > title, subtitle, cover art, captioning info., etc

Video Container File Formats

- MP4 (video_file.mp4)
 - > H.264 (video codec format) + AAC (audio codec format)
- Ogg (video_file.org or video_file.ogg)
 - > Theora (video codec format) + Vorbis (audio codec format)
- WebM (video_file.webm)
 - > VP8 (video codec format) + Vorbis (audio codec format)
- ...

What is and Why Video/Audio Codec?

- What are codecs?
 - > Codecs (Coders/Decoders) are algorithms used to encode and decode a particular video/audio stream so that they can be played back
- Why codecs?
 - > Raw media files too big to transmit over the internet
- Example video codecs
 - > H.264, VP8, Ogg Theora
- Example audio codecs
 - > AAC, MP3, Ogg Vorbis

Video Codecs and Browser Support

- There is NOT a single Codec that is being supported by all browsers at this point :-)

- **MP4/H.264**

- > Chrome, Safari, IE9, Firefox*
- > Potential royalty payment issue

- **WebM**

- > Chrome, Firefox, Opera, IE9
- > Open source

- **Ogg Theora**

- > Chrome, Firefox, Opera
- > Open source

The screenshot shows the canIuse.com website with search results for video codecs. The browser's address bar shows 'canIuse.com/#search=video'. The page displays three sections, each with a table of browser support:

- MPEG-4/H.264 video format - other**
 - Support: 64.99% (Global)
 - Commonly used video compression format (not royalty-free)
 - Table columns: IE, Firefox, Chrome, Safari, Opera, iOS Safari, Opera Mini, Android Browser, BlackBerry Browser
 - Table rows: 8.0, 9.0, 10.0 (Current), Near future, Farther future
- WebM/VP8 video format - other**
 - Support: 55.38% (Global)
 - Multimedia format designed to provide a royalty-free, high-quality open video compression format for use with HTML5 video.
 - Table columns: IE, Firefox, Chrome, Safari, Opera, iOS Safari, Opera Mini, Android Browser, BlackBerry Browser
 - Table rows: 8.0, 9.0, 10.0 (Current), Near future, Farther future
- Ogg/Theora video format - other**
 - Support: 50.85% (Global)
 - Free lossy video compression format.
 - Table columns: IE, Firefox, Chrome, Safari, Opera, iOS Safari, Opera Mini, Android Browser, BlackBerry Browser
 - Table rows: 8.0, 9.0

Fallback Options

- However, you can use multiple sources in your videos which will fall back to one another
- You can even fall back all the way to Flash for older browsers

Encoding and Transcoding Tools

- Firefogg
 - > Video and audio encoding for Firefox
 - > <http://firefogg.org/>
- Handbrake.fr
 - > An open source multiplatform video transcoder
 - > <http://handbrake.fr/>
- Zencoder
 - > API-based online video encoding service
 - > <http://zencoder.com>
- Microvideo Converter
 - > Video converter
 - > <http://www.mirovideoconverter.com/>

Lab:

Exercise 1: Browser Support Test 1230_html5_media.zip



<video> element

<video ...>

- With a single source

```
<video src="movie.webm" controls>
```

Your browser does not support HTML5 video.

```
</video>
```

- With multiple sources

```
<video width="320" height="240" controls>
```

```
<source src="movie.mp4" type="video/mp4">
```

```
<source src="movie.ogg" type="video/ogg">
```

```
<source src="movie.webm" type="video/webm">
```

```
<object data="movie.mp4" width="320" height="240">
```

```
<embed src="movie.swf" width="320" height="240">
```

```
</object>
```

```
</video>
```

<video> element Attributes

- controls
- autoplay
- poster
- loop
- preload
- width/height

<video> element Attributes & Methods

- <http://www.w3.org/2010/05/video/mediaevents.html>

The screenshot shows a web browser window with the URL www.w3.org/2010/05/video/mediaevents.html. The video player is paused at 0:00. Below the player are several control buttons:

- load(), play(), pause(), currentTime+=10, currentTime-=10, currentTime=50
- playbackRate++, playbackRate--, playbackRate+=0.1, playbackRate-=0.1
- volume+=0.1, volume-=0.1, muted=true, muted=false
- Sintel teaser, Bunny trailer, Bunny movie, Test movie

The developer console shows the following sections:

Media Events

loadstart	1	progress	0	suspend	0	abort	0	error	0
emptied	0	stalled	1	loadedmetadata	0	loadeddata	0	canplay	0
canplaythrough	0	playing	0	waiting	0	seeking	0	seeked	0
ended	0	durationchange	0	timeupdate	0	play	0	pause	0
ratechange	0	volumechange	0						

Media Properties

error		src	http://media.w3.org/2010/05/sintel/trailer.mp4
crossOrigin	undefined	networkState	2
buffered	[object TimeRanges]	readyState	0
currentTime	0	duration	NaN
paused	true	defaultPlaybackRate	1
played	[object TimeRanges]	seekable	[object TimeRanges]
autoplay	false	loop	false
controller		controls	true
muted	false	defaultMuted	false
videoTracks	undefined	textTracks	[object TextTrackList]
height	0	videoWidth	0
poster	http://media.w3.org/2010/05/sintel/poster.png	videoHeight	0
		preload	none
		seeking	false
		startDate	undefined
		playbackRate	1
		ended	false
		mediaGroup	
		volume	1
		audioTracks	undefined
		width	0
		height	0

canPlayType

video/ogg	video/mp4	video/webm
"maybe"	"maybe"	"maybe"

Tracks

Audio	Video	Text
?	?	0

Lab:

Exercise 2: `<video>` Element 1230_html5_media.zip



**<track> sub-element
(of <video> element)**

<track> sub-element

- Used for providing time triggered text to the viewer
- 5 Types of tracks
 - > Subtitles - Translations of the dialogue in the video
 - > Captions - Transcription of the dialogue, sound effects, musical cues, and other audio information
 - > Chapters - Used to create navigation within the video, Typically they're in the form of a list of chapters that the viewer can click on to go to a specific chapter.
 - > Descriptions (not supported yet) - Text descriptions of what's happening in the video
 - > Metadata (not supported yet) - Tracks that have data meant for javascript to parse and do something with. These aren't shown to the user
- WebVTT format

<track> attributes

- **kind**
 - > One of the five track types. Kind defaults to “subtitles” if no kind is included.
- **src**
 - > URL of the track file
- **srclang**
 - > The two-letter code (valid BCP 47 language tag) for the language of the text track, for example "en" for English
- **label**
 - > The label for the track that will be shown to the user, for example in a menu that list the different languages available for subtitles
- **default**
 - > Default selection

<track> sub-element with attributes

- A video with two subtitle tracks - “English” subtitle is the default.

```
<video width="320" height="240" controls>  
  <source src="forrest_gump.mp4" type="video/mp4">  
  <source src="forrest_gump.ogv" type="video/ogg">  
  <track kind="subtitles" src="subtitles_en.vtt" srclang="en"  
        label="English" default>  
  <track kind="subtitles" src="subtitles_ko.vtt" srclang="ko"  
        label="Korean">  
</video>
```


Tools

- HTML5 Video caption maker
 - > Helps you to create simple video caption file
 - > <http://ie.microsoft.com/testdrive/Graphics/CaptionMaker/>

Lab:

Exercise 3: Tracks
1230_html5_media.zip



JavaScript control of Video

Control Functions

- `load()`
- `play()`
- `pause()`
- `canPlayType(type)`

Lab:

Exercise 4: JavaScript control of Video 1230_html5_media.zip



<audio> tag

<audio ...>

- With a single source

```
<audio src="horse.mp3" autoplay controls loop preload="auto" >  
  Your browser does not support the audio element.  
</audio>
```

- With multiple sources

```
<audio controls>  
  <source src="horse.mp3" type="audio/mpeg">  
  <source src="horse.ogg" type="audio/ogg">  
  Your browser does not support HTML5 audio.  
</audio>
```

<audio ...> attributes

- autoplay
- controls
- loop
- muted
- preload
- src

Audio Formats

- Currently, there are 3 supported file formats for the <audio> element
 - > MP3 (audio/mpeg)
 - > Wav (audio/wav)
 - > Ogg (audio/ogg)

Lab:

Exercise 5: `<audio>` Element 1230_html5_media.zip



Advanced Manipulation of Video

Advanced Features

- Usage of <video> with Canvas
- Transformation of <video> with CSS transformation
- Cross-domain access

Lab:

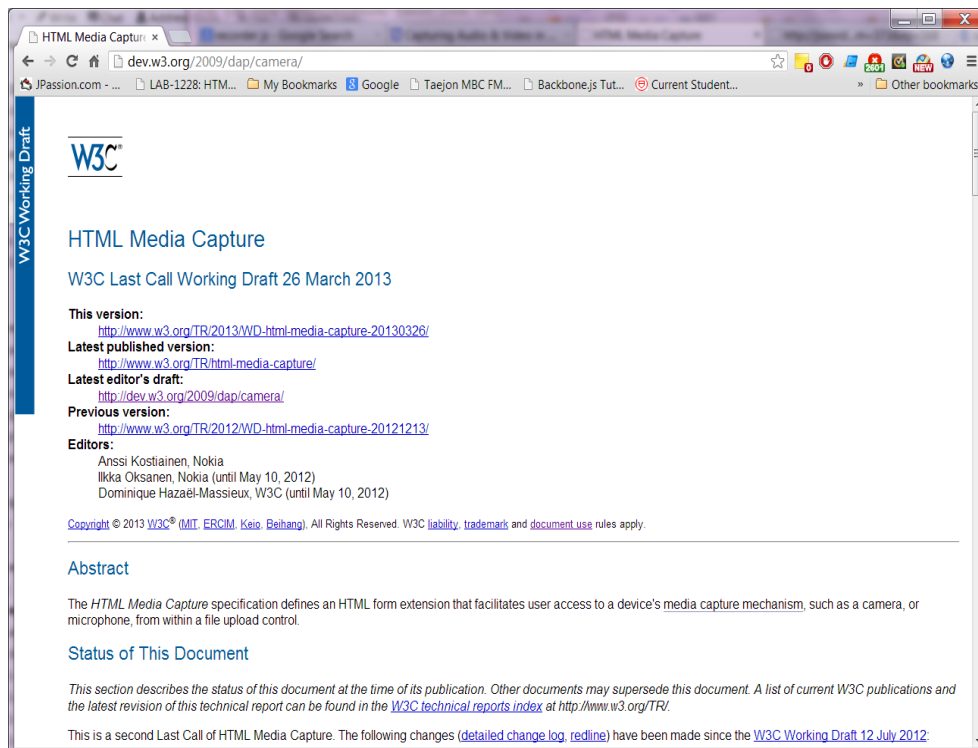
Exercise 6: Advanced Features
1230_html5_media.zip



Future Features

W3C HTML Media Capture

- <http://dev.w3.org/2009/dap/camera/>
- Facilitates user access to a device's media capture mechanism, such as a camera, or microphone,



W3C HTML Media Capture Browser Support

- <http://caniuse.com/#search=media%20capture>

Can I use... Support tables for HTML5, CSS3, SVG and more in desktop and mobile browsers.

Latest update: Three new features added: Shadow DOM, WebP images & Intrinsic width & height (April 3, 2013)

Search: media capture

1 result found

Index Tables

Compatibility tables Browser comparison

Show options ■ = Supported ■ = Not supported ■ = Partially supported ■ = Support unknown

getUserMedia/Stream API - Working Draft Usage stats: Global Support: 46.37%

Method of accessing external device data (such as a webcam video stream). Formerly this was envisioned as the <device> element.

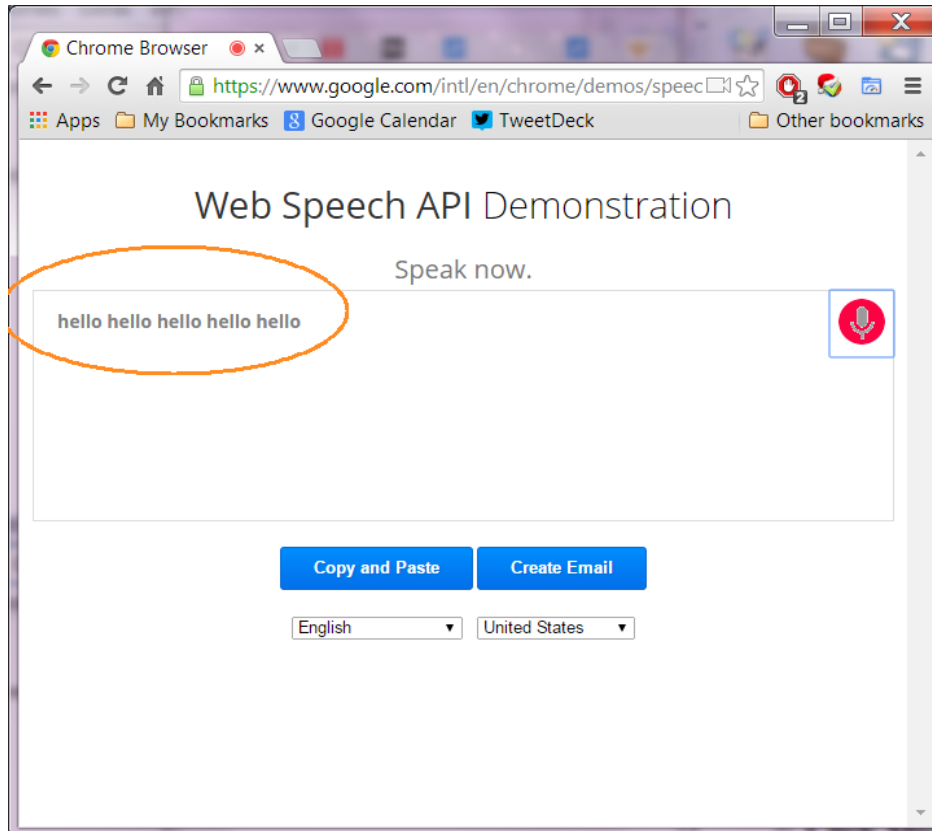
Show all versions	IE	Firefox	Chrome	Safari	Opera	iOS Safari	Opera Mini	Android Browser	Blackberry Browser	
								2.1		
								2.2		
						3.2		2.3		
						4.0-4.1		3.0		
	8.0		24.0	webkit		4.2-4.3		4.0		
	9.0	19.0	25.0	webkit	5.1	5.0-5.1		4.1		
Current	10.0	20.0	26.0	webkit	6.0	12.1	6.0	5.0-7.0	4.2	7.0
Near future		21.0	27.0	webkit						10.0
Farther future		22.0	28.0	webkit						

Notes Known issues (0) Resources (2) Feedback Edit on GitHub

Supported on Chrome for Android under chrome://flags

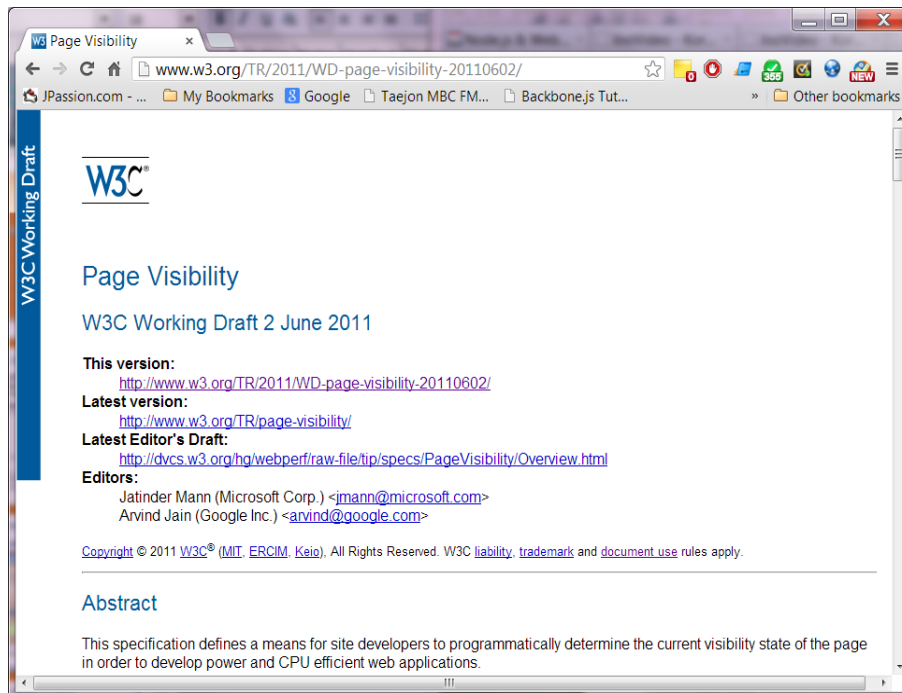
Speech Recognition API for Webkit-enabled Browsers

- `var recognition = new webkitSpeechRecognition();`



Page Visibility

- <http://www.w3.org/TR/2011/WD-page-visibility-20110602/>
- Defines a means for site developers to programmatically determine the current visibility state of the page in order to develop power and CPU efficient web applications.



Lab:

Exercise 7: Future Features 1230_html5_media.zip



Libraries & Frameworks

Libraries

- Video.js
 - > Fixed many cross browser HTML5 bugs or inconsistencies
 - > Added new features that haven't been implemented by all browsers (like fullscreen and subtitles)
 - > Provides consistent JavaScript API for both HTML5, Flash, and other playback technologies
 - > <http://videojs.com/>
- MediaElement.js

HTML5 Media Frameworks

- Popcorn.js (open source)
 - > HTML5 media framework written in JavaScript for filmmakers, web developers, and anyone who wants to create time-based interactive media on the web
 - > Part of Mozilla's Popcorn project
 - > <http://popcornjs.org/>
- Popcorn maker
 - > Popcorn Maker makes it easy to enhance, remix and share web video. Use your web browser to combine video and audio with content from the rest of the web — from text, links and maps to pictures and live feeds.
 - > <https://popcorn.webmaker.org/>

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