# WebM

## Plug-In for Premiere Pro

by Brendan Bolles, www.fnordware.com

Version 1.1.0
June 15, 2017

## About

WebM is a free-as-in-beer, free-as-in-speech video format developed by Google, based on technology they got when they acquired On2 Technologies. The now-free VP8/VP9 video codecs combine with the Vorbis and Opus audio codecs, wrapped up in the Matroska container to make a high-quality, royalty-free movie format. It's really quite awesome.

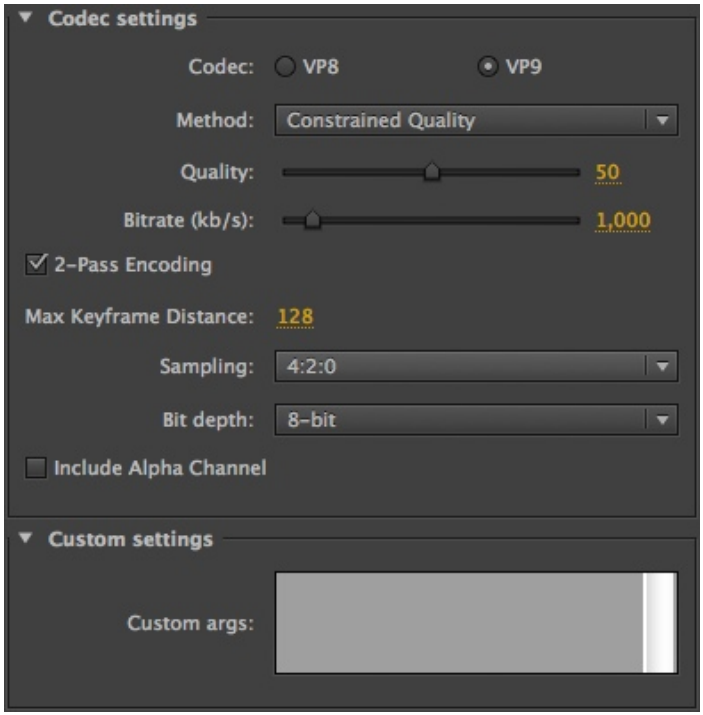
## Usage

Go to File > Export > Media and choose WebM as the format to encode WebM video. WebM should also appear as a supported format in Adobe Media Encoder. You'll be able to import .webm files into each.

Most parameters should be pretty self-explanatory. For quality sliders, higher quality means higher image/audio quality and bigger files. (For some reason, FFmpeg uses a quality scale where 0 is the highest quality. Not this plug-in.)

## Video Codecs

Two video codecs are supported by WebM: VP8 and its successor VP9. VP8's quality for a certain bitrate (i.e. coding efficiency) is roughly the same as H.264, while VP9 is a next-generation codec akin to H.265. VP9 enjoys better encoding efficiency but at the cost of much longer encode times.




VP9 supports video encoded with 10/12-bits or 4:2:2/4:4:4 sampling, but these are not supported in many players.

## Video Encoding Methods

- **Constant Quality** Compress frames to achieve a certain level of quality, regardless of file size. Bigger values for Quality mean better looking images and bigger files.
- **Constrained Quality** Like Constant Quality, but also lets you specify a bitrate target that the encoder will try to stay within.
- **Constant Bitrate** Compresses frames to a certain file size regardless of image content. Frames with a lot of detail may look worse than frames with less.
- **Variable Bitrate** Tries to achieve the indicated bitrate, but will allocate more bits to frames with a lot of detail, less to frames that don't need it as much.

Two-pass encoding can be used with any of the encoding methods, and should yield better results at the expense of the extra time it takes to complete the first pass. Two-pass is recommended for the Variable Bitrate method, less necessary for the other methods.

### Alpha Channel

The plug-in can write (but not read) an alpha channel. Alpha channel support is an unofficial standard and most players do not support it. When using this option be careful to set a good value for Max Keyframe Distance, which will in fact become the locked keyframe interval.

### Custom Arguments

The VPX encoder supports many different options, far too many to include in Premiere's interface. There is a text field provided for entering additional options, so you might put something like "-t 4 --bias-pct=80" in there. Much more information here:

http://www.webmproject.org/docs/encoder-parameters

The flags are taken from the sample "vpxenc" utility that comes with libvpx. Here are the supported arguments printed right from vpxenc, many of which I have no clue what they do:

```
Options:
  -d <arg>, --deadline=<arg>                Deadline per frame (usec)
            --best                          Use Best Quality Deadline
            --good                          Use Good Quality Deadline
            --rt                            Use Realtime Quality Deadline

Encoder Global Options:
  -t <arg>, --threads=<arg>                 Max number of threads to use
            --lag-in-frames=<arg>           Max number of frames to lag

Rate Control Options:
            --drop-frame=<arg>              Temporal resampling threshold (buf %)
            --resize-allowed=<arg>          Spatial resampling enabled (bool)
```

```
            --resize-up=<arg>               Upscale threshold (buf %)
            --resize-down=<arg>             Downscale threshold (buf %)
            --target-bitrate=<arg>          Bitrate (kbps)
            --min-q=<arg>                   Minimum (best) quantizer
            --max-q=<arg>                   Maximum (worst) quantizer
            --undershoot-pct=<arg>          Datarate undershoot (min) target (%)
            --overshoot-pct=<arg>           Datarate overshoot (max) target (%)
            --buf-sz=<arg>                  Client buffer size (ms)
            --buf-initial-sz=<arg>          Client initial buffer size (ms)
            --buf-optimal-sz=<arg>          Client optimal buffer size (ms)

Twopass Rate Control Options:
            --bias-pct=<arg>                CBR/VBR bias (0=CBR, 100=VBR)
            --minsection-pct=<arg>          GOP min bitrate (% of target)
            --maxsection-pct=<arg>          GOP max bitrate (% of target)

Keyframe Placement Options:
            --kf-min-dist=<arg>             Minimum keyframe interval (frames)
            --kf-max-dist=<arg>             Maximum keyframe interval (frames)
            --disable-kf                    Disable keyframe placement

VP8 Specific Options:
            --cpu-used=<arg>                CPU Used (-16..16)
            --auto-alt-ref=<arg>            Enable automatic alt reference frames
            --noise-sensitivity=<arg>       Noise sensitivity (frames to blur)
            --sharpness=<arg>               Filter sharpness (0-7)
            --static-thresh=<arg>           Motion detection threshold
            --token-parts=<arg>             Number of token partitions to use, log2
            --arnr-maxframes=<arg>          AltRef Max Frames
            --arnr-strength=<arg>           AltRef Strength
            --arnr-type=<arg>               AltRef Type
            --tune=<arg>                    Material to favor (psnr or ssim)
            --cq-level=<arg>                Constrained Quality Level
            --max-intra-rate=<arg>          Max I-frame bitrate (pct)
            --screen-content-mode=<arg>     Screen content mode
```

```
VP9 Specific Options:
            --cpu-used=<arg>                CPU Used (-16..16)
            --auto-alt-ref=<arg>            Enable automatic alt reference frames
            --noise-sensitivity=<arg>       Noise sensitivity (frames to blur)
            --sharpness=<arg>               Filter sharpness (0-7)
            --static-thresh=<arg>           Motion detection threshold
            --tile-columns=<arg>            Number of tile columns to use, log2
            --tile-rows=<arg>               Number of tile rows to use, log2
            --arnr-maxframes=<arg>          AltRef Max Frames
            --arnr-strength=<arg>           AltRef Strength
            --arnr-type=<arg>               AltRef Type
            --tune=<arg>                    Material to favor (psnr or ssim)
            --cq-level=<arg>                Constrained Quality Level
            --max-intra-rate=<arg>          Max I-frame bitrate (pct)
            --lossless=<arg>                Lossless mode
            --frame-parallel=<arg>          Enable frame parallel decodability features
            --aq-mode=<arg>                 Adaptive quantization mode (0: off (default),
                                                        1: variance 2: complexity,
                                                        3: cyclic refresh)
            --frame_boost=<arg>             Enable frame periodic boost (0:off (default), 1:on)
            --noise-sensitivity=<arg>       Noise sensitivity (frames to blur)
            --tune-content=<arg>            Tune content type (default or screen)
            --color-space=<arg>             The color space of input content:
                                                    unknown, bt601, bt709, smpte170,
                                                    smpte240, bt2020, reserved, sRGB
            --color-range=<arg>             0: 16-235, 1: 0-255
            --min-gf-interval=<arg>         min gf/arf frame interval
            --max-gf-interval=<arg>         max gf/arf frame interval
            --target-level=<arg>            converted to float: 15 = 1.5 (whatever that means)
            --row-mt=<arg>                  row-based multithreading
```

When running VP9, the plug-in automatically applies --cpu-used=2, although you can override it with whichever value you like. The libvpx default --cpu-used=0 will take a lot longer to encode, but should eke out some better image quality.

### Audio Codecs

As with video, WebM supports two audio codecs: Vorbis (older, more widely supported) and Opus (newer, better quality). However, unlike VP9 you probably won't notice Opus taking much longer to encode.

## Acknowledgements

Thanks to the many, many developers who have contributed to the codecs used in WebM. Their work makes up the vast majority of the code in this plug-in!

Thanks to my friends at Adobe for being always being supportive of plug-ins like this one. Special thanks to Tom Nord who helped with the presets and has been a great cheerleader within Adobe.

Thanks to Matt Frost and Yaowu Xu at Google for all their help.

Thanks to Dan Garcia and Brian Barsky at UC Berkeley for supporting my computer graphics habit early on.

## History

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|---|---|---|
| 1.1 | 15 June 2017 | Alpha channels, bit depths, sampling |
| 1.0 | 13 April 2015 | First official release |
| 0.5b1 | 6 June 2013 | First beta |

## Details

### System Requirements

The WebM plug-in is built with the Premiere CS5 SDK and should work in any later version.

### Open Source

Like WebM itself, this plug-in is open source. See the code and participate here: http://github.com/fnordware/AdobeWebM

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