

FFmpeg Formats Documentation

Table of Contents

- 1 Description
- 2 Format Options
 - 2.1 Format stream specifiers
- 3 Demuxers
 - 3.1 applehttp
 - 3.2 apng
 - 3.3 asf
 - 3.4 concat
 - 3.4.1 Syntax
 - 3.4.2 Options
 - 3.5 flv
 - 3.6 libgme
 - 3.7 libquvi
 - 3.8 gif
 - 3.9 image2
 - 3.9.1 Examples
 - 3.10 mpegts
 - 3.11 rawvideo
 - 3.12 sbg
 - 3.13 tedcaptions
- 4 Muxers
 - 4.1 aiff
 - 4.1.1 Options
 - 4.2 crc
 - 4.2.1 Examples
 - 4.3 framecrc
 - 4.3.1 Examples
 - 4.4 framemd5
 - 4.4.1 Examples
 - 4.5 gif
 - 4.6 hls
 - 4.6.1 Options
 - 4.7 ico
 - 4.8 image2
 - 4.8.1 Examples
 - 4.8.2 Options
 - 4.9 matroska
 - 4.9.1 Metadata
 - 4.9.2 Options

- 4.10 md5
- 4.11 mov, mp4, ismv
 - 4.11.1 Options
 - 4.11.2 Example
- 4.12 mp3
- 4.13 mpegts
 - 4.13.1 Options
 - 4.13.2 Example
- 4.14 null
- 4.15 nut
- 4.16 ogg
- 4.17 segment, stream_segment, ssegment
 - 4.17.1 Options
 - 4.17.2 Examples
- 4.18 smoothstreaming
- 4.19 tee
 - 4.19.1 Examples
- 4.20 webm_dash_manifest
 - 4.20.1 Options
 - 4.20.2 Example
- 5 Metadata
- 6 See Also
- 7 Authors

1 Description

This document describes the supported formats (muxers and demuxers) provided by the libavformat library.

2 Format Options

The libavformat library provides some generic global options, which can be set on all the muxers and demuxers. In addition each muxer or demuxer may support so-called private options, which are specific for that component.

Options may be set by specifying *-option value* in the FFmpeg tools, or by setting the value explicitly in the AVFormatContext options or using the `libavutil/opt.h` API for programmatic use.

The list of supported options follows:

```
avioflags flags (input/output)
```

Possible values:

‘direct’

Reduce buffering.

`probesize integer (input)`

Set probing size in bytes, i.e. the size of the data to analyze to get stream information. A higher value will allow to detect more information in case it is dispersed into the stream, but will increase latency. Must be an integer not lesser than 32. It is 5000000 by default.

`packetsize integer (output)`

Set packet size.

`fflags flags (input/output)`

Set format flags.

Possible values:

‘ignidx’

Ignore index.

‘genpts’

Generate PTS.

‘nofillin’

Do not fill in missing values that can be exactly calculated.

‘noparse’

Disable AVParsers, this needs +nofillin too.

‘igndts’

Ignore DTS.

‘discardcorrupt’

Discard corrupted frames.

‘sortdts’

Try to interleave output packets by DTS.

`'keepside'`

Do not merge side data.

`'latm'`

Enable RTP MP4A-LATM payload.

`'nobuffer'`

Reduce the latency introduced by optional buffering

`'bitexact'`

Only write platform-, build- and time-independent data. This ensures that file and data checksums are reproducible and match between platforms. Its primary use is for regression testing.

`seek2any integer (input)`

Allow seeking to non-keyframes on demuxer level when supported if set to 1. Default is 0.

`analyzeduration integer (input)`

Specify how many microseconds are analyzed to probe the input. A higher value will allow to detect more accurate information, but will increase latency. It defaults to 5,000,000 microseconds = 5 seconds.

`cryptokey hexadecimal string (input)`

Set decryption key.

`indexmem integer (input)`

Set max memory used for timestamp index (per stream).

`rtbufsize integer (input)`

Set max memory used for buffering real-time frames.

`fdebug flags (input/output)`

Print specific debug info.

Possible values:

`'ts'`

`max_delay integer (input/output)`

Set maximum muxing or demuxing delay in microseconds.

`fpsprobesize integer (input)`

Set number of frames used to probe fps.

`audio_preload integer (output)`

Set microseconds by which audio packets should be interleaved earlier.

`chunk_duration integer (output)`

Set microseconds for each chunk.

`chunk_size integer (output)`

Set size in bytes for each chunk.

`err_detect, f_err_detect flags (input)`

Set error detection flags. `f_err_detect` is deprecated and should be used only via the `ffmpeg` tool.

Possible values:

`'crccheck'`

Verify embedded CRCs.

`'bitstream'`

Detect bitstream specification deviations.

`'buffer'`

Detect improper bitstream length.

`'explode'`

Abort decoding on minor error detection.

`'careful'`

Consider things that violate the spec and have not been seen in the wild as errors.

`'compliant'`

Consider all spec non compliances as errors.

`'aggressive'`

Consider things that a sane encoder should not do as an error.

`use_wallclock_as_timestamps integer (input)`

Use wallclock as timestamps.

`avoid_negative_ts integer (output)`

Possible values:

`'make_non_negative'`

Shift timestamps to make them non-negative. Also note that this affects only leading negative timestamps, and not non-monotonic negative timestamps.

`'make_zero'`

Shift timestamps so that the first timestamp is 0.

`'auto (default)'`

Enables shifting when required by the target format.

`'disabled'`

Disables shifting of timestamp.

When shifting is enabled, all output timestamps are shifted by the same amount. Audio, video, and subtitles desynching and relative timestamp differences are preserved compared to how they would have been without shifting.

`skip_initial_bytes integer (input)`

Set number of bytes to skip before reading header and frames if set to 1. Default is 0.

`correct_ts_overflow integer (input)`

Correct single timestamp overflows if set to 1. Default is 1.

`flush_packets integer (output)`

Flush the underlying I/O stream after each packet. Default 1 enables it, and has the effect of reducing the latency; 0 disables it and may slightly increase performance in some cases.

`output_ts_offset offset (output)`

Set the output time offset.

offset must be a time duration specification, see (ffmpeg-utils)the Time duration section in the ffmpeg-utils(1) manual.

The offset is added by the muxer to the output timestamps.

Specifying a positive offset means that the corresponding streams are delayed by the time duration specified in *offset*. Default value is 0 (meaning that no offset is applied).

`format_whitelist list (input)`

"," separated List of allowed demuxers. By default all are allowed.

`dump_separator string (input)`

Separator used to separate the fields printed on the command line about the Stream parameters. For example to separate the fields with newlines and indentation:

```
ffprobe -dump_separator "
    -i ~/videos/matrixbench_mpeg2.mpg
```

2.1 Format stream specifiers

Format stream specifiers allow selection of one or more streams that match specific properties.

Possible forms of stream specifiers are:

stream_index

Matches the stream with this index.

stream_type[:stream_index]

stream_type is one of following: 'v' for video, 'a' for audio, 's' for subtitle, 'd' for data, and 't' for attachments. If *stream_index* is given, then it matches the stream number *stream_index* of this type. Otherwise, it matches all streams of this type.

p:program_id[:stream_index]

If *stream_index* is given, then it matches the stream with number *stream_index* in the program with the id *program_id*. Otherwise, it matches all streams in the program.

#stream_id

Matches the stream by a format-specific ID.

The exact semantics of stream specifiers is defined by the `avformat_match_stream_specifier()` function declared in the `libavformat/avformat.h` header.

3 Demuxers

Demuxers are configured elements in FFmpeg that can read the multimedia streams from a particular type of file.

When you configure your FFmpeg build, all the supported demuxers are enabled by default. You can list all available ones using the configure option `--list-demuxers`.

You can disable all the demuxers using the configure option `--disable-demuxers`, and selectively enable a single demuxer with the option `--enable-demuxer=DEMUXER`, or disable it with the option `--disable-demuxer=DEMUXER`.

The option `-formats` of the ff* tools will display the list of enabled demuxers.

The description of some of the currently available demuxers follows.

3.1 applehttp

Apple HTTP Live Streaming demuxer.

This demuxer presents all AVStreams from all variant streams. The `id` field is set to the bitrate variant index number. By setting the discard flags on AVStreams (by pressing 'a' or 'v' in ffplay), the caller can decide which variant streams to actually receive. The total bitrate of the variant that the stream belongs to is available in a metadata key named "variant_bitrate".

3.2 apng

Animated Portable Network Graphics demuxer.

This demuxer is used to demux APNG files. All headers, but the PNG signature, up to (but not including) the first fcTL chunk are transmitted as extradata. Frames are then split as being all the chunks between two fcTL ones, or between the last fcTL and IEND chunks.

`-ignore_loop` *bool*

Ignore the loop variable in the file if set.

`-max_fps` *int*

Maximum framerate in frames per second (0 for no limit).

`-default_fps int`

Default framerate in frames per second when none is specified in the file (0 meaning as fast as possible).

3.3 asf

Advanced Systems Format demuxer.

This demuxer is used to demux ASF files and MMS network streams.

`-no_resync_search bool`

Do not try to resynchronize by looking for a certain optional start code.

3.4 concat

Virtual concatenation script demuxer.

This demuxer reads a list of files and other directives from a text file and demuxes them one after the other, as if all their packet had been muxed together.

The timestamps in the files are adjusted so that the first file starts at 0 and each next file starts where the previous one finishes. Note that it is done globally and may cause gaps if all streams do not have exactly the same length.

All files must have the same streams (same codecs, same time base, etc.).

The duration of each file is used to adjust the timestamps of the next file: if the duration is incorrect (because it was computed using the bit-rate or because the file is truncated, for example), it can cause artifacts. The `duration` directive can be used to override the duration stored in each file.

3.4.1 Syntax

The script is a text file in extended-ASCII, with one directive per line. Empty lines, leading spaces and lines starting with '#' are ignored. The following directive is recognized:

`file path`

Path to a file to read; special characters and spaces must be escaped with backslash or single quotes.

All subsequent file-related directives apply to that file.

`ffconcat version 1.0`

Identify the script type and version. It also sets the `safe` option to 1 if it was to its default -1.

To make FFmpeg recognize the format automatically, this directive must appear exactly as is (no extra space or byte-order-mark) on the very first line of the script.

`duration dur`

Duration of the file. This information can be specified from the file; specifying it here may be more efficient or help if the information from the file is not available or accurate.

If the duration is set for all files, then it is possible to seek in the whole concatenated video.

`stream`

Introduce a stream in the virtual file. All subsequent stream-related directives apply to the last introduced stream. Some streams properties must be set in order to allow identifying the matching streams in the subfiles. If no streams are defined in the script, the streams from the first file are copied.

`exact_stream_id id`

Set the id of the stream. If this directive is given, the string with the corresponding id in the subfiles will be used. This is especially useful for MPEG-PS (VOB) files, where the order of the streams is not reliable.

3.4.2 Options

This demuxer accepts the following option:

`safe`

If set to 1, reject unsafe file paths. A file path is considered safe if it does not contain a protocol specification and is relative and all components only contain characters from the portable character set (letters, digits, period, underscore and hyphen) and have no period at the beginning of a component.

If set to 0, any file name is accepted.

The default is -1, it is equivalent to 1 if the format was automatically probed and 0 otherwise.

`auto_convert`

If set to 1, try to perform automatic conversions on packet data to make the streams concatenable.

Currently, the only conversion is adding the `h264_mp4toannexb` bitstream filter to H.264 streams in MP4 format. This is necessary in particular if there are resolution changes.

3.5 flv

Adobe Flash Video Format demuxer.

This demuxer is used to demux FLV files and RTMP network streams.

`-flv_metadata bool`

Allocate the streams according to the onMetaData array content.

3.6 libgme

The Game Music Emu library is a collection of video game music file emulators.

See <http://code.google.com/p/game-music-emu/> for more information.

Some files have multiple tracks. The demuxer will pick the first track by default. The `track_index` option can be used to select a different track. Track indexes start at 0. The demuxer exports the number of tracks as *tracks* meta data entry.

For very large files, the `max_size` option may have to be adjusted.

3.7 libquvi

Play media from Internet services using the quvi project.

The demuxer accepts a `format` option to request a specific quality. It is by default set to *best*.

See <http://quvi.sourceforge.net/> for more information.

FFmpeg needs to be built with `--enable-libquvi` for this demuxer to be enabled.

3.8 gif

Animated GIF demuxer.

It accepts the following options:

`min_delay`

Set the minimum valid delay between frames in hundredths of seconds. Range is 0 to 6000. Default value is 2.

`default_delay`

Set the default delay between frames in hundredths of seconds. Range is 0 to 6000. Default value is 10.

`ignore_loop`

GIF files can contain information to loop a certain number of times (or infinitely). If `ignore_loop` is set to 1, then the loop setting from the input will be ignored and looping will not occur. If set to 0, then looping will occur and will cycle the number of times according to the GIF. Default value is 1.

For example, with the overlay filter, place an infinitely looping GIF over another video:

```
ffmpeg -i input.mp4 -ignore_loop 0 -i input.gif -filter_complex overlay=shortest=1 out.mkv
```

Note that in the above example the shortest option for overlay filter is used to end the output video at the length of the shortest input file, which in this case is `input.mp4` as the GIF in this example loops infinitely.

3.9 image2

Image file demuxer.

This demuxer reads from a list of image files specified by a pattern. The syntax and meaning of the pattern is specified by the option *pattern_type*.

The pattern may contain a suffix which is used to automatically determine the format of the images contained in the files.

The size, the pixel format, and the format of each image must be the same for all the files in the sequence.

This demuxer accepts the following options:

`framerate`

Set the frame rate for the video stream. It defaults to 25.

`loop`

If set to 1, loop over the input. Default value is 0.

`pattern_type`

Select the pattern type used to interpret the provided filename.

pattern_type accepts one of the following values.

`sequence`

Select a sequence pattern type, used to specify a sequence of files indexed by sequential numbers.

A sequence pattern may contain the string "%d" or "%0Nd", which specifies the position of the characters representing a sequential number in each filename matched by the pattern. If the form "%d0Nd" is used, the string representing the number in each filename is 0-padded and *N* is the total number of 0-padded digits representing the number. The literal character '%' can be specified in the pattern with the string "%%".

If the sequence pattern contains "%d" or "%0Nd", the first filename of the file list specified by the pattern must contain a number inclusively contained between *start_number* and *start_number+start_number_range-1*, and all the following numbers must be sequential.

For example the pattern "img-%03d.bmp" will match a sequence of filenames of the form *img-001.bmp*, *img-002.bmp*, ..., *img-010.bmp*, etc.; the pattern "i%%m%%g-%d.jpg" will match a sequence of filenames of the form *i%%m%%g-1.jpg*, *i%%m%%g-2.jpg*, ..., *i%%m%%g-10.jpg*, etc.

Note that the pattern must not necessarily contain "%d" or "%0Nd", for example to convert a single image file *img.jpeg* you can employ the command:

```
ffmpeg -i img.jpeg img.png
```

glob

Select a glob wildcard pattern type.

The pattern is interpreted like a `glob()` pattern. This is only selectable if libavformat was compiled with globbing support.

`glob_sequence` (*deprecated, will be removed*)

Select a mixed glob wildcard/sequence pattern.

If your version of libavformat was compiled with globbing support, and the provided pattern contains at least one glob meta character among `%*?[]{}` that is preceded by an unescaped "%", the pattern is interpreted like a `glob()` pattern, otherwise it is interpreted like a sequence pattern.

All glob special characters `%*?[]{}` must be prefixed with "%". To escape a literal "%" you shall use "%%".

For example the pattern `foo-%*.jpeg` will match all the filenames prefixed by "foo-" and terminating with ".jpeg", and `foo-%?%?%.jpeg` will match all the filenames prefixed with "foo-", followed by a sequence of three characters, and terminating with ".jpeg".

This pattern type is deprecated in favor of *glob* and *sequence*.

Default value is *glob_sequence*.

pixel_format

Set the pixel format of the images to read. If not specified the pixel format is guessed from the first image file in the sequence.

`start_number`

Set the index of the file matched by the image file pattern to start to read from. Default value is 0.

`start_number_range`

Set the index interval range to check when looking for the first image file in the sequence, starting from *start_number*. Default value is 5.

`ts_from_file`

If set to 1, will set frame timestamp to modification time of image file. Note that monotonicity of timestamps is not provided: images go in the same order as without this option. Default value is 0. If set to 2, will set frame timestamp to the modification time of the image file in nanosecond precision.

`video_size`

Set the video size of the images to read. If not specified the video size is guessed from the first image file in the sequence.

3.9.1 Examples

- Use `ffmpeg` for creating a video from the images in the file sequence `img-001.jpeg`, `img-002.jpeg`, ..., assuming an input frame rate of 10 frames per second:

```
ffmpeg -framerate 10 -i 'img-%03d.jpeg' out.mkv
```

- As above, but start by reading from a file with index 100 in the sequence:

```
ffmpeg -framerate 10 -start_number 100 -i 'img-%03d.jpeg' out.mkv
```

- Read images matching the `"*.png"` glob pattern, that is all the files terminating with the `".png"` suffix:

```
ffmpeg -framerate 10 -pattern_type glob -i "*.png" out.mkv
```

3.10 mpegts

MPEG-2 transport stream demuxer.

`fix_teletext_pts`

Overrides teletext packet PTS and DTS values with the timestamps calculated from the PCR of the first program which the teletext stream is part of and is not discarded. Default value is 1, set this option to 0 if you want your teletext packet PTS and DTS values untouched.

3.11 rawvideo

Raw video demuxer.

This demuxer allows one to read raw video data. Since there is no header specifying the assumed video parameters, the user must specify them in order to be able to decode the data correctly.

This demuxer accepts the following options:

`framerate`

Set input video frame rate. Default value is 25.

`pixel_format`

Set the input video pixel format. Default value is `yuv420p`.

`video_size`

Set the input video size. This value must be specified explicitly.

For example to read a rawvideo file `input.raw` with `ffplay`, assuming a pixel format of `rgb24`, a video size of `320x240`, and a frame rate of 10 images per second, use the command:

```
ffplay -f rawvideo -pixel_format rgb24 -video_size 320x240 -framerate 10 input.raw
```

3.12 sbg

SBaGen script demuxer.

This demuxer reads the script language used by SBaGen <http://uazu.net/sbagen/> to generate binaural beats sessions. A SBG script looks like that:

```
-SE
a: 300-2.5/3 440+4.5/0
b: 300-2.5/0 440+4.5/3
off: -
NOW      == a
+0:07:00 == b
+0:14:00 == a
+0:21:00 == b
+0:30:00  off
```

A SBG script can mix absolute and relative timestamps. If the script uses either only absolute timestamps (including the script start time) or only relative ones, then its layout is fixed, and the conversion is straightforward. On the other hand, if the script mixes both kind of timestamps, then the *NOW* reference for relative timestamps will be taken from the current time of day at the time the script is read, and the script layout will be frozen according to that reference. That means that if the script is directly played, the actual times will match the absolute timestamps up to the sound controller's clock accuracy, but if the user somehow pauses the playback or seeks, all times will be shifted accordingly.

3.13 tedcaptions

JSON captions used for TED Talks.

TED does not provide links to the captions, but they can be guessed from the page. The file `tools/bookmarklets.html` from the FFmpeg source tree contains a bookmarklet to expose them.

This demuxer accepts the following option:

`start_time`

Set the start time of the TED talk, in milliseconds. The default is 15000 (15s). It is used to sync the captions with the downloadable videos, because they include a 15s intro.

Example: convert the captions to a format most players understand:

```
ffmpeg -i http://www.ted.com/talks/subtitles/id/1/lang/en talk1-en.srt
```

4 Muxers

Muxers are configured elements in FFmpeg which allow writing multimedia streams to a particular type of file.

When you configure your FFmpeg build, all the supported muxers are enabled by default. You can list all available muxers using the configure option `--list-muxers`.

You can disable all the muxers with the configure option `--disable-muxers` and selectively enable / disable single muxers with the options `--enable-muxer=MUXER` / `--disable-muxer=MUXER`.

The option `-formats` of the ff* tools will display the list of enabled muxers.

A description of some of the currently available muxers follows.

4.1 aiff

Audio Interchange File Format muxer.

4.1.1 Options

It accepts the following options:

`write_id3v2`

Enable ID3v2 tags writing when set to 1. Default is 0 (disabled).

`id3v2_version`

Select ID3v2 version to write. Currently only version 3 and 4 (aka. ID3v2.3 and ID3v2.4) are supported. The default is version 4.

4.2 crc

CRC (Cyclic Redundancy Check) testing format.

This muxer computes and prints the Adler-32 CRC of all the input audio and video frames. By default audio frames are converted to signed 16-bit raw audio and video frames to raw video before computing the CRC.

The output of the muxer consists of a single line of the form: `CRC=0xCRC`, where *CRC* is a hexadecimal number 0-padded to 8 digits containing the CRC for all the decoded input frames.

See also the `framecrc` muxer.

4.2.1 Examples

For example to compute the CRC of the input, and store it in the file `out.crc`:

```
ffmpeg -i INPUT -f crc out.crc
```

You can print the CRC to stdout with the command:

```
ffmpeg -i INPUT -f crc -
```

You can select the output format of each frame with `ffmpeg` by specifying the audio and video codec and format. For example to compute the CRC of the input audio converted to PCM unsigned 8-bit and the input video converted to MPEG-2 video, use the command:

```
ffmpeg -i INPUT -c:a pcm_u8 -c:v mpeg2video -f crc -
```

4.3 framecrc

Per-packet CRC (Cyclic Redundancy Check) testing format.

This muxer computes and prints the Adler-32 CRC for each audio and video packet. By default audio frames are converted to signed 16-bit raw audio and video frames to raw video before computing the CRC.

The output of the muxer consists of a line for each audio and video packet of the form:

```
stream_index, packet_dts, packet_pts, packet_duration, packet_size, 0xCRC
```

CRC is a hexadecimal number 0-padded to 8 digits containing the CRC of the packet.

4.3.1 Examples

For example to compute the CRC of the audio and video frames in `INPUT`, converted to raw audio and video packets, and store it in the file `out.crc`:

```
ffmpeg -i INPUT -f framecrc out.crc
```

To print the information to stdout, use the command:

```
ffmpeg -i INPUT -f framecrc -
```

With `ffmpeg`, you can select the output format to which the audio and video frames are encoded before computing the CRC for each packet by specifying the audio and video codec. For example, to compute the CRC of each decoded input audio frame converted to PCM unsigned 8-bit and of each decoded input video frame converted to MPEG-2 video, use the command:

```
ffmpeg -i INPUT -c:a pcm_u8 -c:v mpeg2video -f framecrc -
```

See also the `crc muxer`.

4.4 framemd5

Per-packet MD5 testing format.

This muxer computes and prints the MD5 hash for each audio and video packet. By default audio frames are converted to signed 16-bit raw audio and video frames to raw video before computing the hash.

The output of the muxer consists of a line for each audio and video packet of the form:

```
stream_index, packet_dts, packet_pts, packet_duration, packet_size, MD5
```

MD5 is a hexadecimal number representing the computed MD5 hash for the packet.

4.4.1 Examples

For example to compute the MD5 of the audio and video frames in `INPUT`, converted to raw audio and video packets, and store it in the file `out.md5`:

```
ffmpeg -i INPUT -f framemd5 out.md5
```

To print the information to stdout, use the command:

```
ffmpeg -i INPUT -f framemd5 -
```

See also the `md5 muxer`.

4.5 gif

Animated GIF muxer.

It accepts the following options:

`loop`

Set the number of times to loop the output. Use `-1` for no loop, `0` for looping indefinitely (default).

`final_delay`

Force the delay (expressed in centiseconds) after the last frame. Each frame ends with a delay until the next frame. The default is `-1`, which is a special value to tell the muxer to re-use the previous delay. In case of a loop, you might want to customize this value to mark a pause for instance.

For example, to encode a gif looping 10 times, with a 5 seconds delay between the loops:

```
ffmpeg -i INPUT -loop 10 -final_delay 500 out.gif
```

Note 1: if you wish to extract the frames in separate GIF files, you need to force the image2 muxer:

```
ffmpeg -i INPUT -c:v gif -f image2 "out%d.gif"
```

Note 2: the GIF format has a very small time base: the delay between two frames can not be smaller than one centi second.

4.6 hls

Apple HTTP Live Streaming muxer that segments MPEG-TS according to the HTTP Live Streaming (HLS) specification.

It creates a playlist file, and one or more segment files. The output filename specifies the playlist filename.

By default, the muxer creates a file for each segment produced. These files have the same name as the playlist, followed by a sequential number and a `.ts` extension.

For example, to convert an input file with `ffmpeg`:

```
ffmpeg -i in.nut out.m3u8
```

This example will produce the playlist, `out.m3u8`, and segment files: `out0.ts`, `out1.ts`, `out2.ts`, etc.

See also the segment muxer, which provides a more generic and flexible implementation of a segmenter, and can be used to perform HLS segmentation.

4.6.1 Options

This muxer supports the following options:

`hls_time seconds`

Set the segment length in seconds. Default value is 2.

`hls_list_size size`

Set the maximum number of playlist entries. If set to 0 the list file will contain all the segments. Default value is 5.

`hls_ts_options options_list`

Set output format options using a `:`-separated list of key=value parameters. Values containing special characters must be escaped.

`hls_wrap wrap`

Set the number after which the segment filename number (the number specified in each segment file) wraps. If set to 0 the number will be never wrapped. Default value is 0.

This option is useful to avoid to fill the disk with many segment files, and limits the maximum number of segment files written to disk to *wrap*.

`start_number number`

Start the playlist sequence number from *number*. Default value is 0.

`hls_allow_cache allowcache`

Explicitly set whether the client MAY (1) or MUST NOT (0) cache media segments.

`hls_base_url baseurl`

Append *baseurl* to every entry in the playlist. Useful to generate playlists with absolute paths.

Note that the playlist sequence number must be unique for each segment and it is not to be confused with the segment filename sequence number which can be cyclic, for example if the `wrap` option is specified.

`hls_flags single_file`

If this flag is set, the muxer will store all segments in a single MPEG-TS file, and will use byte ranges in the playlist. HLS playlists generated with this way will have the version number 4. For example:

```
ffmpeg -i in.nut -hls_flags single_file out.m3u8
```

Will produce the playlist, `out.m3u8`, and a single segment file, `out.ts`.

4.7 ico

ICO file muxer.

Microsoft's icon file format (ICO) has some strict limitations that should be noted:

- Size cannot exceed 256 pixels in any dimension
- Only BMP and PNG images can be stored
- If a BMP image is used, it must be one of the following pixel formats:

BMP Bit Depth	FFmpeg Pixel Format
1bit	pal8
4bit	pal8
8bit	pal8
16bit	rgb555le
24bit	bgr24
32bit	bgra

- If a BMP image is used, it must use the BITMAPINFOHEADER DIB header
- If a PNG image is used, it must use the rgba pixel format

4.8 image2

Image file muxer.

The image file muxer writes video frames to image files.

The output filenames are specified by a pattern, which can be used to produce sequentially numbered series of files. The pattern may contain the string `%d` or `%0Nd`, this string specifies the position of the characters representing a numbering in the filenames. If the form `%0Nd` is used, the string representing the number in each filename is 0-padded to *N* digits. The literal character `'%'` can be specified in the pattern with the string `"%%"`.

If the pattern contains `%d` or `%0Nd`, the first filename of the file list specified will contain the number 1, all the following numbers will be sequential.

The pattern may contain a suffix which is used to automatically determine the format of the image files to write.

For example the pattern `img-%03d.bmp` will specify a sequence of filenames of the form `img-001.bmp`, `img-002.bmp`, ..., `img-010.bmp`, etc. The pattern `img%-%d.jpg` will specify a sequence of filenames of the form `img%-1.jpg`, `img%-2.jpg`, ..., `img%-10.jpg`, etc.

4.8.1 Examples

The following example shows how to use `ffmpeg` for creating a sequence of files `img-001.jpeg`, `img-002.jpeg`, ..., taking one image every second from the input video:

```
ffmpeg -i in.avi -vsync 1 -r 1 -f image2 'img-%03d.jpeg'
```

Note that with `ffmpeg`, if the format is not specified with the `-f` option and the output filename specifies an image file format, the `image2` muxer is automatically selected, so the previous command can be written as:

```
ffmpeg -i in.avi -vsync 1 -r 1 'img-%03d.jpeg'
```

Note also that the pattern must not necessarily contain `"%d"` or `"%0Nd"`, for example to create a single image file `img.jpeg` from the input video you can employ the command:

```
ffmpeg -i in.avi -f image2 -frames:v 1 img.jpeg
```

The `strftime` option allows you to expand the filename with date and time information. Check the documentation of the `strftime()` function for the syntax.

For example to generate image files from the `strftime()` `"%Y-%m-%d_%H-%M-%S"` pattern, the following `ffmpeg` command can be used:

```
ffmpeg -f v4l2 -r 1 -i /dev/video0 -f image2 -strftime 1 "%Y-%m-%d_%H-%M-%S.jpg"
```

4.8.2 Options

`start_number`

Start the sequence from the specified number. Default value is 1. Must be a non-negative number.

`update`

If set to 1, the filename will always be interpreted as just a filename, not a pattern, and the corresponding file will be continuously overwritten with new images. Default value is 0.

`strftime`

If set to 1, expand the filename with date and time information from `strftime()`. Default value is 0.

The image muxer supports the `.Y.U.V` image file format. This format is special in that that each image frame consists of three files, for each of the YUV420P components. To read or write this image file format, specify the name of the `'.Y'` file. The muxer will automatically open the `'.U'` and `'.V'` files as required.

4.9 matroska

Matroska container muxer.

This muxer implements the matroska and webm container specs.

4.9.1 Metadata

The recognized metadata settings in this muxer are:

`title`

Set title name provided to a single track.

`language`

Specify the language of the track in the Matroska languages form.

The language can be either the 3 letters bibliographic ISO-639-2 (ISO 639-2/B) form (like "fre" for French), or a language code mixed with a country code for specialities in languages (like "fre-ca" for Canadian French).

`stereo_mode`

Set stereo 3D video layout of two views in a single video track.

The following values are recognized:

`'mono'`

video is not stereo

`'left_right'`

Both views are arranged side by side, Left-eye view is on the left

`'bottom_top'`

Both views are arranged in top-bottom orientation, Left-eye view is at bottom

`'top_bottom'`

Both views are arranged in top-bottom orientation, Left-eye view is on top

`'checkerboard_rl'`

Each view is arranged in a checkerboard interleaved pattern, Left-eye view being first

`'checkerboard_lr'`

Each view is arranged in a checkerboard interleaved pattern, Right-eye view being first

`'row_interleaved_rl'`

Each view is constituted by a row based interleaving, Right-eye view is first row

`'row_interleaved_lr'`

Each view is constituted by a row based interleaving, Left-eye view is first row

`'col_interleaved_rl'`

Both views are arranged in a column based interleaving manner, Right-eye view is first column

`'col_interleaved_lr'`

Both views are arranged in a column based interleaving manner, Left-eye view is first column

`'anaglyph_cyan_red'`

All frames are in anaglyph format viewable through red-cyan filters

`'right_left'`

Both views are arranged side by side, Right-eye view is on the left

`'anaglyph_green_magenta'`

All frames are in anaglyph format viewable through green-magenta filters

`'block_lr'`

Both eyes laced in one Block, Left-eye view is first

`'block_rl'`

Both eyes laced in one Block, Right-eye view is first

For example a 3D WebM clip can be created using the following command line:

```
ffmpeg -i sample_left_right_clip.mpg -an -c:v libvpx -metadata stereo_mode=left_right -y stereo_clip.webm
```

4.9.2 Options

This muxer supports the following options:

`reserve_index_space`

By default, this muxer writes the index for seeking (called cues in Matroska terms) at the end of the file, because it cannot know in advance how much space to leave for the index at the beginning of the file. However for some use cases – e.g. streaming where seeking is possible but slow – it is useful to put the index at the beginning of the file.

If this option is set to a non-zero value, the muxer will reserve a given amount of space in the file header and then try to write the cues there when the muxing finishes. If the available space does not suffice, muxing will fail. A safe size for most use cases should be about 50kB per hour of video.

Note that cues are only written if the output is seekable and this option will have no effect if it is not.

4.10 md5

MD5 testing format.

This muxer computes and prints the MD5 hash of all the input audio and video frames. By default audio frames are converted to signed 16-bit raw audio and video frames to raw video before computing the hash.

The output of the muxer consists of a single line of the form: `MD5=MD5`, where *MD5* is a hexadecimal number representing the computed MD5 hash.

For example to compute the MD5 hash of the input converted to raw audio and video, and store it in the file `out.md5`:

```
ffmpeg -i INPUT -f md5 out.md5
```

You can print the MD5 to stdout with the command:

```
ffmpeg -i INPUT -f md5 -
```

See also the `framemd5` muxer.

4.11 mov, mp4, ismv

MOV/MP4/ISMV (Smooth Streaming) muxer.

The `mov/mp4/ismv` muxer supports fragmentation. Normally, a MOV/MP4 file has all the metadata about all packets stored in one location (written at the end of the file, it can be moved to the start for better playback by adding *faststart* to the *movflags*, or using the `qt-faststart` tool). A fragmented file consists of a number of fragments, where packets and metadata about these packets are stored together. Writing a fragmented file has the advantage that the file is decodable even if the writing is interrupted (while a normal MOV/MP4 is undecodable if it is not properly finished), and it requires less memory when writing very long files (since writing normal MOV/MP4 files stores info about every single packet in memory until the file is closed). The downside is that it is less compatible with other applications.

4.11.1 Options

Fragmentation is enabled by setting one of the AVOptions that define how to cut the file into fragments:

`-moov_size bytes`

Reserves space for the moov atom at the beginning of the file instead of placing the moov atom at the end. If the space reserved is insufficient, muxing will fail.

`-movflags frag_keyframe`

Start a new fragment at each video keyframe.

`-frag_duration duration`

Create fragments that are *duration* microseconds long.

`-frag_size size`

Create fragments that contain up to *size* bytes of payload data.

`-movflags frag_custom`

Allow the caller to manually choose when to cut fragments, by calling `av_write_frame(ctx, NULL)` to write a fragment with the packets written so far. (This is only useful with other applications integrating libavformat, not from ffmpeg.)

`-min_frag_duration duration`

Don't create fragments that are shorter than *duration* microseconds long.

If more than one condition is specified, fragments are cut when one of the specified conditions is fulfilled. The exception to this is `-min_frag_duration`, which has to be fulfilled for any of the other conditions to apply.

Additionally, the way the output file is written can be adjusted through a few other options:

`-movflags empty_moov`

Write an initial moov atom directly at the start of the file, without describing any samples in it. Generally, an mdat/moov pair is written at the start of the file, as a normal MOV/MP4 file, containing only a short portion of the file. With this option set, there is no initial mdat atom, and the moov atom only describes the tracks but has a zero duration.

This option is implicitly set when writing ismv (Smooth Streaming) files.

`-movflags separate_moof`

Write a separate moof (movie fragment) atom for each track. Normally, packets for all tracks are written in a moof atom (which is slightly more efficient), but with this option set, the muxer writes one moof/mdat pair for each track, making it easier to separate tracks.

This option is implicitly set when writing ismv (Smooth Streaming) files.

`-movflags faststart`

Run a second pass moving the index (moov atom) to the beginning of the file. This operation can take a while, and will not work in various situations such as fragmented output, thus it is not enabled by default.

`-movflags rtphint`

Add RTP hinting tracks to the output file.

`-movflags disable_chpl`

Disable Nero chapter markers (chpl atom). Normally, both Nero chapters and a QuickTime chapter track are written to the file. With this option set, only the QuickTime chapter track will be written. Nero chapters can cause failures when the file is reprocessed with certain tagging programs, like mp3Tag 2.61a and iTunes 11.3, most likely other versions are affected as well.

`-movflags omit_tfhd_offset`

Do not write any absolute base_data_offset in tfhd atoms. This avoids tying fragments to absolute byte positions in the file/streams.

`-movflags default_base_moof`

Similarly to the omit_tfhd_offset, this flag avoids writing the absolute base_data_offset field in tfhd atoms, but does so by using the new default-base-is-moof flag instead. This flag is new from 14496-12:2012. This may make the fragments easier to parse in certain circumstances (avoiding basing track fragment location calculations on the implicit end of the previous track fragment).

4.11.2 Example

Smooth Streaming content can be pushed in real time to a publishing point on IIS with this muxer. Example:

```
ffmpeg -re <normal input/transcoding options> -movflags isml+frag_keyframe -f ismv http://server/publishingpoint.isml/Streams(Encoder1)
```

4.12 mp3

The MP3 muxer writes a raw MP3 stream with the following optional features:

- An ID3v2 metadata header at the beginning (enabled by default). Versions 2.3 and 2.4 are supported, the id3v2_version private option controls which one is used (3 or 4). Setting id3v2_version to 0 disables the ID3v2 header completely.

The muxer supports writing attached pictures (APIC frames) to the ID3v2 header. The pictures are supplied to the muxer in form of a video stream with a single packet. There can be any number of those streams, each will correspond to a single APIC frame. The stream metadata tags *title* and *comment* map to APIC *description* and *picture type* respectively. See <http://id3.org/id3v2.4.0-frames> for allowed picture types.

Note that the APIC frames must be written at the beginning, so the muxer will buffer the audio frames until it gets all the pictures. It is therefore advised to provide the pictures as soon as possible to avoid excessive buffering.

- A Xing/LAME frame right after the ID3v2 header (if present). It is enabled by default, but will be written only if the output is seekable. The `write_xing` private option can be used to disable it. The frame contains various information that may be useful to the decoder, like the audio duration or encoder delay.
- A legacy ID3v1 tag at the end of the file (disabled by default). It may be enabled with the `write_id3v1` private option, but as its capabilities are very limited, its usage is not recommended.

Examples:

Write an mp3 with an ID3v2.3 header and an ID3v1 footer:

```
ffmpeg -i INPUT -id3v2_version 3 -write_id3v1 1 out.mp3
```

To attach a picture to an mp3 file select both the audio and the picture stream with `map`:

```
ffmpeg -i input.mp3 -i cover.png -c copy -map 0 -map 1  
-metadata:s:v title="Album cover" -metadata:s:v comment="Cover (Front)" out.mp3
```

Write a "clean" MP3 without any extra features:

```
ffmpeg -i input.wav -write_xing 0 -id3v2_version 0 out.mp3
```

4.13 mpegts

MPEG transport stream muxer.

This muxer implements ISO 13818-1 and part of ETSI EN 300 468.

The recognized metadata settings in mpegts muxer are `service_provider` and `service_name`. If they are not set the default for `service_provider` is "FFmpeg" and the default for `service_name` is "Service01".

4.13.1 Options

The muxer options are:

```
-mpegts_original_network_id number
```

Set the `original_network_id` (default 0x0001). This is unique identifier of a network in DVB. Its main use is in the unique identification of a service through the path `Original_Network_ID`, `Transport_Stream_ID`.

`-mpegts_transport_stream_id number`

Set the `transport_stream_id` (default 0x0001). This identifies a transponder in DVB.

`-mpegts_service_id number`

Set the `service_id` (default 0x0001) also known as program in DVB.

`-mpegts_pmt_start_pid number`

Set the first PID for PMT (default 0x1000, max 0x1f00).

`-mpegts_start_pid number`

Set the first PID for data packets (default 0x0100, max 0x0f00).

`-mpegts_m2ts_mode number`

Enable m2ts mode if set to 1. Default value is -1 which disables m2ts mode.

`-muxrate number`

Set a constant muxrate (default VBR).

`-pcr_period number`

Override the default PCR retransmission time (default 20ms), ignored if variable muxrate is selected.

`-pes_payload_size number`

Set minimum PES packet payload in bytes.

`-mpegts_flags flags`

Set flags (see below).

`-mpegts_copyts number`

Preserve original timestamps, if value is set to 1. Default value is -1, which results in shifting timestamps so that they start from 0.

`-tables_version number`

Set PAT, PMT and SDT version (default 0, valid values are from 0 to 31, inclusively). This option allows updating stream structure so that standard consumer may detect the change. To do so, reopen output `AVFormatContext` (in case of API usage) or restart `ffmpeg` instance, cyclically changing

tables_version value:

```
ffmpeg -i source1.ts -codec copy -f mpegts -tables_version 0 udp://1.1.1.1:1111
ffmpeg -i source2.ts -codec copy -f mpegts -tables_version 1 udp://1.1.1.1:1111
...
ffmpeg -i source3.ts -codec copy -f mpegts -tables_version 31 udp://1.1.1.1:1111
ffmpeg -i source1.ts -codec copy -f mpegts -tables_version 0 udp://1.1.1.1:1111
ffmpeg -i source2.ts -codec copy -f mpegts -tables_version 1 udp://1.1.1.1:1111
...
```

Option `mpegts_flags` may take a set of such flags:

`resend_headers`

Reemit PAT/PMT before writing the next packet.

`latm`

Use LATM packetization for AAC.

4.13.2 Example

```
ffmpeg -i file.mpg -c copy \
-mpegts_original_network_id 0x1122 \
-mpegts_transport_stream_id 0x3344 \
-mpegts_service_id 0x5566 \
-mpegts_pmt_start_pid 0x1500 \
-mpegts_start_pid 0x150 \
-metadata service_provider="Some provider" \
-metadata service_name="Some Channel" \
-y out.ts
```

4.14 null

Null muxer.

This muxer does not generate any output file, it is mainly useful for testing or benchmarking purposes.

For example to benchmark decoding with `ffmpeg` you can use the command:

```
ffmpeg -benchmark -i INPUT -f null out.null
```

Note that the above command does not read or write the `out.null` file, but specifying the output file is required by the `ffmpeg` syntax.

Alternatively you can write the command as:

```
ffmpeg -benchmark -i INPUT -f null -
```

4.15 nut

`-syncpoints flags`

Change the syncpoint usage in nut:

default use the normal low-overhead seeking aids.

none do not use the syncpoints at all, reducing the overhead but making the stream non-seekable;

Use of this option is not recommended, as the resulting files are very damage sensitive and seeking is not possible. Also in general the overhead from syncpoints is negligible. Note, `-write_index 0` can be used to disable all growing data tables, allowing to mux endless streams with limited memory and without these disadvantages.

timestamped extend the syncpoint with a wallclock field.

The *none* and *timestamped* flags are experimental.

`-write_index bool`

Write index at the end, the default is to write an index.

```
ffmpeg -i INPUT -f_strict experimental -syncpoints none - | processor
```

4.16 ogg

Ogg container muxer.

`-page_duration duration`

Preferred page duration, in microseconds. The muxer will attempt to create pages that are approximately *duration* microseconds long. This allows the user to compromise between seek granularity and container overhead. The default is 1 second. A value of 0 will fill all segments, making pages as large as possible. A value of 1 will effectively use 1 packet-per-page in most situations, giving a small seek granularity at the cost of additional container overhead.

4.17 segment, stream_segment, ssegment

Basic stream segmenter.

This muxer outputs streams to a number of separate files of nearly fixed duration. Output filename pattern can be set in a fashion similar to `image2`.

`stream_segment` is a variant of the muxer used to write to streaming output formats, i.e. which do not require global headers, and is recommended for outputting e.g. to MPEG transport stream segments.

`ssegment` is a shorter alias for `stream_segment`.

Every segment starts with a keyframe of the selected reference stream, which is set through the `reference_stream` option.

Note that if you want accurate splitting for a video file, you need to make the input key frames correspond to the exact splitting times expected by the segmenter, or the segment muxer will start the new segment with the key frame found next after the specified start time.

The segment muxer works best with a single constant frame rate video.

Optionally it can generate a list of the created segments, by setting the option `segment_list`. The list type is specified by the `segment_list_type` option. The entry filenames in the segment list are set by default to the basename of the corresponding segment files.

See also the hls muxer, which provides a more specific implementation for HLS segmentation.

4.17.1 Options

The segment muxer supports the following options:

`reference_stream specifier`

Set the reference stream, as specified by the string *specifier*. If *specifier* is set to `auto`, the reference is chosen automatically. Otherwise it must be a stream specifier (see the “Stream specifiers” chapter in the ffmpeg manual) which specifies the reference stream. The default value is `auto`.

`segment_format format`

Override the inner container format, by default it is guessed by the filename extension.

`segment_format_options options_list`

Set output format options using a `:`-separated list of `key=value` parameters. Values containing the `:` special character must be escaped.

`segment_list name`

Generate also a listfile named *name*. If not specified no listfile is generated.

`segment_list_flags flags`

Set flags affecting the segment list generation.

It currently supports the following flags:

‘cache’

Allow caching (only affects M3U8 list files).

`'live'`

Allow live-friendly file generation.

`segment_list_type type`

Select the listing format.

flat use a simple flat list of entries.

hls use a m3u8-like structure.

`segment_list_size size`

Update the list file so that it contains at most *size* segments. If 0 the list file will contain all the segments. Default value is 0.

`segment_list_entry_prefix prefix`

Prepend *prefix* to each entry. Useful to generate absolute paths. By default no prefix is applied.

The following values are recognized:

`'flat'`

Generate a flat list for the created segments, one segment per line.

`'csv, ext'`

Generate a list for the created segments, one segment per line, each line matching the format (comma-separated values):

segment_filename, segment_start_time, segment_end_time

segment_filename is the name of the output file generated by the muxer according to the provided pattern. CSV escaping (according to RFC4180) is applied if required.

segment_start_time and *segment_end_time* specify the segment start and end time expressed in seconds.

A list file with the suffix `".csv"` or `".ext"` will auto-select this format.

`'ext'` is deprecated in favor of `'csv'`.

`'ffconcat'`

Generate an ffconcat file for the created segments. The resulting file can be read using the FFmpeg concat demuxer.

A list file with the suffix `".ffcat"` or `".ffconcat"` will auto-select this format.

`'m3u8'`

Generate an extended M3U8 file, version 3, compliant with <http://tools.ietf.org/id/draft-pantos-http-live-streaming>.

A list file with the suffix `".m3u8"` will auto-select this format.

If not specified the type is guessed from the list file name suffix.

`segment_time time`

Set segment duration to *time*, the value must be a duration specification. Default value is `"2"`. See also the `segment_times` option.

Note that splitting may not be accurate, unless you force the reference stream key-frames at the given time. See the introductory notice and the examples below.

`segment_atclocktime 1/0`

If set to `"1"` split at regular clock time intervals starting from 00:00 o'clock. The *time* value specified in `segment_time` is used for setting the length of the splitting interval.

For example with `segment_time` set to `"900"` this makes it possible to create files at 12:00 o'clock, 12:15, 12:30, etc.

Default value is `"0"`.

`segment_time_delta delta`

Specify the accuracy time when selecting the start time for a segment, expressed as a duration specification. Default value is `"0"`.

When delta is specified a key-frame will start a new segment if its PTS satisfies the relation:

$$\text{PTS} \geq \text{start_time} - \text{time_delta}$$

This option is useful when splitting video content, which is always split at GOP boundaries, in case a key frame is found just before the specified split time.

In particular may be used in combination with the `ffmpeg` option *force_key_frames*. The key frame times specified by *force_key_frames* may not be set accurately because of rounding issues, with the consequence that a key frame time may result set just before the specified time. For constant frame rate videos a value of $1/(2*\text{frame_rate})$ should address the worst case mismatch between the specified time and the time set by *force_key_frames*.

`segment_times times`

Specify a list of split points. *times* contains a list of comma separated duration specifications, in increasing order. See also the `segment_time` option.

`segment_frames frames`

Specify a list of split video frame numbers. *frames* contains a list of comma separated integer numbers, in increasing order.

This option specifies to start a new segment whenever a reference stream key frame is found and the sequential number (starting from 0) of the frame is greater or equal to the next value in the list.

`segment_wrap limit`

Wrap around segment index once it reaches *limit*.

`segment_start_number number`

Set the sequence number of the first segment. Defaults to 0.

`reset_timestamps 1/0`

Reset timestamps at the begin of each segment, so that each segment will start with near-zero timestamps. It is meant to ease the playback of the generated segments. May not work with some combinations of muxers/codecs. It is set to 0 by default.

`initial_offset offset`

Specify timestamp offset to apply to the output packet timestamps. The argument must be a time duration specification, and defaults to 0.

4.17.2 Examples

- Remux the content of file `in.mkv` to a list of segments `out-000.nut`, `out-001.nut`, etc., and write the list of generated segments to `out.list`:

```
ffmpeg -i in.mkv -codec copy -map 0 -f segment -segment_list out.list out%03d.nut
```

- Segment input and set output format options for the output segments:

```
ffmpeg -i in.mkv -f segment -segment_time 10 -segment_format_options movflags=+faststart out%03d.mp4
```

- Segment the input file according to the split points specified by the *segment_times* option:

```
ffmpeg -i in.mkv -codec copy -map 0 -f segment -segment_list out.csv -segment_times 1,2,3,5,8,13,21 out%03d.nut
```

- Use the `ffmpeg force_key_frames` option to force key frames in the input at the specified location, together with the segment option `segment_time_delta` to account for possible roundings operated when setting key frame times.

```
ffmpeg -i in.mkv -force_key_frames 1,2,3,5,8,13,21 -codec:v mpeg4 -codec:a pcm_s16le -map 0 \
-f segment -segment_list out.csv -segment_times 1,2,3,5,8,13,21 -segment_time_delta 0.05 out%03d.nut
```

In order to force key frames on the input file, transcoding is required.

- Segment the input file by splitting the input file according to the frame numbers sequence specified with the `segment_frames` option:

```
ffmpeg -i in.mkv -codec copy -map 0 -f segment -segment_list out.csv -segment_frames 100,200,300,500,800 out%03d.nut
```

- Convert the `in.mkv` to TS segments using the `libx264` and `libfaac` encoders:

```
ffmpeg -i in.mkv -map 0 -codec:v libx264 -codec:a libfaac -f ssegment -segment_list out.list out%03d.ts
```

- Segment the input file, and create an M3U8 live playlist (can be used as live HLS source):

```
ffmpeg -re -i in.mkv -codec copy -map 0 -f segment -segment_list playlist.m3u8 \
-segment_list_flags +live -segment_time 10 out%03d.mkv
```

4.18 smoothstreaming

Smooth Streaming muxer generates a set of files (Manifest, chunks) suitable for serving with conventional web server.

`window_size`

Specify the number of fragments kept in the manifest. Default 0 (keep all).

`extra_window_size`

Specify the number of fragments kept outside of the manifest before removing from disk. Default 5.

`lookahead_count`

Specify the number of lookahead fragments. Default 2.

`min_frag_duration`

Specify the minimum fragment duration (in microseconds). Default 5000000.

`remove_at_exit`

Specify whether to remove all fragments when finished. Default 0 (do not remove).

4.19 tee

The tee muxer can be used to write the same data to several files or any other kind of muxer. It can be used, for example, to both stream a video to the network and save it to disk at the same time.

It is different from specifying several outputs to the `ffmpeg` command-line tool because the audio and video data will be encoded only once with the tee muxer; encoding can be a very expensive process. It is not useful when using the libavformat API directly because it is then possible to feed the same packets to several muxers directly.

The slave outputs are specified in the file name given to the muxer, separated by `'|'`. If any of the slave name contains the `'|'` separator, leading or trailing spaces or any special character, it must be escaped (see (ffmpeg-utils)the "Quoting and escaping" section in the ffmpeg-utils(1) manual).

Muxer options can be specified for each slave by prepending them as a list of *key=value* pairs separated by `':'`, between square brackets. If the options values contain a special character or the `':'` separator, they must be escaped; note that this is a second level escaping.

The following special options are also recognized:

`f`

Specify the format name. Useful if it cannot be guessed from the output name suffix.

`bsfs[/spec]`

Specify a list of bitstream filters to apply to the specified output.

It is possible to specify to which streams a given bitstream filter applies, by appending a stream specifier to the option separated by `/`. *spec* must be a stream specifier (see Format stream specifiers). If the stream specifier is not specified, the bitstream filters will be applied to all streams in the output.

Several bitstream filters can be specified, separated by `","`.

`select`

Select the streams that should be mapped to the slave output, specified by a stream specifier. If not specified, this defaults to all the input streams.

4.19.1 Examples

- Encode something and both archive it in a WebM file and stream it as MPEG-TS over UDP (the streams need to be explicitly mapped):

```
ffmpeg -i ... -c:v libx264 -c:a mp2 -f tee -map 0:v -map 0:a  
"archive-20121107.mkv|[f=mpegts]udp://10.0.1.255:1234/"
```

- Use `ffmpeg` to encode the input, and send the output to three different destinations. The `dump_extra` bitstream filter is used to add extradata information to all the output video keyframes packets, as requested by the MPEG-TS format. The `select` option is applied to `out.aac` in order to make it contain only audio packets.

```
ffmpeg -i ... -map 0 -flags +global_header -c:v libx264 -c:a aac -strict experimental
-f tee "[bsfs/v=dump_extra]out.ts|[movflags=+faststart]out.mp4|[select=a]out.aac"
```

- As below, but select only stream a : 1 for the audio output. Note that a second level escaping must be performed, as ":" is a special character used to separate options.

```
ffmpeg -i ... -map 0 -flags +global_header -c:v libx264 -c:a aac -strict experimental
-f tee "[bsfs/v=dump_extra]out.ts|[movflags=+faststart]out.mp4|[select='\a:1\' ]out.aac"
```

Note: some codecs may need different options depending on the output format; the auto-detection of this can not work with the tee muxer. The main example is the `global_header` flag.

4.20 webm_dash_manifest

WebM DASH Manifest muxer.

This muxer implements the WebM DASH Manifest specification to generate the DASH manifest XML.

4.20.1 Options

This muxer supports the following options:

`adaptation_sets`

This option has the following syntax: "id=x,streams=a,b,c id=y,streams=d,e" where x and y are the unique identifiers of the adaptation sets and a,b,c,d and e are the indices of the corresponding audio and video streams. Any number of adaptation sets can be added using this option.

4.20.2 Example

```
ffmpeg -f webm_dash_manifest -i video1.webm \
-f webm_dash_manifest -i video2.webm \
-f webm_dash_manifest -i audio1.webm \
-f webm_dash_manifest -i audio2.webm \
-map 0 -map 1 -map 2 -map 3 \
-c copy \
-f webm_dash_manifest \
-adaptation_sets "id=0,streams=0,1 id=1,streams=2,3" \
manifest.xml
```

5 Metadata

FFmpeg is able to dump metadata from media files into a simple UTF-8-encoded INI-like text file and then load it back using the metadata muxer/demuxer.

The file format is as follows:

1. A file consists of a header and a number of metadata tags divided into sections, each on its own line.
2. The header is a `'FFMETADATA'` string, followed by a version number (now 1).
3. Metadata tags are of the form `'key=value'`

4. Immediately after header follows global metadata
5. After global metadata there may be sections with per-stream/per-chapter metadata.
6. A section starts with the section name in uppercase (i.e. STREAM or CHAPTER) in brackets ('[', ']') and ends with next section or end of file.
7. At the beginning of a chapter section there may be an optional timebase to be used for start/end values. It must be in form 'TIMEBASE=num/den', where num and den are integers. If the timebase is missing then start/end times are assumed to be in milliseconds. Next a chapter section must contain chapter start and end times in form 'START=num', 'END=num', where num is a positive integer.
8. Empty lines and lines starting with ';' or '#' are ignored.
9. Metadata keys or values containing special characters ('=', ';', '#', '\', and a newline) must be escaped with a backslash '\'.
10. Note that whitespace in metadata (e.g. foo = bar) is considered to be a part of the tag (in the example above key is 'foo ', value is ' bar').

A ffmetadata file might look like this:

```
;FFMETADATA1
title=bike\shed
;this is a comment
artist=FFmpeg troll team

[CHAPTER]
TIMEBASE=1/1000
START=0
#chapter ends at 0:01:00
END=60000
title=chapter \#1
[STREAM]
title=multi\
line
```

By using the ffmetadata muxer and demuxer it is possible to extract metadata from an input file to an ffmetadata file, and then transcode the file into an output file with the edited ffmetadata file.

Extracting an ffmetadata file with `ffmpeg` goes as follows:

```
ffmpeg -i INPUT -f ffmetadata FFMETADATAFILE
```

Reinserting edited metadata information from the FFMETADATAFILE file can be done as:

```
ffmpeg -i INPUT -i FFMETADATAFILE -map_metadata 1 -codec copy OUTPUT
```

6 See Also

ffmpeg, ffplay, ffprobe, ffserver, libavformat

7 Authors

The FFmpeg developers.

For details about the authorship, see the Git history of the project (<git://source.ffmpeg.org/ffmpeg>), e.g. by typing the command `git log` in the FFmpeg source directory, or browsing the online repository at <http://source.ffmpeg.org>.

Maintainers for the specific components are listed in the file `MAINTAINERS` in the source code tree.

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FFmpeg Formats Documentation

Table of Contents

- 1 Description
- 2 Format Options
 - 2.1 Format stream specifiers
- 3 Demuxers
 - 3.1 applehttp
 - 3.2 apng
 - 3.3 asf
 - 3.4 concat
 - 3.4.1 Syntax
 - 3.4.2 Options
 - 3.5 flv
 - 3.6 libgme
 - 3.7 libquvi
 - 3.8 gif
 - 3.9 image2
 - 3.9.1 Examples
 - 3.10 mpegts
 - 3.11 rawvideo
 - 3.12 sbg
 - 3.13 tedcaptions
- 4 Muxers
 - 4.1 aiff
 - 4.1.1 Options
 - 4.2 crc
 - 4.2.1 Examples
 - 4.3 framecrc
 - 4.3.1 Examples
 - 4.4 framemd5
 - 4.4.1 Examples
 - 4.5 gif
 - 4.6 hls
 - 4.6.1 Options
 - 4.7 ico
 - 4.8 image2
 - 4.8.1 Examples
 - 4.8.2 Options
 - 4.9 matroska
 - 4.9.1 Metadata
 - 4.9.2 Options

- 4.10 md5
- 4.11 mov, mp4, ismv
 - 4.11.1 Options
 - 4.11.2 Example
- 4.12 mp3
- 4.13 mpegts
 - 4.13.1 Options
 - 4.13.2 Example
- 4.14 null
- 4.15 nut
- 4.16 ogg
- 4.17 segment, stream_segment, ssegment
 - 4.17.1 Options
 - 4.17.2 Examples
- 4.18 smoothstreaming
- 4.19 tee
 - 4.19.1 Examples
- 4.20 webm_dash_manifest
 - 4.20.1 Options
 - 4.20.2 Example
- 5 Metadata
- 6 See Also
- 7 Authors

1 Description

This document describes the supported formats (muxers and demuxers) provided by the libavformat library.

2 Format Options

The libavformat library provides some generic global options, which can be set on all the muxers and demuxers. In addition each muxer or demuxer may support so-called private options, which are specific for that component.

Options may be set by specifying *-option value* in the FFmpeg tools, or by setting the value explicitly in the AVFormatContext options or using the `libavutil/opt.h` API for programmatic use.

The list of supported options follows:

```
avioflags flags (input/output)
```

Possible values:

`'direct'`

Reduce buffering.

`probesize integer (input)`

Set probing size in bytes, i.e. the size of the data to analyze to get stream information. A higher value will allow to detect more information in case it is dispersed into the stream, but will increase latency. Must be an integer not lesser than 32. It is 5000000 by default.

`packetsize integer (output)`

Set packet size.

`fflags flags (input/output)`

Set format flags.

Possible values:

`'ignidx'`

Ignore index.

`'genpts'`

Generate PTS.

`'nofillin'`

Do not fill in missing values that can be exactly calculated.

`'noparse'`

Disable AVParsers, this needs `+nofillin` too.

`'igndts'`

Ignore DTS.

`'discardcorrupt'`

Discard corrupted frames.

`'sortdts'`

Try to interleave output packets by DTS.

`'keepside'`

Do not merge side data.

`'latm'`

Enable RTP MP4A-LATM payload.

`'nobuffer'`

Reduce the latency introduced by optional buffering

`'bitexact'`

Only write platform-, build- and time-independent data. This ensures that file and data checksums are reproducible and match between platforms. Its primary use is for regression testing.

`seek2any integer (input)`

Allow seeking to non-keyframes on demuxer level when supported if set to 1. Default is 0.

`analyzeduration integer (input)`

Specify how many microseconds are analyzed to probe the input. A higher value will allow to detect more accurate information, but will increase latency. It defaults to 5,000,000 microseconds = 5 seconds.

`cryptokey hexadecimal string (input)`

Set decryption key.

`indexmem integer (input)`

Set max memory used for timestamp index (per stream).

`rtbufsize integer (input)`

Set max memory used for buffering real-time frames.

`fdebug flags (input/output)`

Print specific debug info.

Possible values:

`'ts'`

`max_delay integer (input/output)`

Set maximum muxing or demuxing delay in microseconds.

`fpsprobesize integer (input)`

Set number of frames used to probe fps.

`audio_preload integer (output)`

Set microseconds by which audio packets should be interleaved earlier.

`chunk_duration integer (output)`

Set microseconds for each chunk.

`chunk_size integer (output)`

Set size in bytes for each chunk.

`err_detect, f_err_detect flags (input)`

Set error detection flags. `f_err_detect` is deprecated and should be used only via the `ffmpeg` tool.

Possible values:

`'crccheck'`

Verify embedded CRCs.

`'bitstream'`

Detect bitstream specification deviations.

`'buffer'`

Detect improper bitstream length.

`'explode'`

Abort decoding on minor error detection.

`'careful'`

Consider things that violate the spec and have not been seen in the wild as errors.

‘compliant’

Consider all spec non compliancies as errors.

‘aggressive’

Consider things that a sane encoder should not do as an error.

`use_wallclock_as_timestamps integer (input)`

Use wallclock as timestamps.

`avoid_negative_ts integer (output)`

Possible values:

‘make_non_negative’

Shift timestamps to make them non-negative. Also note that this affects only leading negative timestamps, and not non-monotonic negative timestamps.

‘make_zero’

Shift timestamps so that the first timestamp is 0.

‘auto (default)’

Enables shifting when required by the target format.

‘disabled’

Disables shifting of timestamp.

When shifting is enabled, all output timestamps are shifted by the same amount. Audio, video, and subtitles desynching and relative timestamp differences are preserved compared to how they would have been without shifting.

`skip_initial_bytes integer (input)`

Set number of bytes to skip before reading header and frames if set to 1. Default is 0.

`correct_ts_overflow integer (input)`

Correct single timestamp overflows if set to 1. Default is 1.

`flush_packets integer (output)`

Flush the underlying I/O stream after each packet. Default 1 enables it, and has the effect of reducing the latency; 0 disables it and may slightly increase performance in some cases.

`output_ts_offset offset (output)`

Set the output time offset.

offset must be a time duration specification, see (ffmpeg-utils)the Time duration section in the ffmpeg-utils(1) manual.

The offset is added by the muxer to the output timestamps.

Specifying a positive offset means that the corresponding streams are delayed by the time duration specified in *offset*. Default value is 0 (meaning that no offset is applied).

`format_whitelist list (input)`

"," separated List of allowed demuxers. By default all are allowed.

`dump_separator string (input)`

Separator used to separate the fields printed on the command line about the Stream parameters. For example to separate the fields with newlines and indentation:

```
ffprobe -dump_separator "
    " -i ~/videos/matrixbench_mpeg2.mpg
```

2.1 Format stream specifiers

Format stream specifiers allow selection of one or more streams that match specific properties.

Possible forms of stream specifiers are:

stream_index

Matches the stream with this index.

stream_type[:stream_index]

stream_type is one of following: 'v' for video, 'a' for audio, 's' for subtitle, 'd' for data, and 't' for attachments. If *stream_index* is given, then it matches the stream number *stream_index* of this type. Otherwise, it matches all streams of this type.

p:program_id[:stream_index]

If *stream_index* is given, then it matches the stream with number *stream_index* in the program with the id *program_id*. Otherwise, it matches all streams in the program.

#stream_id

Matches the stream by a format-specific ID.

The exact semantics of stream specifiers is defined by the `avformat_match_stream_specifier()` function declared in the `libavformat/avformat.h` header.

3 Demuxers

Demuxers are configured elements in FFmpeg that can read the multimedia streams from a particular type of file.

When you configure your FFmpeg build, all the supported demuxers are enabled by default. You can list all available ones using the configure option `--list-demuxers`.

You can disable all the demuxers using the configure option `--disable-demuxers`, and selectively enable a single demuxer with the option `--enable-demuxer=DEMUXER`, or disable it with the option `--disable-demuxer=DEMUXER`.

The option `-formats` of the ff* tools will display the list of enabled demuxers.

The description of some of the currently available demuxers follows.

3.1 applehttp

Apple HTTP Live Streaming demuxer.

This demuxer presents all AVStreams from all variant streams. The `id` field is set to the bitrate variant index number. By setting the discard flags on AVStreams (by pressing 'a' or 'v' in ffplay), the caller can decide which variant streams to actually receive. The total bitrate of the variant that the stream belongs to is available in a metadata key named "variant_bitrate".

3.2 apng

Animated Portable Network Graphics demuxer.

This demuxer is used to demux APNG files. All headers, but the PNG signature, up to (but not including) the first fcTL chunk are transmitted as extradata. Frames are then split as being all the chunks between two fcTL ones, or between the last fcTL and IEND chunks.

`-ignore_loop` *bool*

Ignore the loop variable in the file if set.

`-max_fps` *int*

Maximum framerate in frames per second (0 for no limit).

`-default_fps int`

Default framerate in frames per second when none is specified in the file (0 meaning as fast as possible).

3.3 asf

Advanced Systems Format demuxer.

This demuxer is used to demux ASF files and MMS network streams.

`-no_resync_search bool`

Do not try to resynchronize by looking for a certain optional start code.

3.4 concat

Virtual concatenation script demuxer.

This demuxer reads a list of files and other directives from a text file and demuxes them one after the other, as if all their packet had been muxed together.

The timestamps in the files are adjusted so that the first file starts at 0 and each next file starts where the previous one finishes. Note that it is done globally and may cause gaps if all streams do not have exactly the same length.

All files must have the same streams (same codecs, same time base, etc.).

The duration of each file is used to adjust the timestamps of the next file: if the duration is incorrect (because it was computed using the bit-rate or because the file is truncated, for example), it can cause artifacts. The `duration` directive can be used to override the duration stored in each file.

3.4.1 Syntax

The script is a text file in extended-ASCII, with one directive per line. Empty lines, leading spaces and lines starting with '#' are ignored. The following directive is recognized:

`file path`

Path to a file to read; special characters and spaces must be escaped with backslash or single quotes.

All subsequent file-related directives apply to that file.

`ffconcat version 1.0`

Identify the script type and version. It also sets the `safe` option to 1 if it was to its default -1.

To make FFmpeg recognize the format automatically, this directive must appear exactly as is (no extra space or byte-order-mark) on the very first line of the script.

`duration dur`

Duration of the file. This information can be specified from the file; specifying it here may be more efficient or help if the information from the file is not available or accurate.

If the duration is set for all files, then it is possible to seek in the whole concatenated video.

`stream`

Introduce a stream in the virtual file. All subsequent stream-related directives apply to the last introduced stream. Some streams properties must be set in order to allow identifying the matching streams in the subfiles. If no streams are defined in the script, the streams from the first file are copied.

`exact_stream_id id`

Set the id of the stream. If this directive is given, the string with the corresponding id in the subfiles will be used. This is especially useful for MPEG-PS (VOB) files, where the order of the streams is not reliable.

3.4.2 Options

This demuxer accepts the following option:

`safe`

If set to 1, reject unsafe file paths. A file path is considered safe if it does not contain a protocol specification and is relative and all components only contain characters from the portable character set (letters, digits, period, underscore and hyphen) and have no period at the beginning of a component.

If set to 0, any file name is accepted.

The default is -1, it is equivalent to 1 if the format was automatically probed and 0 otherwise.

`auto_convert`

If set to 1, try to perform automatic conversions on packet data to make the streams concatenable.

Currently, the only conversion is adding the `h264_mp4toannexb` bitstream filter to H.264 streams in MP4 format. This is necessary in particular if there are resolution changes.

3.5 flv

Adobe Flash Video Format demuxer.

This demuxer is used to demux FLV files and RTMP network streams.

`-flv_metadata bool`

Allocate the streams according to the onMetaData array content.

3.6 libgme

The Game Music Emu library is a collection of video game music file emulators.

See <http://code.google.com/p/game-music-emu/> for more information.

Some files have multiple tracks. The demuxer will pick the first track by default. The `track_index` option can be used to select a different track. Track indexes start at 0. The demuxer exports the number of tracks as *tracks* meta data entry.

For very large files, the `max_size` option may have to be adjusted.

3.7 libquvi

Play media from Internet services using the quvi project.

The demuxer accepts a `format` option to request a specific quality. It is by default set to *best*.

See <http://quvi.sourceforge.net/> for more information.

FFmpeg needs to be built with `--enable-libquvi` for this demuxer to be enabled.

3.8 gif

Animated GIF demuxer.

It accepts the following options:

`min_delay`

Set the minimum valid delay between frames in hundredths of seconds. Range is 0 to 6000. Default value is 2.

`default_delay`

Set the default delay between frames in hundredths of seconds. Range is 0 to 6000. Default value is 10.

`ignore_loop`

GIF files can contain information to loop a certain number of times (or infinitely). If `ignore_loop` is set to 1, then the loop setting from the input will be ignored and looping will not occur. If set to 0, then looping will occur and will cycle the number of times according to the GIF. Default value is 1.

For example, with the overlay filter, place an infinitely looping GIF over another video:

```
ffmpeg -i input.mp4 -ignore_loop 0 -i input.gif -filter_complex overlay=shortest=1 out.mkv
```

Note that in the above example the `shortest` option for overlay filter is used to end the output video at the length of the shortest input file, which in this case is `input.mp4` as the GIF in this example loops infinitely.

3.9 image2

Image file demuxer.

This demuxer reads from a list of image files specified by a pattern. The syntax and meaning of the pattern is specified by the option *pattern_type*.

The pattern may contain a suffix which is used to automatically determine the format of the images contained in the files.

The size, the pixel format, and the format of each image must be the same for all the files in the sequence.

This demuxer accepts the following options:

`framerate`

Set the frame rate for the video stream. It defaults to 25.

`loop`

If set to 1, loop over the input. Default value is 0.

`pattern_type`

Select the pattern type used to interpret the provided filename.

pattern_type accepts one of the following values.

`sequence`

Select a sequence pattern type, used to specify a sequence of files indexed by sequential numbers.

A sequence pattern may contain the string "%d" or "%0Nd", which specifies the position of the characters representing a sequential number in each filename matched by the pattern. If the form "%d0Nd" is used, the string representing the number in each filename is 0-padded and *N* is the total number of 0-padded digits representing the number. The literal character '%' can be specified in the pattern with the string "%%".

If the sequence pattern contains "%d" or "%0Nd", the first filename of the file list specified by the pattern must contain a number inclusively contained between *start_number* and *start_number+start_number_range-1*, and all the following numbers must be sequential.

For example the pattern "img-%03d.bmp" will match a sequence of filenames of the form *img-001.bmp*, *img-002.bmp*, ..., *img-010.bmp*, etc.; the pattern "i%%m%%g-%d.jpg" will match a sequence of filenames of the form *i%%m%%g-1.jpg*, *i%%m%%g-2.jpg*, ..., *i%%m%%g-10.jpg*, etc.

Note that the pattern must not necessarily contain "%d" or "%0Nd", for example to convert a single image file *img.jpeg* you can employ the command:

```
ffmpeg -i img.jpeg img.png
```

glob

Select a glob wildcard pattern type.

The pattern is interpreted like a `glob()` pattern. This is only selectable if libavformat was compiled with globbing support.

`glob_sequence` (*deprecated, will be removed*)

Select a mixed glob wildcard/sequence pattern.

If your version of libavformat was compiled with globbing support, and the provided pattern contains at least one glob meta character among `%*?[]{}` that is preceded by an unescaped "%", the pattern is interpreted like a `glob()` pattern, otherwise it is interpreted like a sequence pattern.

All glob special characters `%*?[]{}` must be prefixed with "%". To escape a literal "%" you shall use "%%".

For example the pattern `foo-%*.jpeg` will match all the filenames prefixed by "foo-" and terminating with ".jpeg", and `foo-%?%?%.jpeg` will match all the filenames prefixed with "foo-", followed by a sequence of three characters, and terminating with ".jpeg".

This pattern type is deprecated in favor of *glob* and *sequence*.

Default value is *glob_sequence*.

pixel_format

Set the pixel format of the images to read. If not specified the pixel format is guessed from the first image file in the sequence.

`start_number`

Set the index of the file matched by the image file pattern to start to read from. Default value is 0.

`start_number_range`

Set the index interval range to check when looking for the first image file in the sequence, starting from *start_number*. Default value is 5.

`ts_from_file`

If set to 1, will set frame timestamp to modification time of image file. Note that monotonicity of timestamps is not provided: images go in the same order as without this option. Default value is 0. If set to 2, will set frame timestamp to the modification time of the image file in nanosecond precision.

`video_size`

Set the video size of the images to read. If not specified the video size is guessed from the first image file in the sequence.

3.9.1 Examples

- Use `ffmpeg` for creating a video from the images in the file sequence `img-001.jpeg`, `img-002.jpeg`, ..., assuming an input frame rate of 10 frames per second:

```
ffmpeg -framerate 10 -i 'img-%03d.jpeg' out.mkv
```

- As above, but start by reading from a file with index 100 in the sequence:

```
ffmpeg -framerate 10 -start_number 100 -i 'img-%03d.jpeg' out.mkv
```

- Read images matching the `"*.png"` glob pattern, that is all the files terminating with the `".png"` suffix:

```
ffmpeg -framerate 10 -pattern_type glob -i "*.png" out.mkv
```

3.10 mpegts

MPEG-2 transport stream demuxer.

`fix_teletext_pts`

Overrides teletext packet PTS and DTS values with the timestamps calculated from the PCR of the first program which the teletext stream is part of and is not discarded. Default value is 1, set this option to 0 if you want your teletext packet PTS and DTS values untouched.

3.11 rawvideo

Raw video demuxer.

This demuxer allows one to read raw video data. Since there is no header specifying the assumed video parameters, the user must specify them in order to be able to decode the data correctly.

This demuxer accepts the following options:

`framerate`

Set input video frame rate. Default value is 25.

`pixel_format`

Set the input video pixel format. Default value is `yuv420p`.

`video_size`

Set the input video size. This value must be specified explicitly.

For example to read a rawvideo file `input.raw` with `ffplay`, assuming a pixel format of `rgb24`, a video size of `320x240`, and a frame rate of 10 images per second, use the command:

```
ffplay -f rawvideo -pixel_format rgb24 -video_size 320x240 -framerate 10 input.raw
```

3.12 sbg

SBaGen script demuxer.

This demuxer reads the script language used by SBaGen <http://uazu.net/sbagen/> to generate binaural beats sessions. A SBG script looks like that:

```
-SE
a: 300-2.5/3 440+4.5/0
b: 300-2.5/0 440+4.5/3
off: -
NOW      == a
+0:07:00 == b
+0:14:00 == a
+0:21:00 == b
+0:30:00  off
```

A SBG script can mix absolute and relative timestamps. If the script uses either only absolute timestamps (including the script start time) or only relative ones, then its layout is fixed, and the conversion is straightforward. On the other hand, if the script mixes both kind of timestamps, then the *NOW* reference for relative timestamps will be taken from the current time of day at the time the script is read, and the script layout will be frozen according to that reference. That means that if the script is directly played, the actual times will match the absolute timestamps up to the sound controller's clock accuracy, but if the user somehow pauses the playback or seeks, all times will be shifted accordingly.

3.13 tedcaptions

JSON captions used for TED Talks.

TED does not provide links to the captions, but they can be guessed from the page. The file `tools/bookmarklets.html` from the FFmpeg source tree contains a bookmarklet to expose them.

This demuxer accepts the following option:

`start_time`

Set the start time of the TED talk, in milliseconds. The default is 15000 (15s). It is used to sync the captions with the downloadable videos, because they include a 15s intro.

Example: convert the captions to a format most players understand:

```
ffmpeg -i http://www.ted.com/talks/subtitles/id/1/lang/en talk1-en.srt
```

4 Muxers

Muxers are configured elements in FFmpeg which allow writing multimedia streams to a particular type of file.

When you configure your FFmpeg build, all the supported muxers are enabled by default. You can list all available muxers using the configure option `--list-muxers`.

You can disable all the muxers with the configure option `--disable-muxers` and selectively enable / disable single muxers with the options `--enable-muxer=MUXER` / `--disable-muxer=MUXER`.

The option `-formats` of the ff* tools will display the list of enabled muxers.

A description of some of the currently available muxers follows.

4.1 aiff

Audio Interchange File Format muxer.

4.1.1 Options

It accepts the following options:

`write_id3v2`

Enable ID3v2 tags writing when set to 1. Default is 0 (disabled).

`id3v2_version`

Select ID3v2 version to write. Currently only version 3 and 4 (aka. ID3v2.3 and ID3v2.4) are supported. The default is version 4.

4.2 crc

CRC (Cyclic Redundancy Check) testing format.

This muxer computes and prints the Adler-32 CRC of all the input audio and video frames. By default audio frames are converted to signed 16-bit raw audio and video frames to raw video before computing the CRC.

The output of the muxer consists of a single line of the form: `CRC=0xCRC`, where *CRC* is a hexadecimal number 0-padded to 8 digits containing the CRC for all the decoded input frames.

See also the `framecrc` muxer.

4.2.1 Examples

For example to compute the CRC of the input, and store it in the file `out.crc`:

```
ffmpeg -i INPUT -f crc out.crc
```

You can print the CRC to stdout with the command:

```
ffmpeg -i INPUT -f crc -
```

You can select the output format of each frame with `ffmpeg` by specifying the audio and video codec and format. For example to compute the CRC of the input audio converted to PCM unsigned 8-bit and the input video converted to MPEG-2 video, use the command:

```
ffmpeg -i INPUT -c:a pcm_u8 -c:v mpeg2video -f crc -
```

4.3 framecrc

Per-packet CRC (Cyclic Redundancy Check) testing format.

This muxer computes and prints the Adler-32 CRC for each audio and video packet. By default audio frames are converted to signed 16-bit raw audio and video frames to raw video before computing the CRC.

The output of the muxer consists of a line for each audio and video packet of the form:

```
stream_index, packet_dts, packet_pts, packet_duration, packet_size, 0xCRC
```

CRC is a hexadecimal number 0-padded to 8 digits containing the CRC of the packet.

4.3.1 Examples

For example to compute the CRC of the audio and video frames in `INPUT`, converted to raw audio and video packets, and store it in the file `out.crc`:

```
ffmpeg -i INPUT -f framecrc out.crc
```

To print the information to stdout, use the command:

```
ffmpeg -i INPUT -f framecrc -
```

With `ffmpeg`, you can select the output format to which the audio and video frames are encoded before computing the CRC for each packet by specifying the audio and video codec. For example, to compute the CRC of each decoded input audio frame converted to PCM unsigned 8-bit and of each decoded input video frame converted to MPEG-2 video, use the command:

```
ffmpeg -i INPUT -c:a pcm_u8 -c:v mpeg2video -f framecrc -
```

See also the `crc muxer`.

4.4 framemd5

Per-packet MD5 testing format.

This muxer computes and prints the MD5 hash for each audio and video packet. By default audio frames are converted to signed 16-bit raw audio and video frames to raw video before computing the hash.

The output of the muxer consists of a line for each audio and video packet of the form:

```
stream_index, packet_dts, packet_pts, packet_duration, packet_size, MD5
```

MD5 is a hexadecimal number representing the computed MD5 hash for the packet.

4.4.1 Examples

For example to compute the MD5 of the audio and video frames in `INPUT`, converted to raw audio and video packets, and store it in the file `out.md5`:

```
ffmpeg -i INPUT -f framemd5 out.md5
```

To print the information to stdout, use the command:

```
ffmpeg -i INPUT -f framemd5 -
```

See also the `md5 muxer`.

4.5 gif

Animated GIF muxer.

It accepts the following options:

`loop`

Set the number of times to loop the output. Use `-1` for no loop, `0` for looping indefinitely (default).

`final_delay`

Force the delay (expressed in centiseconds) after the last frame. Each frame ends with a delay until the next frame. The default is `-1`, which is a special value to tell the muxer to re-use the previous delay. In case of a loop, you might want to customize this value to mark a pause for instance.

For example, to encode a gif looping 10 times, with a 5 seconds delay between the loops:

```
ffmpeg -i INPUT -loop 10 -final_delay 500 out.gif
```

Note 1: if you wish to extract the frames in separate GIF files, you need to force the image2 muxer:

```
ffmpeg -i INPUT -c:v gif -f image2 "out%d.gif"
```

Note 2: the GIF format has a very small time base: the delay between two frames can not be smaller than one centi second.

4.6 hls

Apple HTTP Live Streaming muxer that segments MPEG-TS according to the HTTP Live Streaming (HLS) specification.

It creates a playlist file, and one or more segment files. The output filename specifies the playlist filename.

By default, the muxer creates a file for each segment produced. These files have the same name as the playlist, followed by a sequential number and a `.ts` extension.

For example, to convert an input file with `ffmpeg`:

```
ffmpeg -i in.nut out.m3u8
```

This example will produce the playlist, `out.m3u8`, and segment files: `out0.ts`, `out1.ts`, `out2.ts`, etc.

See also the segment muxer, which provides a more generic and flexible implementation of a segmenter, and can be used to perform HLS segmentation.

4.6.1 Options

This muxer supports the following options:

`hls_time seconds`

Set the segment length in seconds. Default value is 2.

`hls_list_size size`

Set the maximum number of playlist entries. If set to 0 the list file will contain all the segments. Default value is 5.

`hls_ts_options options_list`

Set output format options using a `:`-separated list of key=value parameters. Values containing special characters must be escaped.

`hls_wrap wrap`

Set the number after which the segment filename number (the number specified in each segment file) wraps. If set to 0 the number will be never wrapped. Default value is 0.

This option is useful to avoid to fill the disk with many segment files, and limits the maximum number of segment files written to disk to *wrap*.

`start_number number`

Start the playlist sequence number from *number*. Default value is 0.

`hls_allow_cache allowcache`

Explicitly set whether the client MAY (1) or MUST NOT (0) cache media segments.

`hls_base_url baseurl`

Append *baseurl* to every entry in the playlist. Useful to generate playlists with absolute paths.

Note that the playlist sequence number must be unique for each segment and it is not to be confused with the segment filename sequence number which can be cyclic, for example if the `wrap` option is specified.

`hls_flags single_file`

If this flag is set, the muxer will store all segments in a single MPEG-TS file, and will use byte ranges in the playlist. HLS playlists generated with this way will have the version number 4. For example:

```
ffmpeg -i in.nut -hls_flags single_file out.m3u8
```

Will produce the playlist, `out.m3u8`, and a single segment file, `out.ts`.

4.7 ico

ICO file muxer.

Microsoft's icon file format (ICO) has some strict limitations that should be noted:

- Size cannot exceed 256 pixels in any dimension
- Only BMP and PNG images can be stored
- If a BMP image is used, it must be one of the following pixel formats:

BMP Bit Depth	FFmpeg Pixel Format
1bit	pal8
4bit	pal8
8bit	pal8
16bit	rgb555le
24bit	bgr24
32bit	bgra

- If a BMP image is used, it must use the BITMAPINFOHEADER DIB header
- If a PNG image is used, it must use the rgba pixel format

4.8 image2

Image file muxer.

The image file muxer writes video frames to image files.

The output filenames are specified by a pattern, which can be used to produce sequentially numbered series of files. The pattern may contain the string `%d` or `%0Nd`, this string specifies the position of the characters representing a numbering in the filenames. If the form `%0Nd` is used, the string representing the number in each filename is 0-padded to *N* digits. The literal character `'%'` can be specified in the pattern with the string `"%%"`.

If the pattern contains `%d` or `%0Nd`, the first filename of the file list specified will contain the number 1, all the following numbers will be sequential.

The pattern may contain a suffix which is used to automatically determine the format of the image files to write.

For example the pattern `img-%03d.bmp` will specify a sequence of filenames of the form `img-001.bmp`, `img-002.bmp`, ..., `img-010.bmp`, etc. The pattern `img%-%d.jpg` will specify a sequence of filenames of the form `img%-1.jpg`, `img%-2.jpg`, ..., `img%-10.jpg`, etc.

4.8.1 Examples

The following example shows how to use `ffmpeg` for creating a sequence of files `img-001.jpeg`, `img-002.jpeg`, ..., taking one image every second from the input video:

```
ffmpeg -i in.avi -vsync 1 -r 1 -f image2 'img-%03d.jpeg'
```

Note that with `ffmpeg`, if the format is not specified with the `-f` option and the output filename specifies an image file format, the `image2` muxer is automatically selected, so the previous command can be written as:

```
ffmpeg -i in.avi -vsync 1 -r 1 'img-%03d.jpeg'
```

Note also that the pattern must not necessarily contain `"%d"` or `"%0Nd"`, for example to create a single image file `img.jpeg` from the input video you can employ the command:

```
ffmpeg -i in.avi -f image2 -frames:v 1 img.jpeg
```

The `strftime` option allows you to expand the filename with date and time information. Check the documentation of the `strftime()` function for the syntax.

For example to generate image files from the `strftime()` `"%Y-%m-%d_%H-%M-%S"` pattern, the following `ffmpeg` command can be used:

```
ffmpeg -f v4l2 -r 1 -i /dev/video0 -f image2 -strftime 1 "%Y-%m-%d_%H-%M-%S.jpg"
```

4.8.2 Options

`start_number`

Start the sequence from the specified number. Default value is 1. Must be a non-negative number.

`update`

If set to 1, the filename will always be interpreted as just a filename, not a pattern, and the corresponding file will be continuously overwritten with new images. Default value is 0.

`strftime`

If set to 1, expand the filename with date and time information from `strftime()`. Default value is 0.

The image muxer supports the `.Y.U.V` image file format. This format is special in that that each image frame consists of three files, for each of the YUV420P components. To read or write this image file format, specify the name of the `'.Y'` file. The muxer will automatically open the `'.U'` and `'.V'` files as required.

4.9 matroska

Matroska container muxer.

This muxer implements the matroska and webm container specs.

4.9.1 Metadata

The recognized metadata settings in this muxer are:

`title`

Set title name provided to a single track.

`language`

Specify the language of the track in the Matroska languages form.

The language can be either the 3 letters bibliographic ISO-639-2 (ISO 639-2/B) form (like "fre" for French), or a language code mixed with a country code for specialities in languages (like "fre-ca" for Canadian French).

`stereo_mode`

Set stereo 3D video layout of two views in a single video track.

The following values are recognized:

`'mono'`

video is not stereo

`'left_right'`

Both views are arranged side by side, Left-eye view is on the left

`'bottom_top'`

Both views are arranged in top-bottom orientation, Left-eye view is at bottom

`'top_bottom'`

Both views are arranged in top-bottom orientation, Left-eye view is on top

`'checkerboard_rl'`

Each view is arranged in a checkerboard interleaved pattern, Left-eye view being first

`'checkerboard_lr'`

Each view is arranged in a checkerboard interleaved pattern, Right-eye view being first

`'row_interleaved_rl'`

Each view is constituted by a row based interleaving, Right-eye view is first row

`'row_interleaved_lr'`

Each view is constituted by a row based interleaving, Left-eye view is first row

`'col_interleaved_rl'`

Both views are arranged in a column based interleaving manner, Right-eye view is first column

`'col_interleaved_lr'`

Both views are arranged in a column based interleaving manner, Left-eye view is first column

`'anaglyph_cyan_red'`

All frames are in anaglyph format viewable through red-cyan filters

`'right_left'`

Both views are arranged side by side, Right-eye view is on the left

`'anaglyph_green_magenta'`

All frames are in anaglyph format viewable through green-magenta filters

`'block_lr'`

Both eyes laced in one Block, Left-eye view is first

`'block_rl'`

Both eyes laced in one Block, Right-eye view is first

For example a 3D WebM clip can be created using the following command line:

```
ffmpeg -i sample_left_right_clip.mpg -an -c:v libvpx -metadata stereo_mode=left_right -y stereo_clip.webm
```

4.9.2 Options

This muxer supports the following options:

`reserve_index_space`

By default, this muxer writes the index for seeking (called cues in Matroska terms) at the end of the file, because it cannot know in advance how much space to leave for the index at the beginning of the file. However for some use cases – e.g. streaming where seeking is possible but slow – it is useful to put the index at the beginning of the file.

If this option is set to a non-zero value, the muxer will reserve a given amount of space in the file header and then try to write the cues there when the muxing finishes. If the available space does not suffice, muxing will fail. A safe size for most use cases should be about 50kB per hour of video.

Note that cues are only written if the output is seekable and this option will have no effect if it is not.

4.10 md5

MD5 testing format.

This muxer computes and prints the MD5 hash of all the input audio and video frames. By default audio frames are converted to signed 16-bit raw audio and video frames to raw video before computing the hash.

The output of the muxer consists of a single line of the form: `MD5=MD5`, where *MD5* is a hexadecimal number representing the computed MD5 hash.

For example to compute the MD5 hash of the input converted to raw audio and video, and store it in the file `out.md5`:

```
ffmpeg -i INPUT -f md5 out.md5
```

You can print the MD5 to stdout with the command:

```
ffmpeg -i INPUT -f md5 -
```

See also the `framemd5` muxer.

4.11 mov, mp4, ismv

MOV/MP4/ISMV (Smooth Streaming) muxer.

The `mov/mp4/ismv` muxer supports fragmentation. Normally, a MOV/MP4 file has all the metadata about all packets stored in one location (written at the end of the file, it can be moved to the start for better playback by adding *faststart* to the *movflags*, or using the `qt-faststart` tool). A fragmented file consists of a number of fragments, where packets and metadata about these packets are stored together. Writing a fragmented file has the advantage that the file is decodable even if the writing is interrupted (while a normal MOV/MP4 is undecodable if it is not properly finished), and it requires less memory when writing very long files (since writing normal MOV/MP4 files stores info about every single packet in memory until the file is closed). The downside is that it is less compatible with other applications.

4.11.1 Options

Fragmentation is enabled by setting one of the AVOptions that define how to cut the file into fragments:

`-moov_size bytes`

Reserves space for the moov atom at the beginning of the file instead of placing the moov atom at the end. If the space reserved is insufficient, muxing will fail.

`-movflags frag_keyframe`

Start a new fragment at each video keyframe.

`-frag_duration duration`

Create fragments that are *duration* microseconds long.

`-frag_size size`

Create fragments that contain up to *size* bytes of payload data.

`-movflags frag_custom`

Allow the caller to manually choose when to cut fragments, by calling `av_write_frame(ctx, NULL)` to write a fragment with the packets written so far. (This is only useful with other applications integrating libavformat, not from ffmpeg.)

`-min_frag_duration duration`

Don't create fragments that are shorter than *duration* microseconds long.

If more than one condition is specified, fragments are cut when one of the specified conditions is fulfilled. The exception to this is `-min_frag_duration`, which has to be fulfilled for any of the other conditions to apply.

Additionally, the way the output file is written can be adjusted through a few other options:

`-movflags empty_moov`

Write an initial moov atom directly at the start of the file, without describing any samples in it. Generally, an mdat/moov pair is written at the start of the file, as a normal MOV/MP4 file, containing only a short portion of the file. With this option set, there is no initial mdat atom, and the moov atom only describes the tracks but has a zero duration.

This option is implicitly set when writing ismv (Smooth Streaming) files.

`-movflags separate_moof`

Write a separate moof (movie fragment) atom for each track. Normally, packets for all tracks are written in a moof atom (which is slightly more efficient), but with this option set, the muxer writes one moof/mdat pair for each track, making it easier to separate tracks.

This option is implicitly set when writing ismv (Smooth Streaming) files.

`-movflags faststart`

Run a second pass moving the index (moov atom) to the beginning of the file. This operation can take a while, and will not work in various situations such as fragmented output, thus it is not enabled by default.

`-movflags rtphint`

Add RTP hinting tracks to the output file.

`-movflags disable_chpl`

Disable Nero chapter markers (chpl atom). Normally, both Nero chapters and a QuickTime chapter track are written to the file. With this option set, only the QuickTime chapter track will be written. Nero chapters can cause failures when the file is reprocessed with certain tagging programs, like mp3Tag 2.61a and iTunes 11.3, most likely other versions are affected as well.

`-movflags omit_tfhd_offset`

Do not write any absolute base_data_offset in tfhd atoms. This avoids tying fragments to absolute byte positions in the file/streams.

`-movflags default_base_moof`

Similarly to the omit_tfhd_offset, this flag avoids writing the absolute base_data_offset field in tfhd atoms, but does so by using the new default-base-is-moof flag instead. This flag is new from 14496-12:2012. This may make the fragments easier to parse in certain circumstances (avoiding basing track fragment location calculations on the implicit end of the previous track fragment).

4.11.2 Example

Smooth Streaming content can be pushed in real time to a publishing point on IIS with this muxer. Example:

```
ffmpeg -re <normal input/transcoding options> -movflags isml+frag_keyframe -f ismv http://server/publishingpoint.isml/Streams(Encoder1)
```

4.12 mp3

The MP3 muxer writes a raw MP3 stream with the following optional features:

- An ID3v2 metadata header at the beginning (enabled by default). Versions 2.3 and 2.4 are supported, the id3v2_version private option controls which one is used (3 or 4). Setting id3v2_version to 0 disables the ID3v2 header completely.

The muxer supports writing attached pictures (APIC frames) to the ID3v2 header. The pictures are supplied to the muxer in form of a video stream with a single packet. There can be any number of those streams, each will correspond to a single APIC frame. The stream metadata tags *title* and *comment* map to APIC *description* and *picture type* respectively. See <http://id3.org/id3v2.4.0-frames> for allowed picture types.

Note that the APIC frames must be written at the beginning, so the muxer will buffer the audio frames until it gets all the pictures. It is therefore advised to provide the pictures as soon as possible to avoid excessive buffering.

- A Xing/LAME frame right after the ID3v2 header (if present). It is enabled by default, but will be written only if the output is seekable. The `write_xing` private option can be used to disable it. The frame contains various information that may be useful to the decoder, like the audio duration or encoder delay.
- A legacy ID3v1 tag at the end of the file (disabled by default). It may be enabled with the `write_id3v1` private option, but as its capabilities are very limited, its usage is not recommended.

Examples:

Write an mp3 with an ID3v2.3 header and an ID3v1 footer:

```
ffmpeg -i INPUT -id3v2_version 3 -write_id3v1 1 out.mp3
```

To attach a picture to an mp3 file select both the audio and the picture stream with `map`:

```
ffmpeg -i input.mp3 -i cover.png -c copy -map 0 -map 1  
-metadata:s:v title="Album cover" -metadata:s:v comment="Cover (Front)" out.mp3
```

Write a "clean" MP3 without any extra features:

```
ffmpeg -i input.wav -write_xing 0 -id3v2_version 0 out.mp3
```

4.13 mpegts

MPEG transport stream muxer.

This muxer implements ISO 13818-1 and part of ETSI EN 300 468.

The recognized metadata settings in mpegts muxer are `service_provider` and `service_name`. If they are not set the default for `service_provider` is "FFmpeg" and the default for `service_name` is "Service01".

4.13.1 Options

The muxer options are:

```
-mpegts_original_network_id number
```

Set the `original_network_id` (default 0x0001). This is unique identifier of a network in DVB. Its main use is in the unique identification of a service through the path `Original_Network_ID`, `Transport_Stream_ID`.

`-mpegts_transport_stream_id number`

Set the `transport_stream_id` (default 0x0001). This identifies a transponder in DVB.

`-mpegts_service_id number`

Set the `service_id` (default 0x0001) also known as program in DVB.

`-mpegts_pmt_start_pid number`

Set the first PID for PMT (default 0x1000, max 0x1f00).

`-mpegts_start_pid number`

Set the first PID for data packets (default 0x0100, max 0x0f00).

`-mpegts_m2ts_mode number`

Enable m2ts mode if set to 1. Default value is -1 which disables m2ts mode.

`-muxrate number`

Set a constant muxrate (default VBR).

`-pcr_period number`

Override the default PCR retransmission time (default 20ms), ignored if variable muxrate is selected.

`-pes_payload_size number`

Set minimum PES packet payload in bytes.

`-mpegts_flags flags`

Set flags (see below).

`-mpegts_copyts number`

Preserve original timestamps, if value is set to 1. Default value is -1, which results in shifting timestamps so that they start from 0.

`-tables_version number`

Set PAT, PMT and SDT version (default 0, valid values are from 0 to 31, inclusively). This option allows updating stream structure so that standard consumer may detect the change. To do so, reopen output `AVFormatContext` (in case of API usage) or restart `ffmpeg` instance, cyclically changing

tables_version value:

```
ffmpeg -i source1.ts -codec copy -f mpegts -tables_version 0 udp://1.1.1.1:1111
ffmpeg -i source2.ts -codec copy -f mpegts -tables_version 1 udp://1.1.1.1:1111
...
ffmpeg -i source3.ts -codec copy -f mpegts -tables_version 31 udp://1.1.1.1:1111
ffmpeg -i source1.ts -codec copy -f mpegts -tables_version 0 udp://1.1.1.1:1111
ffmpeg -i source2.ts -codec copy -f mpegts -tables_version 1 udp://1.1.1.1:1111
...
```

Option mpegts_flags may take a set of such flags:

resend_headers

Reemit PAT/PMT before writing the next packet.

latm

Use LATM packetization for AAC.

4.13.2 Example

```
ffmpeg -i file.mpg -c copy \
-mpegts_original_network_id 0x1122 \
-mpegts_transport_stream_id 0x3344 \
-mpegts_service_id 0x5566 \
-mpegts_pmt_start_pid 0x1500 \
-mpegts_start_pid 0x150 \
-metadata service_provider="Some provider" \
-metadata service_name="Some Channel" \
-y out.ts
```

4.14 null

Null muxer.

This muxer does not generate any output file, it is mainly useful for testing or benchmarking purposes.

For example to benchmark decoding with ffmpeg you can use the command:

```
ffmpeg -benchmark -i INPUT -f null out.null
```

Note that the above command does not read or write the out.null file, but specifying the output file is required by the ffmpeg syntax.

Alternatively you can write the command as:

```
ffmpeg -benchmark -i INPUT -f null -
```

4.15 nut

`-syncpoints flags`

Change the syncpoint usage in nut:

default use the normal low-overhead seeking aids.

none do not use the syncpoints at all, reducing the overhead but making the stream non-seekable;

Use of this option is not recommended, as the resulting files are very damage sensitive and seeking is not possible. Also in general the overhead from syncpoints is negligible. Note, `-write_index 0` can be used to disable all growing data tables, allowing to mux endless streams with limited memory and without these disadvantages.

timestamped extend the syncpoint with a wallclock field.

The *none* and *timestamped* flags are experimental.

`-write_index bool`

Write index at the end, the default is to write an index.

```
ffmpeg -i INPUT -f_strict experimental -syncpoints none - | processor
```

4.16 ogg

Ogg container muxer.

`-page_duration duration`

Preferred page duration, in microseconds. The muxer will attempt to create pages that are approximately *duration* microseconds long. This allows the user to compromise between seek granularity and container overhead. The default is 1 second. A value of 0 will fill all segments, making pages as large as possible. A value of 1 will effectively use 1 packet-per-page in most situations, giving a small seek granularity at the cost of additional container overhead.

4.17 segment, stream_segment, ssegment

Basic stream segmenter.

This muxer outputs streams to a number of separate files of nearly fixed duration. Output filename pattern can be set in a fashion similar to `image2`.

`stream_segment` is a variant of the muxer used to write to streaming output formats, i.e. which do not require global headers, and is recommended for outputting e.g. to MPEG transport stream segments.

`ssegment` is a shorter alias for `stream_segment`.

Every segment starts with a keyframe of the selected reference stream, which is set through the `reference_stream` option.

Note that if you want accurate splitting for a video file, you need to make the input key frames correspond to the exact splitting times expected by the segmenter, or the segment muxer will start the new segment with the key frame found next after the specified start time.

The segment muxer works best with a single constant frame rate video.

Optionally it can generate a list of the created segments, by setting the option `segment_list`. The list type is specified by the `segment_list_type` option. The entry filenames in the segment list are set by default to the basename of the corresponding segment files.

See also the hls muxer, which provides a more specific implementation for HLS segmentation.

4.17.1 Options

The segment muxer supports the following options:

`reference_stream specifier`

Set the reference stream, as specified by the string *specifier*. If *specifier* is set to `auto`, the reference is chosen automatically. Otherwise it must be a stream specifier (see the “Stream specifiers” chapter in the ffmpeg manual) which specifies the reference stream. The default value is `auto`.

`segment_format format`

Override the inner container format, by default it is guessed by the filename extension.

`segment_format_options options_list`

Set output format options using a `:`-separated list of `key=value` parameters. Values containing the `:` special character must be escaped.

`segment_list name`

Generate also a listfile named *name*. If not specified no listfile is generated.

`segment_list_flags flags`

Set flags affecting the segment list generation.

It currently supports the following flags:

‘cache’

Allow caching (only affects M3U8 list files).

`'live'`

Allow live-friendly file generation.

`segment_list_type type`

Select the listing format.

flat use a simple flat list of entries.

hls use a m3u8-like structure.

`segment_list_size size`

Update the list file so that it contains at most *size* segments. If 0 the list file will contain all the segments. Default value is 0.

`segment_list_entry_prefix prefix`

Prepend *prefix* to each entry. Useful to generate absolute paths. By default no prefix is applied.

The following values are recognized:

`'flat'`

Generate a flat list for the created segments, one segment per line.

`'csv, ext'`

Generate a list for the created segments, one segment per line, each line matching the format (comma-separated values):

segment_filename, segment_start_time, segment_end_time

segment_filename is the name of the output file generated by the muxer according to the provided pattern. CSV escaping (according to RFC4180) is applied if required.

segment_start_time and *segment_end_time* specify the segment start and end time expressed in seconds.

A list file with the suffix `".csv"` or `".ext"` will auto-select this format.

`'ext'` is deprecated in favor of `'csv'`.

`'ffconcat'`

Generate an ffconcat file for the created segments. The resulting file can be read using the FFmpeg concat demuxer.

A list file with the suffix `".ffcat"` or `".ffconcat"` will auto-select this format.

`'m3u8'`

Generate an extended M3U8 file, version 3, compliant with <http://tools.ietf.org/id/draft-pantos-http-live-streaming>.

A list file with the suffix `" .m3u8 "` will auto-select this format.

If not specified the type is guessed from the list file name suffix.

`segment_time time`

Set segment duration to *time*, the value must be a duration specification. Default value is "2". See also the `segment_times` option.

Note that splitting may not be accurate, unless you force the reference stream key-frames at the given time. See the introductory notice and the examples below.

`segment_atclocktime 1/0`

If set to "1" split at regular clock time intervals starting from 00:00 o'clock. The *time* value specified in `segment_time` is used for setting the length of the splitting interval.

For example with `segment_time` set to "900" this makes it possible to create files at 12:00 o'clock, 12:15, 12:30, etc.

Default value is "0".

`segment_time_delta delta`

Specify the accuracy time when selecting the start time for a segment, expressed as a duration specification. Default value is "0".

When delta is specified a key-frame will start a new segment if its PTS satisfies the relation:

$$PTS \geq start_time - time_delta$$

This option is useful when splitting video content, which is always split at GOP boundaries, in case a key frame is found just before the specified split time.

In particular may be used in combination with the `ffmpeg` option *force_key_frames*. The key frame times specified by *force_key_frames* may not be set accurately because of rounding issues, with the consequence that a key frame time may result set just before the specified time. For constant frame rate videos a value of $1/(2*frame_rate)$ should address the worst case mismatch between the specified time and the time set by *force_key_frames*.

`segment_times times`

Specify a list of split points. *times* contains a list of comma separated duration specifications, in increasing order. See also the `segment_time` option.

`segment_frames frames`

Specify a list of split video frame numbers. *frames* contains a list of comma separated integer numbers, in increasing order.

This option specifies to start a new segment whenever a reference stream key frame is found and the sequential number (starting from 0) of the frame is greater or equal to the next value in the list.

`segment_wrap limit`

Wrap around segment index once it reaches *limit*.

`segment_start_number number`

Set the sequence number of the first segment. Defaults to 0.

`reset_timestamps 1/0`

Reset timestamps at the begin of each segment, so that each segment will start with near-zero timestamps. It is meant to ease the playback of the generated segments. May not work with some combinations of muxers/codecs. It is set to 0 by default.

`initial_offset offset`

Specify timestamp offset to apply to the output packet timestamps. The argument must be a time duration specification, and defaults to 0.

4.17.2 Examples

- Remux the content of file `in.mkv` to a list of segments `out-000.nut`, `out-001.nut`, etc., and write the list of generated segments to `out.list`:

```
ffmpeg -i in.mkv -codec copy -map 0 -f segment -segment_list out.list out%03d.nut
```

- Segment input and set output format options for the output segments:

```
ffmpeg -i in.mkv -f segment -segment_time 10 -segment_format_options movflags=+faststart out%03d.mp4
```

- Segment the input file according to the split points specified by the *segment_times* option:

```
ffmpeg -i in.mkv -codec copy -map 0 -f segment -segment_list out.csv -segment_times 1,2,3,5,8,13,21 out%03d.nut
```

- Use the `ffmpeg force_key_frames` option to force key frames in the input at the specified location, together with the segment option `segment_time_delta` to account for possible roundings operated when setting key frame times.

```
ffmpeg -i in.mkv -force_key_frames 1,2,3,5,8,13,21 -codec:v mpeg4 -codec:a pcm_s16le -map 0 \
-f segment -segment_list out.csv -segment_times 1,2,3,5,8,13,21 -segment_time_delta 0.05 out%03d.nut
```

In order to force key frames on the input file, transcoding is required.

- Segment the input file by splitting the input file according to the frame numbers sequence specified with the `segment_frames` option:

```
ffmpeg -i in.mkv -codec copy -map 0 -f segment -segment_list out.csv -segment_frames 100,200,300,500,800 out%03d.nut
```

- Convert the `in.mkv` to TS segments using the `libx264` and `libfaac` encoders:

```
ffmpeg -i in.mkv -map 0 -codec:v libx264 -codec:a libfaac -f ssegment -segment_list out.list out%03d.ts
```

- Segment the input file, and create an M3U8 live playlist (can be used as live HLS source):

```
ffmpeg -re -i in.mkv -codec copy -map 0 -f segment -segment_list playlist.m3u8 \
-segment_list_flags +live -segment_time 10 out%03d.mkv
```

4.18 smoothstreaming

Smooth Streaming muxer generates a set of files (Manifest, chunks) suitable for serving with conventional web server.

`window_size`

Specify the number of fragments kept in the manifest. Default 0 (keep all).

`extra_window_size`

Specify the number of fragments kept outside of the manifest before removing from disk. Default 5.

`lookahead_count`

Specify the number of lookahead fragments. Default 2.

`min_frag_duration`

Specify the minimum fragment duration (in microseconds). Default 5000000.

`remove_at_exit`

Specify whether to remove all fragments when finished. Default 0 (do not remove).

4.19 tee

The tee muxer can be used to write the same data to several files or any other kind of muxer. It can be used, for example, to both stream a video to the network and save it to disk at the same time.

It is different from specifying several outputs to the `ffmpeg` command-line tool because the audio and video data will be encoded only once with the tee muxer; encoding can be a very expensive process. It is not useful when using the libavformat API directly because it is then possible to feed the same packets to several muxers directly.

The slave outputs are specified in the file name given to the muxer, separated by `'|'`. If any of the slave name contains the `'|'` separator, leading or trailing spaces or any special character, it must be escaped (see (ffmpeg-utils)the "Quoting and escaping" section in the ffmpeg-utils(1) manual).

Muxer options can be specified for each slave by prepending them as a list of *key=value* pairs separated by `':'`, between square brackets. If the options values contain a special character or the `':'` separator, they must be escaped; note that this is a second level escaping.

The following special options are also recognized:

`f`

Specify the format name. Useful if it cannot be guessed from the output name suffix.

`bsfs[/spec]`

Specify a list of bitstream filters to apply to the specified output.

It is possible to specify to which streams a given bitstream filter applies, by appending a stream specifier to the option separated by `/`. *spec* must be a stream specifier (see Format stream specifiers). If the stream specifier is not specified, the bitstream filters will be applied to all streams in the output.

Several bitstream filters can be specified, separated by `","`.

`select`

Select the streams that should be mapped to the slave output, specified by a stream specifier. If not specified, this defaults to all the input streams.

4.19.1 Examples

- Encode something and both archive it in a WebM file and stream it as MPEG-TS over UDP (the streams need to be explicitly mapped):

```
ffmpeg -i ... -c:v libx264 -c:a mp2 -f tee -map 0:v -map 0:a  
"archive-20121107.mkv|[f=mpegts]udp://10.0.1.255:1234/"
```

- Use `ffmpeg` to encode the input, and send the output to three different destinations. The `dump_extra` bitstream filter is used to add extradata information to all the output video keyframes packets, as requested by the MPEG-TS format. The `select` option is applied to `out.aac` in order to make it contain only audio packets.

```
ffmpeg -i ... -map 0 -flags +global_header -c:v libx264 -c:a aac -strict experimental
-f tee "[bsfs/v=dump_extra]out.ts|[movflags=+faststart]out.mp4|[select=a]out.aac"
```

- As below, but select only stream a : 1 for the audio output. Note that a second level escaping must be performed, as ":" is a special character used to separate options.

```
ffmpeg -i ... -map 0 -flags +global_header -c:v libx264 -c:a aac -strict experimental
-f tee "[bsfs/v=dump_extra]out.ts|[movflags=+faststart]out.mp4|[select='\a:1\' ]out.aac"
```

Note: some codecs may need different options depending on the output format; the auto-detection of this can not work with the tee muxer. The main example is the `global_header` flag.

4.20 webm_dash_manifest

WebM DASH Manifest muxer.

This muxer implements the WebM DASH Manifest specification to generate the DASH manifest XML.

4.20.1 Options

This muxer supports the following options:

`adaptation_sets`

This option has the following syntax: "`id=x,streams=a,b,c id=y,streams=d,e`" where x and y are the unique identifiers of the adaptation sets and a,b,c,d and e are the indices of the corresponding audio and video streams. Any number of adaptation sets can be added using this option.

4.20.2 Example

```
ffmpeg -f webm_dash_manifest -i video1.webm \
-f webm_dash_manifest -i video2.webm \
-f webm_dash_manifest -i audio1.webm \
-f webm_dash_manifest -i audio2.webm \
-map 0 -map 1 -map 2 -map 3 \
-c copy \
-f webm_dash_manifest \
-adaptation_sets "id=0,streams=0,1 id=1,streams=2,3" \
manifest.xml
```

5 Metadata

FFmpeg is able to dump metadata from media files into a simple UTF-8-encoded INI-like text file and then load it back using the metadata muxer/demuxer.

The file format is as follows:

1. A file consists of a header and a number of metadata tags divided into sections, each on its own line.
2. The header is a `'FFMETADATA'` string, followed by a version number (now 1).
3. Metadata tags are of the form `'key=value'`

4. Immediately after header follows global metadata
5. After global metadata there may be sections with per-stream/per-chapter metadata.
6. A section starts with the section name in uppercase (i.e. STREAM or CHAPTER) in brackets ('[', ']') and ends with next section or end of file.
7. At the beginning of a chapter section there may be an optional timebase to be used for start/end values. It must be in form 'TIMEBASE=num/den', where num and den are integers. If the timebase is missing then start/end times are assumed to be in milliseconds. Next a chapter section must contain chapter start and end times in form 'START=num', 'END=num', where num is a positive integer.
8. Empty lines and lines starting with ';' or '#' are ignored.
9. Metadata keys or values containing special characters ('=', ';', '#', '\', and a newline) must be escaped with a backslash '\'.
10. Note that whitespace in metadata (e.g. foo = bar) is considered to be a part of the tag (in the example above key is 'foo ', value is ' bar').

A ffmetadata file might look like this:

```
;FFMETADATA1
title=bike\shed
;this is a comment
artist=FFmpeg troll team

[CHAPTER]
TIMEBASE=1/1000
START=0
#chapter ends at 0:01:00
END=60000
title=chapter \#1
[STREAM]
title=multi\
line
```

By using the ffmetadata muxer and demuxer it is possible to extract metadata from an input file to an ffmetadata file, and then transcode the file into an output file with the edited ffmetadata file.

Extracting an ffmetadata file with `ffmpeg` goes as follows:

```
ffmpeg -i INPUT -f ffmetadata FFMETADATAFILE
```

Reinserting edited metadata information from the FFMETADATAFILE file can be done as:

```
ffmpeg -i INPUT -i FFMETADATAFILE -map_metadata 1 -codec copy OUTPUT
```

6 See Also

ffmpeg, ffplay, ffprobe, ffserver, libavformat

7 Authors

The FFmpeg developers.

For details about the authorship, see the Git history of the project ([git://source.ffmpeg.org/ffmpeg](http://source.ffmpeg.org/ffmpeg)), e.g. by typing the command `git log` in the FFmpeg source directory, or browsing the online repository at <http://source.ffmpeg.org>.

Maintainers for the specific components are listed in the file `MAINTAINERS` in the source code tree.

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