



VIDEO & AUDIO FOR WEB

MODUL W4400

PASCAL STOOP

V 1.0


THEMEN

- VIDEO-CODECS FÜR DAS WEB
- VIDEOS KONVERTIEREN MITTELS AME
- HTML5 VIDEO TAG
- VIDEOJS-LIBRARY
- VIDEOS AUF YOUTUBE/VIMEO
- HTML5 AUDIO-TAG & HOWLER.JS-LIBRARY (AUDIO)

HTML5 VIDEO-TAG

```
<video src="media/video.mp4"></video>
```

BROWSERKOMPATIBILITÄT (VIDEO)

Video element  - LS Global 94.79% + 0.15% = 94.94%

Method of playing videos on webpages (without requiring a plug-in). Includes support for the following media properties:
`currentSrc`, `currentTime`, `paused`, `playbackRate`, `buffered`,
`duration`, `played`, `seekable`, `ended`, `autoplay`, `loop`, `controls`, `volume`
& ``muted``

Current aligned Usage relative Date relative Show all

IE	Edge [*]	Firefox	Chrome	Safari	Opera	iOS Safari [*]	Opera Mini [*]	Android Browser [*]	Chrome for Android
			49						
			56			9.2		4.4	
	14	52	57			10.2		4.4.4	
11	15	53	58	10.1	44	10.3	all	56	57
		54	59	TP	45				
		55	60		46				
		56	61						

HTML5 VIDEO-TAG

```
<video controls="controls">
```

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

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

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

Your browser does not support the video tag.

```
</video>
```

WAS IST EIN VIDEO-CODEC?

- ALGORITHMEN-PAAR (ENCODER & DECODER)
- VIDEOKOMPRESSION
- VERSCHLÜSSELUNG

Weitere Infos: http://en.wikipedia.org/wiki/Video_codec

GRUNDLAGEN VIDEO (EUROPA)

- EINZELNE BILDER
- SCHNELL HINTEREINANDER
- DAUMENKINO
- KINO: 24 FPS
- VIDEO (PAL): 25 FPS
- VIDEO (NTSC): 30 FPS



GRUNDLAGEN VIDEO (EUROPA)

- 25 BILDER PRO SEKUNDE
- 1'500 BILDER PRO MINUTE
- 90'000 BILDER PRO STUNDE

● WIE FUNKTIONIERT EIN VIDEO-CODEC?



Quelle: SRF

WICHTIGSTER PARAMETER EINES VERLUSTBEHAFTETEN VIDEO-CODECS?

- BITRATE (Z.B. 3 MBPS)
- DATENMENGE PRO SEKUNDE (MEGABIT PER SECOND)
- DIREKTEN EINFLUSS AUF
 - DATEIGRÖSSE
 - BILDQUALITÄT (ARTEFAKTE)

Weitere Infos: http://en.wikipedia.org/wiki/Video_codec

AUSLÖSUNG VS. BITRATE

SD

720 x 405

1 Mbps

HD

1280 x 720

2 Mbps

Full HD

1920 x 1080

5 Mbps

• ZUSAMMENFASSUNG VIDEO-CODEC

- ENCODER & DECODER
- VIDEOKOMPRESSION
- BITRATE (DATEIGRÖSSE & BILDQUALITÄT)

Weitere Infos: http://en.wikipedia.org/wiki/Video_codec

ÜBERSICHT GELÄUFIGE VIDEO-CODECS

CODEC

WMA-CODECS

DIVX 3/4/5, MPEG 4 PART 2, XVID

DIVX 7

DIVX 7, MATROSKA

QUICKTIME, APPLE PRORES

MPEG 1, MPEG 2

MPEG 4 PART 10/H.264

OGG VORBIS

REAL MEDIA CODECS

RADIUS CINEPAK

SORENSEN

DATEIENDUNG

ASF, WMA, WMV

AVI

DIVX

MKA, MKV

MOV

MPG, MPEG, VOB, M1V, MP2, MP3

MP4, MOV

OGG, OGV

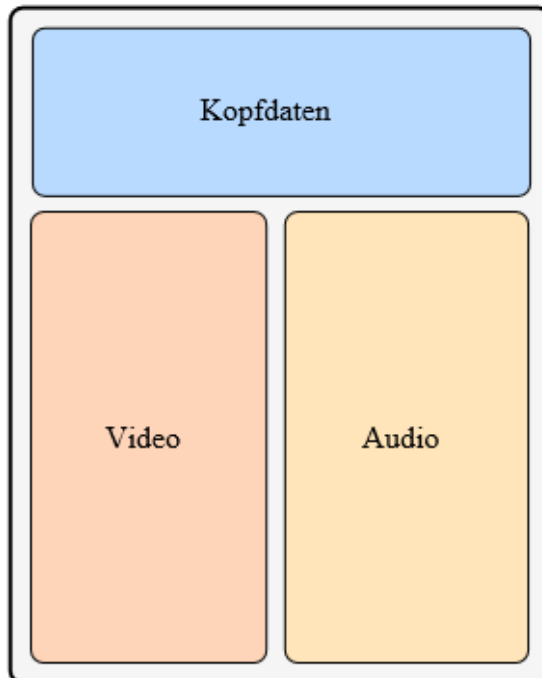
RA, RAM, RM, RV

AVI, MOV

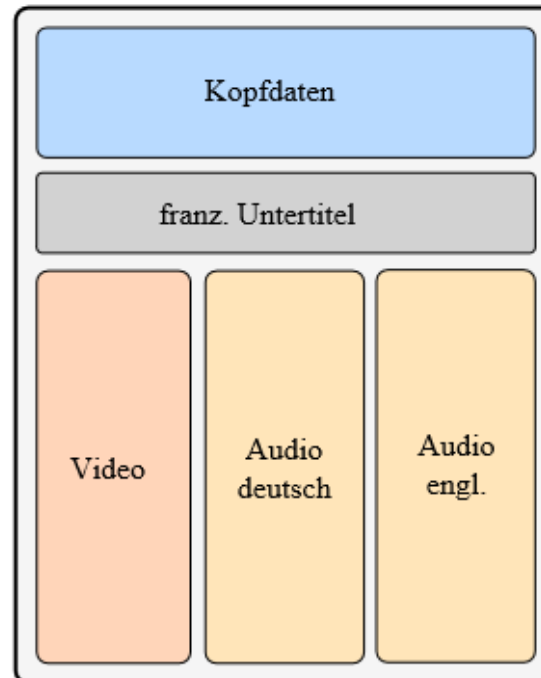
MOV, AVI, FLV

CONTAINER-FORMATE

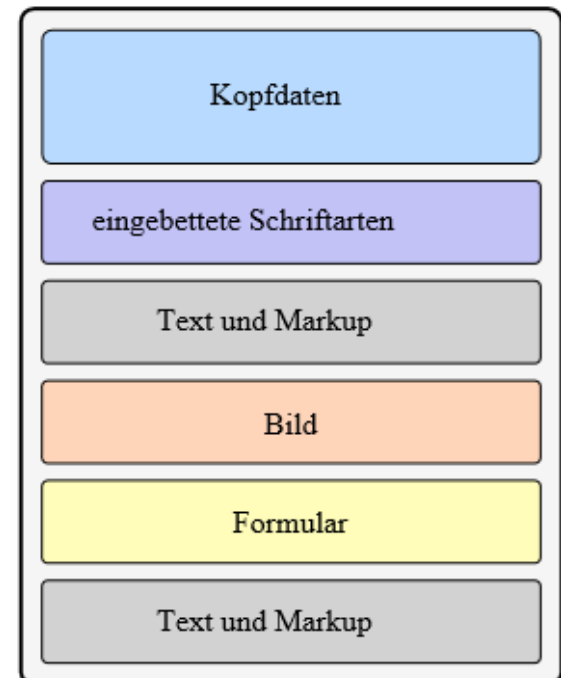
z. B. AVI-Datei



z. B. Datei mit Matroska-Container



z. B. PDF-Datei



ÜBERSICHT GELÄUFIGE VIDEO-CODECS

CODEC

WMA-CODECS

DIVX 3/4/5, MPEG 4 PART 2, XVID

DIVX 7

DIVX 7, MATROSKA

QUICKTIME, APPLE PRORES

MPEG 1, MPEG 2

MPEG 4 PART 10/H.264

OGG VORBIS

REAL MEDIA CODECS

RADIUS CINEPAK

SORENSEN

Quelle: http://de.wikipedia.org/wiki/Liste_der_Videocodecs

DATEIENDUNG

ASF, WMA, WMV

AVI

DIVX

MKA, MKV

MOV

MPG, MPEG, VOB, M1V, MP2, MP3

MP4, MOV

OGG, OGV

RA, RAM, RM, RV

AVI, MOV

MOV, AVI, FLV

WEB-VIDEO CODECS

- MP4 (H.264) (PATENTIERT)
- OGG (THEORA) (BSD-LIZENZ)
- WEBM (VP8, VP9) (BSD-LIZENZ)

BROWSERKOMPATIBILITÄT (H.264)

MPEG-4/H.264 video format - OTHER

Global

84.95% + 9.7% = 94.65%

Commonly used video compression format.

Current aligned Usage relative Date relative Show all

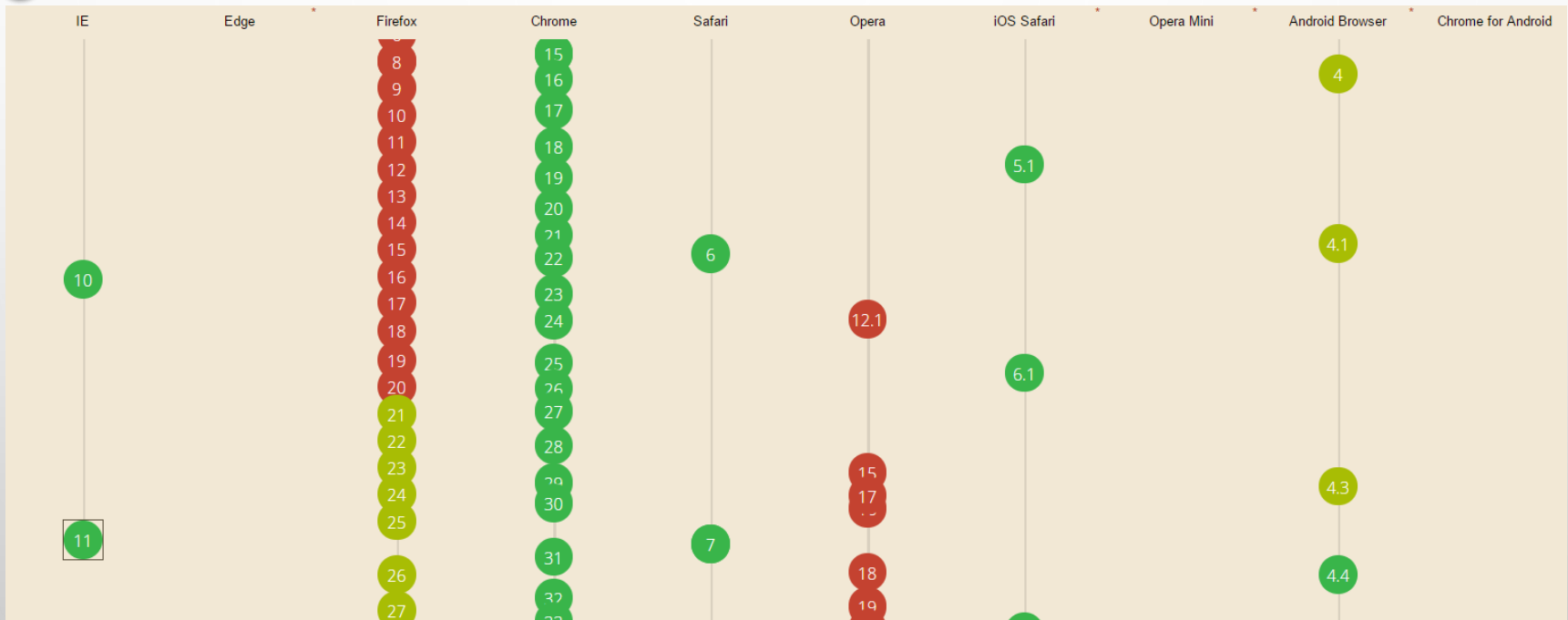
IE	Edge *	Firefox	Chrome	Safari	Opera	iOS Safari *	Opera Mini *	Android Browser *	Chrome for Android
			49						
			56			9.2		4.4	
	14	52	57			10.2		4.4.4	
11	15	53	58	10.1	44	10.3	all	56	57
		54	59	TP	45				
		55	60		46				
		56	61						

Notes Known issues (3) Resources (3) Feedback

Firefox supports H.264 on Windows 7 and later since version 21. Firefox supports H.264 on Linux since version 26 if the appropriate gstreamer plug-ins are installed.

Partial support for older Firefox versions refers to the lack of support in OS X & some non-Android Linux platforms.

BROWSERKOMPATIBILITÄT (H.264)



STAND JUNI 2017; QUELLE: [HTTP://CANIUSE.COM/#FEAT=MPEG4](http://caniuse.com/#feat=mpeg4)

BROWSERKOMPATIBILITÄT (OGG)

Ogg/Theora video format - OTHER

Global

43.03%

Free lossy video compression format.

Current aligned Usage relative Date relative Show all

IE	Edge *	Firefox	Chrome	Safari	Opera	iOS Safari *	Opera Mini *	Android Browser *	Chrome for Android
			49						
			56			9.2		4.4	
	14	52	57			10.2		4.4.4	
11	15	53	58	10.1	44	10.3	all	56	57
		54	59	TP	45				
		55	60		46				
		56	61						

Notes Known issues (0) Resources (4) Feedback

MS Edge status: Not currently planned (Theora Video Codec) Under Consideration (OGG Container)

BROWSERKOMPATIBILITÄT (WEBM)

WebM video format OTHER

Global

70.73% + 7.64% = 78.38%

Multimedia format designed to provide a royalty-free, high-quality open video compression format for use with HTML5 video. WebM supports the video codec VP8 and VP9.

Current aligned Usage relative Date relative Show all

IE	Edge *	Firefox	Chrome	Safari	Opera	iOS Safari *	Opera Mini *	Android Browser *	Chrome for Android
			49						
			56			9.2		4.4	
	14	52	57			10.2		4.4.4	
11	15	53	58	10.1	44	10.3	all	56	57
		54	59	TP	45				
		55	60		46				
		56	61						

Notes Known issues (0) Resources (9) Feedback

Will work in IE9+ and Safari/MacOSX provided the user has the WebM codecs installed. Partial support indicates that at least one codec is supported but not all. MS Edge supports VP9 from MSE sources, also progressive sources are not supported by Edge.

HTML5 VIDEO-TAG

```
<video controls="controls">
```

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

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

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

Your browser does not support the video tag.

```
</video>
```

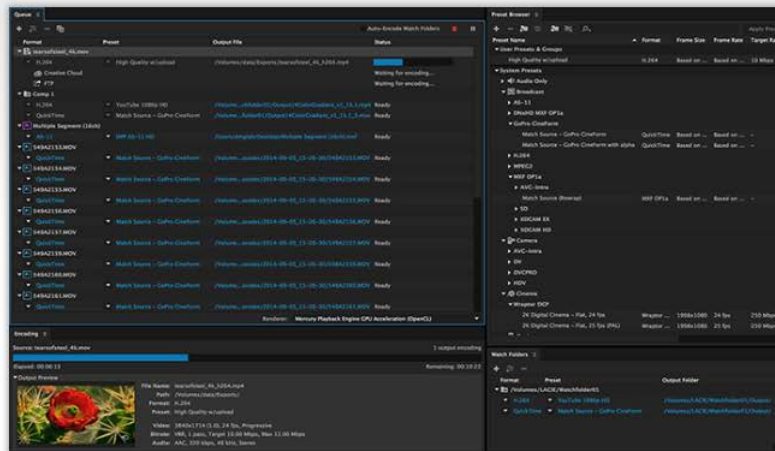
ADOBE MEDIA ENCODER

[HTTP://CREATIVE.ADOBE.COM/PRODUCTS/MEDIA-ENCODER](http://creative.adobe.com/products/media-encoder)



Media Encoder CC

Testversion herunterladen



Mit Media Encoder CC erstellen Sie brillante Videoinhalte fürs Internet, für Übertragungen oder fürs Kino. Eine enge Integration mit Premiere Pro CC bietet einen nahtlosen Arbeitsablauf, einschließlich praktischer Vorgaben für zahlreiche Formate. Und dank der Hintergrundkodierung können Sie weiterarbeiten, während Ihre Dateien gerendert werden.

[Weitere Informationen](#) | [Hilfe](#)

HTML5 <VIDEO> - ATTRIBUTE

- autoplay = "autoplay"
- controls = "controls"
- width = "480" (*Angabe in Pixel*)
- height = "230" (*Angabe in Pixel*)
- loop= "loop"
- muted= "muted"
- poster= "media/startImage.jpg" (*Pfad zum Startbild*)
- preload= "auto|metadata|none"
- src= "media/video.mp4" (*Pfad zum Video*)

HTML5 <SOURCE> - ATTRIBUTE

- src = "media/video.mp4" (*Pfad zum Video*)
- type = "video/mp4" (*Angabe als Media-Type*)
- media = "all" (*Angabe als media_query*)
- *Meist verwendete Media-Types:*
 - video/ogg
 - video/mp4
 - video/webm

HTML5 VIDEO

```
<video controls="controls">
```

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

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

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

Your browser does not support the video tag.

```
</video>
```

VIDEO SEEKING (SCROLLING)

- SERVER MUSS “BYTE SERVING” UNTERSTÜTZEN
 - HTTP STATUSCODE 206 (PARTIAL CONTENT)
- UNTERSCHIED: CHROME / FIREFOX
 - NUR STREAMING / DOWNLOAD GESAMTE VIDEODATEI
- LINKS:
 - [HTTPS://EN.WIKIPEDIA.ORG/WIKI/BYTE_SERVING](https://en.wikipedia.org/wiki/Byte_Serving)
 - [HTTPS://EN.WIKIPEDIA.ORG/WIKI/LIST_OF_HTTP_STATUS_CODES](https://en.wikipedia.org/wiki/List_of_HTTP_status_codes)

HTML5 VIDEO MIT FLASH-FALLBACK

```
<video controls="controls" width="600" height="400">
  <source src="video.mp4" type="video/mp4">
  <source src="video.ogv" type="video/ogg">
  <source src="video.webm" type="video/webm">
  <object type="application/x-shockwave-flash" data="flashfox.swf"
    width="600" height="400">
    <param name="movie" value="flashfox.swf" />
    <param name="allowFullScreen" value="true" />
    <param name="wmode" value="transparent" />
    <param name="flashVars" value="controls=true
      &amp;src=http%3A%2F%2Fwww.mydomain.ch%2Fvideo.mp4" />
  </object>
</video>
```

WEITERE INFOS: [HTTP://V4E.THEWIKIES.COM/](http://v4e.thewikies.com/)

UNTERTITEL MIT HTML5-VIDEO

<track> -Tag

- Attribute
 - default = "default"
 - kind = "subtitles"
 - label = "Deutsch"
 - src = "subtitles_de.vtt"
 - srclang = "de"

UNTERTITEL MIT HTML5-VIDEO

```
<video controls="controls">  
  <source src="video.mp4" type="video/mp4">  
  <source src="video.ogv" type="video/ogg">  
  <source src="video.webm" type="video/webm">  
  <track src="subtitles_en.vtt" kind="subtitles"  
    srclang="en" label="English" default="default">  
  <track src="subtitles_de.vtt" kind="subtitles"  
    srclang="de" label="Deutsch">  
</video>
```

WEBVTT

- Web Video Text Track
- Text-Datei

WEBVTT

Header/Number (*not visible*)

00:00:02.000 --> 00:00:07.000

Subtitle Text

WEITERE INFOS:

[HTTP://DEV.W3.ORG/HTML5/WEBVTT/#THE-WEBVTT-FILE-FORMAT](http://dev.w3.org/html5/webvtt/#the-webvtt-file-format)

[HTTP://EDUTECHWIKI.UNICE.CH/EN/WEBVTT](http://edutechwiki.unice.ch/en/webvtt)

WEBVTT FORMAT

WEBVTT

Header/Number (*not visible*)

00:00:02.000 --> 00:00:07.000

Subtitle Text 1

Header/Number (*not visible*)

00:00:10.000 --> 00:00:15.000

Subtitle Text 2

WEITERE INFOS:

[HTTP://DEV.W3.ORG/HTML5/WEBVTT/#THE-WEBVTT-FILE-FORMAT](http://dev.w3.org/html5/webvtt/#the-webvtt-file-format)

[HTTP://EDUTECHWIKI.UNICE.CH/EN/WEBVTT](http://edutechwiki.unice.ch/en/webvtt)

STYLING SUBTITLES

::cue *(aktuell nur Chrome, Opera, Safari)*

- color
- opacity
- visibility
- text-decoration
- text-shadow
- background shorthand properties
- outline shorthand properties
- font shorthand properties, including line-height
- white-space

STYLING SUBTITLES

Mit Klassen *(aktuell nur Chrome, Opera, Safari)*

```
<style>
::cue(.red){ color: red; }
::cue(.background-yellow){ background-color: yellow; }
</style>
```

Header/Number *(not visible)*

00:00:02.000 --> 00:00:07.000

```
<c.red.background-yellow>my styled cue</c>
```

HTML VIDEO DOM REFERENCE

- Media-Methoden
- Media-Properties
- Media-Events
- http://www.w3schools.com/tags/ref_av_dom.asp

● WEBRTC (WEB REAL-TIME COMMUNICATIONS)

- Live-Streams
- Webcams
- `MediaDevices.getUserMedia()`-Method
 - Anfordern einer Berechtigung

```
var promise =  
navigator.mediaDevices.getUserMedia(constraints);
```

https://developer.mozilla.org/en-US/docs/Web/API/WebRTC_API

URHEBERRECHTE BILD/TON

Bild

- Nur eigen gefilmtes Material verwenden
- Bei Fremdmaterial Rechte sichern (schriftlich)

Audio

- Eigene Kompositionen
- Fremdkompositionen nur mit entsprechenden Rechten (Idee: Sound-Alikes)
- GEMA, SUIA, ...

LINKS GEMA / SUISA-FREIE MUSIK

- www.musicfox.com
- www.audiojungle.net
- www.premiumbeat.com

YOUTUBE



- Google / Youtube-Account immer kostenlos
- Jede Art von Videos hochladen
- Youtube-Channel
- Möglichkeit von Live-Streams
- Blog für jedes Video
- Video kann online gering angepasst werden
- Anbindung an Social Medias
- Integration auf eigener Webseite

VIMEO



- Kostenlose & kostenpflichtige Abos
- Zulassungskriterien für Videos
- Vimeo-Kanäle, Live-Stream
- Blog/Community für jedes Video
- Umfangreiche Rechteeinstellungen (inkl. Passwort-Schutz)
- Anbindung an Social Medias
- Integration auf eigener Webseite



YOUTUBE VS. VIMEO



YOUTUBE

- KEINE KRITERIEN FÜR VIDEO-UPLOAD (AUSSER URHEBERRECHTE)
- ACCOUNT KOSTENLOS
- ZIELPUBLIKUM: ALLE

VIMEO

- STRIKTERE KRITERIEN FÜR VIDEO-UPLOAD
- KOSTENLOSE & KOSTENPFLICHTE ACCOUNTS
- PASSWORT-SCHUTZ-FUNKTION
- ZIELPUBLIKUM: KÜNSTLER, PRODUKTIONSFIRMEN

RESPONSIVE INTEGRATION <IFRAME>

```
<iframe width="560" height="315"  
src="https://www.youtube.com/embed/qIQpatuIMLQ?rel=0&showinfo=0"  
frameborder="0" allowfullscreen></iframe>
```

RESPONSIVE INTEGRATION <IFRAME>

```
<div class="video-container">
```

```
<iframe width="560" height="315"
```

```
src="https://www.youtube.com/embed/qlQpatuIMLQ?rel=0&showinfo=0"
```

```
frameborder="0" allowfullscreen></iframe>
```

```
</div>
```

RESPONSIVE INTEGRATION <IFRAME>

```
.video-container {  
  position: relative;  
  padding-bottom: 56.25%;  
  padding-top: 30px;  
  height: 0;  
  overflow: hidden;  
}
```

```
.video-container iframe, .video-container object, .video-container embed {  
  position: absolute;  
  top: 0; left: 0; width: 100%; height: 100%;  
}
```

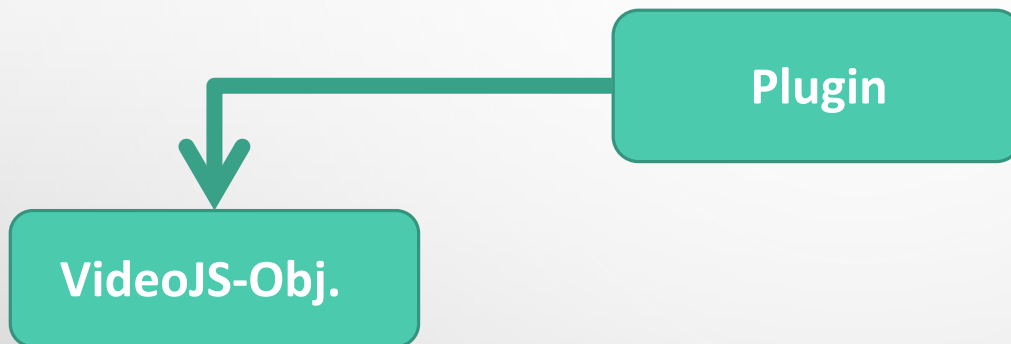
WEITERE INFOS: [HTTP://AVEXDESIGNS.COM/RESPONSIVE-YOUTUBE-EMBED/](http://avexdesigns.com/responsive-youtube-embed/)

VIDEOJS.COM



- Kostenlose Library
- HTML5 Video & Flash-Fallback
- Einfache grafische Anpassung des Players
- Full-Screen-Modus
- Einsatz von Untertiteln & grafische Anpassung
- JS-API sowie einfache Plugin-Programmierung

PLUGINS SCHREIBEN



```
data-setup='{ "plugins": {  
  "zoomrotate": { "rotate": "0", "zoom": "1" }  
} }'
```

HTML5 AUDIO-TAG

```
<audio src="media/audio.mp3"></audio>
```

BROWSERKOMPATIBILITÄT (AUDIO)

Audio element - LS

Global

94.79% + 0.15% = 94.94%

Method of playing sound on webpages (without requiring a plugin). Includes support for the following media properties: `currentSrc`, `currentTime`, `paused`, `playbackRate`, `buffered`, `duration`, `played`, `seekable`, `ended`, `autoplay`, `loop`, `controls`, `volume` & `muted`

Current aligned

Usage relative

Date relative

Show all

IE	Edge *	Firefox	Chrome	Safari	Opera	iOS Safari *	Opera Mini *	Android Browser *	Chrome for Android
			49						
			56						
			57			9.2		4.4	
	14	52	58			10.2		4.4.4	
11	15	53	59	10.1	45	10.3	all	56	59
	16	54	60	11	46	11			
		55	61	TP	47				
		56	62						

Notes

Sub-features (6)

Known issues (3)

Resources (9)

Feedback

STAND JUNI 2017; QUELLE: [HTTP://CANIUSE.COM/#FEAT=AUDIO](http://caniuse.com/#feat=audio)

WEB-AUDIO CODECS

- MP3 (SEIT 4/2017 KEINE LIZENZ BENÖTIGT)
 - OGG (KEINE LIZENZ BENÖTIGT)
 - WAV (PCM) (KEINE LIZENZ BENÖTIGT)
 - AAC (SEIT 9/2010 KEINE LIZENZ BENÖTIGT)
- FÜR NORMALEN GEBRAUCH IM WEB

BROWSERKOMPATIBILITÄT (MP3)

MP3 audio format OTHER Global 94.69% + 0.17% = 94.86%

Popular lossy audio compression format

Current aligned Usage relative Date relative Show all

IE	Edge *	Firefox	Chrome	Safari	Opera	iOS Safari *	Opera Mini *	Android Browser *	Chrome for Android
			49						
			56						
			57						
	14	52	58			9.2		4.4	
						10.2		4.4.4	
11	15	53	59	10.1	45	10.3	all	56	59
	16	54	60	11	46	11			
		55	61	TP	47				
		56	62						

Notes Known issues (0) Resources (2) Feedback

Support refers to this format's use in the `audio` element, not other conditions.

BROWSERKOMPATIBILITÄT (OGG)

Ogg Vorbis audio format - OTHER

Global

77.08%

Vorbis is a free and open source audio format, most commonly used with the Ogg container.

Current aligned

Usage relative

Date relative

Show all

IE	Edge *	Firefox	Chrome	Safari	Opera	iOS Safari *	Opera Mini *	Android Browser *	Chrome for Android
			49						
			56						
			57						
	14	52	58			9.2		4.4	
						10.2		4.4.4	
11	15	53	59	10.1	45	10.3	all	56	59
	16	54	60	11	46	11			
		55	61	TP	47				
		56	62						

Notes

Known issues (0)

Resources (4)

Feedback

Support refers to this format's use in the `audio` element, not other conditions.

MS Edge status: Under Consideration (Vorbis Audio Codec) Under Consideration (OGG Container)

BROWSERKOMPATIBILITÄT (WAV)

Wav audio format - OTHER Global 90.79%

Waveform Audio File Format, aka WAV or WAVE, a typically uncompressed audio format.

Current aligned
Usage relative
Date relative
Show all

IE	Edge [*]	Firefox	Chrome	Safari	Opera	iOS Safari [*]	Opera Mini [*]	Android Browser [*]	Chrome for Android
			49						
			56						
			57			9.2		4.4	
	14	52	58			10.2		4.4.4	
11	15	53	59	10.1	45	10.3	all	56	59
	16	54	60	11	46	11			
		55	61	TP	47				
		56	62						

Notes
Known issues (0)
Resources (3)
Feedback

Support refers to this format's use in the `audio` element, not other conditions.

BROWSERKOMPATIBILITÄT (AAC)

AAC audio file format - OTHER Global 88.27% + 6.01% = 94.27%

Advanced Audio Coding format, designed to be the successor format to MP3, with generally better sound quality.

Current aligned
Usage relative
Date relative
Show all

IE	Edge *	Firefox	Chrome	Safari	Opera	iOS Safari *	Opera Mini *	Android Browser *	Chrome for Android
			49						
			56						
			57			9.2		4.4	
	14	ⁱ 52	58			10.2		4.4.4	
11	15	ⁱ 53	59	10.1	45	10.3	all	56	59
	16	ⁱ 54	60	11	46	11			
		ⁱ 55	61	TP	47				
		ⁱ 56	62						

Notes
Known issues (0)
Resources (2)
Feedback

Support refers to this format's use in the **audio** element, not other conditions.

ⁱ Partial support in Firefox refers to only supporting AAC in an MP4 container and only when the operating system already has the codecs installed.

HTML AUDIO

`<audio controls>`

`<source src="test.ogg" type="audio/ogg">`

`<source src="test.mp3" type="audio/mpeg">`

Your browser does not support the audio element.

`</audio>`

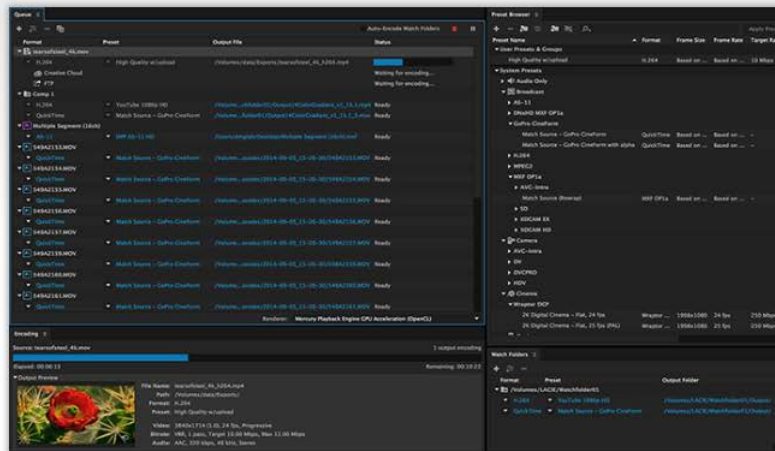
ADOBE MEDIA ENCODER

[HTTP://CREATIVE.ADOBE.COM/PRODUCTS/MEDIA-ENCODER](http://creative.adobe.com/products/media-encoder)



Media Encoder CC

Testversion herunterladen



Mit Media Encoder CC erstellen Sie brillante Videoinhalte fürs Internet, für Übertragungen oder fürs Kino. Eine enge Integration mit Premiere Pro CC bietet einen nahtlosen Arbeitsablauf, einschließlich praktischer Vorgaben für zahlreiche Formate. Und dank der Hintergrundkodierung können Sie weiterarbeiten, während Ihre Dateien gerendert werden.

[Weitere Informationen](#) | [Hilfe](#)

HTML5 <AUDIO> - ATTRIBUTE

- `autoplay = "autoplay"`
- `controls = "controls"`
- `loop= "loop"`
- `muted= "muted"`
- `preload= "auto|metadata|none"`
- `src= "media/audio.mp3"`

HTML5 <SOURCE> - ATTRIBUTE

- src = "media/audio.mp3"
- type = "audio/mpeg" (*Angabe als Media-Type*)
- media = "all" (*Angabe als media_query*)
- *Meist verwendete Media-Types:*
 - audio/mpeg
 - audio/ogg
 - audio/wav
 - audio/aac

HTML AUDIO

`<audio controls>`

`<source src="test.ogg" type="audio/ogg">`

`<source src="test.mp3" type="audio/mpeg">`

Your browser does not support the audio element.

`</audio>`

HOWLER.JS LIBRARY



- Web Audio API – Fallback to HTML5 Audio
- Abspielen mehreren Sounds gleichzeitig
- Kontrolle über Caching
- Sprite-Support

WEITERE INFOS: [HTTPS://GITHUB.COM/GOLDFIRE/HOWLER.JS](https://github.com/goldfire/howler.js)

HOWLER.JS LIBRARY



```
<script src="/path/to/howler.js"></script>  
<script>  
  var sound = new Howl({  
    src: ['sound.ogg', 'sound.mp3']  
  });  
</script>
```

HOWLER.JS LIBRARY



```
var sound = new Howl({  
  src: ['sound.ogg', 'sound.mp3', 'sound.wav'],  
  autoplay: true,  
  loop: true,  
  volume: 0.5,  
  onend: function() {  
    console.log('loaded!');  
  }  
});
```

HOWLER.JS LIBRARY



```
var sound = new Howl({  
  src: ['sounds.ogg', 'sounds.mp3'],  
  sprite: {  
    blast: [0, 3000],  
    laser: [4000, 1000],  
    winner: [6000, 5000]  
  }  
});
```

```
// Shoot the laser!  
sound.play('laser');
```

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www.howlerjs.com

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