

MPV

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MPV – What is MPV?

MPV is a free (as in freedom) media player for the command line.

It supports a wide variety of media file formats, **audio** and **video** codecs, and **subtitle** types.

- Website: <https://mpv.io/>
- Source Code: <https://github.com/mpv-player/mpv>
- Contributors: 323
- Latest Release: 0.33.0 - November 22, 2020
- Operating system: BSD-based, Linux, macOS, Windows

MPV Human sensors and digitization

Humans sense of...

- Vision - visual system – Eyes – Captured by Camera.
- Hearing - auditory system – Ears – Captured by Microphone.
- Touch - somatosensory system – Skin - ?
- Smell - olfactory system – Nose - ?
- Taste - gustatory system – Mouth - ?

Visual and Auditory systems:

Capture and digitized, allowing data storage and transmission.

Reproduction through video displays (including subtitles) and loud speakers.

MPV – Audio vs. Video

The Information is in the sound.

That's why TV is called “Radio with Pictures”.

Add sub-titling for video.

Propagation:

Visual information arrives at 3×10^8 m/s.

Sound information at 300m/s.

Visual and Audio information may be “naturally” out of sync.

Need to adjust the the sync between video and audio:

- Lightning strike and thunder.
- Someone in the distance chopping wood with an axe.
- Different transmission paths for Video and Audio.

MPV – Digitizing Audio and Video

Audio:

Capture 20Hz to 20KHz

Sample at 44.1KHz with 16 bits of data for two channels.
1,411,200 b/s ~ 1.4Mb/s

Video:

Capture 400 to 800 THz

Sample at 25Hz with 1920 x 1080 x 3 (RGB) x 8bit data.
1,244,160,000 b/s ~ 1.2Gb/s

Subtitles:

Multiple subtitle languages available for display.

MPV - History

- 2000 ffmpeg. A command-line tool that converts audio or video formats. It can also capture and encode in real-time from various hardware and software sources such as a TV capture card.
- 2000 FFPlay is a multiformat video player.
- 2000 Mplayer. Command line Media Player
- 2007 FFprobe multimedia streams analyzer with a command-line interface based on the FFmpeg project libraries.
- 2010 MPlayer2 forked from MPlayer
- 2012 **MPV** was forked from MPlayer2
 - encourage developer activity by:
 - removing unmaintainable code.
 - dropping support for very old systems.
- mpv is designed to be used directly by other applications through a library interface called libmpv

MPV - Installation

MPV included in Ubuntu Mate distro since 20.04.

Installation on Debian system:

```
$ sudo apt install mpv
```

Total of 47 dependencies....

MPV \$ apt show mpv – Dependencies. 1/3

libarchive13	Multi-format archive and compression library (shared library)
libasound2	shared library for ALSA applications
libass9	library for SSA/ASS subtitles rendering
libavcodec58	FFmpeg library with de/encoders for audio/video codecs - runtime files
libavdevice58	FFmpeg library for handling input and output devices - runtime files
libavfilter7	FFmpeg library containing media filters - runtime files
libavformat58	FFmpeg library with (de)muxers for multimedia containers - runtime files
libavutil56	FFmpeg library with functions for simplifying programming - runtime files
libbluray2	Blu-ray disc playback support library (shared library)
libc6	GNU C Library: Shared libraries
libcaca0	colour ASCII art library
libcdio-cdda2	library to read and control digital audio CDs
libcdio-paranoia2	library to read digital audio CDs with error correction
libcdio18	library to read and control CD-ROM
libdrm2	Userspace interface to kernel DRM services -- runtime
libdvdnav4	DVD navigation library

MPV \$ apt show mpv – Dependencies. 2/3

libegl1	Vendor neutral GL dispatch library -- EGL support
libgbm1	generic buffer management API -- runtime
libgl1	Vendor neutral GL dispatch library -- legacy GL support
libjack-jackd2-0	JACK Audio Connection Kit (libraries)
libjpeg8	Independent JPEG Group's JPEG runtime library (dependency package)
liblcms2-2	Little CMS 2 color management library
liblua5.2-0	Shared library for the Lua interpreter version 5.2
libpulse0	PulseAudio client libraries
librubberband2	audio time-stretching and pitch-shifting library
libsdl2-2.0-0	Simple DirectMedia Layer
libsmbclient	shared library for communication with SMB/CIFS servers
libsndio7.0	Small audio and MIDI framework from OpenBSD, runtime libraries
libswresample3	FFmpeg library for audio resampling, rematrixing etc. - runtime files
libswscale5	FFmpeg library for image scaling and various conversions - runtime files
libuchardet0	universal charset detection library - shared library
libva-drm2	Video Acceleration (VA) API for Linux -- DRM runtime

MPV \$ apt show mpv – Dependencies. 3/3

libva-wayland2	Video Acceleration (VA) API for Linux -- Wayland runtime
libva-x11-2	Video Acceleration (VA) API for Linux -- X11 runtime
libva2	Video Acceleration (VA) API for Linux -- runtime
libvdpau1	Video Decode and Presentation API for Unix (libraries)
libwayland-client0	wayland compositor infrastructure - client library
libwayland-cursor0	wayland compositor infrastructure - cursor library
libwayland-egl1	wayland compositor infrastructure - EGL library
libx11-6	X11 client-side library
libxext6	X11 miscellaneous extension library
libxinerama1	X11 Xinerama extension library
libxkbcommon0	library interface to the XKB compiler - shared library
libxrandr2	X11 RandR extension library
libxss1	X11 Screen Saver extension library
libxv1	X11 Video extension library
zlib1g	compression library - runtime

MPV - Documentation <https://mpv.io/manual/stable/>

Main Categories of Commands...

Track Selection	Playback Control	Program Behavior
Video	Audio	Subtitles
Window	Disc Devices	Equalizer
Demuxer	Input	OSD – On Screen Display
Screenshot	Software Scaler	Audio Resampler
Terminal	Cache	Network
DVB - Digital Video Broadcasting	ALSA audio output options	GPU renderer options

```
$ mpv -list-options
```

```
...
```

```
Total: 883 options
```

MPV – Basic Command

\$ mpv *path/filename* or *http link* or *DVD*

Example:

RNZ website gives Advanced Audio Coding links for their Concert program as:

- https://stream-ice.radionz.co.nz/Concert_aac128.m3u
- https://stream-ice.radionz.co.nz/Concert_aac128.xspf

These are text files. MPV extracts the real link...

https://radionz-ice.streamguys.com:80/Concert_aac128

See next slides...

MPV – Reading a “m3u” script file to get a link.

```
$ wget https://stream-ice.radionz.co.nz/Concert_aac128.m3u
--2021-02-27 18:29:42-- https://stream-ice.radionz.co.nz/Concert_aac128.m3u
Resolving stream-ice.radionz.co.nz (stream-ice.radionz.co.nz)...
216.246.10.227
Connecting to stream-ice.radionz.co.nz (stream-ice.radionz.co.nz)|
216.246.10.227|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 54 [audio/x-mpegurl]
Saving to: 'Concert_aac128.m3u'
```

```
Concert_aac128.m3u 100%[=====>]          54  --.-KB/s    in 0s
```

```
2021-02-27 18:29:44 (6.02 MB/s) - 'Concert_aac128.m3u' saved [54/54]
```

```
$ cat Concert_aac128.m3u
https://radionz-ice.streamguys.com:80/Concert_aac128
```

MPV - Reading a “xspf” script file to get a link. 1/2

```
$ wget https://stream-ice.radionz.co.nz/Concert_aac128.xspf
--2021-02-27 18:32:12-- https://stream-ice.radionz.co.nz/Concert_aac128.xspf
Resolving stream-ice.radionz.co.nz (stream-ice.radionz.co.nz)...
216.246.10.227
Connecting to stream-ice.radionz.co.nz (stream-ice.radionz.co.nz)|
216.246.10.227|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 503 [application/xspf+xml]
Saving to: 'Concert_aac128.xspf'

Concert_aac128.xspf 100%[=====>]          503  --.-KB/s    in 0s

2021-02-27 18:32:15 (29.6 MB/s) - 'Concert_aac128.xspf' saved [503/503]
```

MPV - Reading a “xspf” script file to get a link. 2.2

```
$ cat Concert_aac128.xspf
```

```
<?xml version="1.0" encoding="UTF-8"?>
<playlist xmlns="http://xspf.org/ns/0/" version="1">
  <title/>
  <creator/>
  <trackList>
    <track>
      <location>http://radionz-ice.streamguys.com:80/Concert\_aac128</location>
      <title/>
      <annotation>Stream Title: RNZ Concert
Stream Description: RNZ Concert
Content Type:audio/aacp
Bitrate: 128
Current Listeners: 3
Peak Listeners: 13
Stream Genre: Classical</annotation>
      <info>rnz.co.nz/concert</info>
    </track>
  </trackList>
</playlist>
```

MPV – Various links. Same stream...

```
$ mpv https://stream-ice.radionz.co.nz/Concert_aac128.m3u
Playing: https://radionz-ice.streamguys.com:80/Concert_aac128
(+) Audio --aid=1 (aac 2ch 48000Hz)
AO: [pulse] 48000Hz stereo 2ch float
A: 00:00:00 / 00:00:05 (19%) Cache: 3.8s/150KB
```

```
$ mpv https://stream-ice.radionz.co.nz/Concert_aac128.xspf
(+) Audio --aid=1 (aac 2ch 48000Hz)
AO: [pulse] 48000Hz stereo 2ch float
A: 00:00:00 / 00:00:04 (19%) Cache: 3.8s/149KB
```

```
$ mpv https://radionz-ice.streamguys.com:80/Concert_aac128
(+) Audio --aid=1 (aac 2ch 48000Hz)
AO: [pulse] 48000Hz stereo 2ch float
A: 00:00:00 / 00:00:05 (19%) Cache: 3.9s/152KB
```


MPV – More fancy commands

Play it in your MATE terminal window with a nice waveform display...

```
$ mpv --config=no --quiet --vo=tct --lavfi-  
complex='[aid1]asplit[ao][a1];  
[a1]avectorscope=r=25:m=lissajous_xy:bc=200:gc=100:rc=75:bf=5:  
gf=3:rf=1:zoom=2[vo]' http://i.mjh.nz/au/Sydney/radio.ih.6186
```

Example:

Streaming TV channel

```
$ mpv https://www.teaomaori.news/30m-te-mana-o-te-wai-fund-now-open
```

MPV - API

Beyond working as a stand-alone media player, mpv is designed to be used directly by other applications through a library interface called libmpv.

Lua scripting:

- mpv's behavior and functions are customizable via use of small programs written in the Lua scripting language,

Python-mpv:

- python-mpv is a ctypes-based python interface to the mpv media player. It gives you more or less full control of all features of the player, just as the lua interface does.
- <https://github.com/jaseg/python-mpv>
- <https://mpv.readthedocs.io/en/latest/api.html>

MPV – Python wrapper for the API

```
$ pip3 install python-mpv
```

```
Collecting python-mpv
```

```
  Downloading python-mpv-0.5.2.tar.gz (25 kB)
```

```
Building wheels for collected packages: python-mpv
```

```
  Building wheel for python-mpv (setup.py) ... done
```

```
  Created wheel for python-mpv: filename=python_mpv-0.5.2-  
py3-none-any.whl size=20964  
sha256=7ef17cacc5f68d8747eab6c4f32921b28bf092a48f9d177fdb98  
1ed04033990e
```

```
  Stored in directory:
```

```
/home/ian/.cache/pip/wheels/ea/34/4b/f608dc1505aae2117cb36b  
3b0b9a5e642f3714650387e46798
```

```
Successfully built python-mpv
```

```
Installing collected packages: python-mpv
```

```
Successfully installed python-mpv-0.5.2
```

MPV – GUI's Open source front-ends of mpv

Based on "libmpv" or the command-line version of mpv...

- Baka MPlayer
- Deepin Movie
- GNOME MPV
- Celluloid (formerly GNOME MPV) – Included with Ubuntu Mate 20.04
- IINA
- Kawaii-Player
- Media Player Classic Qute Theater (mpc-qt)
- mpv for Android
- mpv.net
- OvoPlayer
- SMPlayer
- Sugoi Player
- xt7-player-mpv

MPV – Celluloid



MPV – Abbreviations in Command Options

Examples:

- AO ~ audio output
- VO ~ video output
- AF ~ audio filter
- VF ~ video filter
- SUB ~ subtitle
- OSD ~ on screen display
- DRM ~ digital rights management
- DVD ~ Digital video disc

MPV - Configuration

Your preferences may be placed in a configuration file in...

~/.config/mpv/mpv.conf

Example:

```
sub-visibility=yes
sub-auto=fuzzy
#alang: jpn, jp, en
#slang: jpn, jp, en
audio-file-auto=fuzzy
save-position-on-quit=yes
autofit-larger=100%x100%
geometry=50%:50%
sub-font="SimSun"
sub-font-size=50
```

MPV – End / Questions?