

# PulseAudio

PulseAudio is a networked sound server, similar in theory to the [Enlightened Sound Daemon](#) (EsoundD). PulseAudio is however much more advanced and has numerous features.

A sound server can serve many functions:

- Software mixing of multiple audio streams, bypassing any restrictions the hardware has.
- Network transparency, allowing an application to play back or record audio on a different machine than the one it is running on.
- Sound API abstraction, alleviating the need for multiple backends in applications to handle the wide diversity of sound systems out there.
- Generic hardware abstraction, giving the possibility of doing things like individual volumes per application.

PulseAudio comes with many [plugin modules](#). All audio from/to clients and audio interfaces goes through modules.

Manuel Amador created [a diagram](#) describing how the different parts of PulseAudio play together. (Not all [modules](#) are shown.) Another, simpler architecture diagram is attached to this page (scroll to the bottom).

PulseAudio clients can send audio to "sinks" and receive audio from "sources". A client can be GStreamer, xinelib, MPlayer or any other audio application. Only the device drivers/audio interfaces can be either sources or sinks (they are often hardware in- and out-puts).

Ol-Hipster, PulseAudio-10.0 port:

```
/export/home/kmays$ uname -a
```

```
SunOS external 5.11 illumos-fd3bae1 i86pc i386 i86pc Solaris
```

```
/export/home/kmays$ /opt/pulseaudio-10.0/bin/pulseaudio --version
```

```
pulseaudio 10.0
```

```
/export/home/kmays$ /opt/pulseaudio-10.0/bin/pulseaudio --dump-modules
```

- module-allow-passthrough When a passthrough stream is requested, route all the other streams to a dummy device
- module-always-sink Always keeps at least one sink loaded even if it's a null one
- module-augment-properties Augment the property sets of streams with additional static information
- module-card-restore Automatically restore profile of cards
- module-cli Command line interface
- module-cli-protocol-tcp Command line interface protocol (TCP sockets)
- module-cli-protocol-unix Command line interface protocol (UNIX sockets)
- module-combine Compatibility module (module-combine rename)
- module-combine-sink Combine multiple sinks to one
- module-console-kit Create a client for each ConsoleKit session of this user
- module-dbus-protocol D-Bus interface
- module-default-device-restore Automatically restore the default sink and source
- module-detect Detect available audio hardware and load matching drivers
- module-device-manager Keep track of devices (and their descriptions) both past and present and prioritise by role
- module-device-restore Automatically restore the volume/mute state of devices
- module-echo-cancel Echo Cancellation
- module-filter-apply Load filter sinks automatically when needed
- module-filter-heuristics Detect when various filters are desirable
- module-http-protocol-tcp HTTP (TCP sockets)
- module-http-protocol-unix HTTP (UNIX sockets)
- module-intended-roles Automatically set device of streams based on intended roles of devices
- module-ladspa-sink Virtual LADSPA sink
- module-loopback Loopback from source to sink
- module-match Playback stream expression matching module
- module-native-protocol-fd Native protocol autospawn helper
- module-native-protocol-tcp Native protocol (TCP sockets)
- module-native-protocol-unix Native protocol (UNIX sockets)
- module-null-sink Clocked NULL sink
- module-null-source Clocked NULL source
- module-oss OSS Sink/Source
- module-pipe-sink UNIX pipe sink
- module-pipe-source UNIX pipe source
- module-position-event-sounds Position event sounds between L and R depending on the position on screen of the widget triggering them.
- module-raop-discover mDNS/DNS-SD Service Discovery of RAOP devices
- module-raop-sink RAOP Sink
- module-remap-sink Virtual channel remapping sink
- module-remap-source Virtual channel remapping source
- module-rescue-streams When a sink/source is removed, try to move its streams to the default sink/source
- module-role-cork Mute & cork streams with certain roles while others exist
- module-role-ducking Apply a ducking effect based on streams roles
- module-rtp-recv Receive data from a network via RTP/SAP/SDP
- module-rtp-send Read data from source and send it to the network via RTP/SAP/SDP
- module-rygel-media-server UPnP MediaServer Plugin for Rygel

- module-simple-protocol-tcp            Simple protocol (TCP sockets)
- module-simple-protocol-unix        Simple protocol (UNIX sockets)
- module-sine                            Sine wave generator
- module-sine-source                  Sine wave generator source
- module-solaris                        Solaris Sink/Source
- module-stream-restore                Automatically restore the volume/mute/device state of streams
- module-suspend-on-idle                When a sink/source is idle for too long, suspend it
- module-switch-on-connect              When a sink/source is added, switch to it or conditionally switch to it
- module-switch-on-port-available      n/a
- module-tunnel-sink                    Tunnel module for sinks
- module-tunnel-sink-new                Create a network sink which connects via a stream to a remote PulseAudio server
- module-tunnel-source                 Tunnel module for sources
- module-tunnel-source-new             Create a network source which connects via a stream to a remote PulseAudio server
- module-virtual-sink                  Virtual sink
- module-virtual-source                Virtual source
- module-virtual-surround-sink        Virtual surround sink
- module-volume-restore                Compatibility module
- module-x11-bell                        X11 bell interceptor
- module-x11-cork-request              Synthesize X11 media key events when cork/uncork is requested
- module-x11-publish                    X11 credential publisher
- module-x11-xsmp                        X11 session management
- module-zeroconf-discover             mDNS/DNS-SD Service Discovery
- module-zeroconf-publish              mDNS/DNS-SD Service Publisher

/opt/pulseaudio-10.0/bin/pulseaudio --dump-resample-methods

- trivial
- speex-float-0
- speex-float-1
- speex-float-2
- speex-float-3
- speex-float-4
- speex-float-5
- speex-float-6
- speex-float-7
- speex-float-8
- speex-float-9
- speex-float-10
- speex-fixed-0
- speex-fixed-1
- speex-fixed-2
- speex-fixed-3
- speex-fixed-4
- speex-fixed-5
- speex-fixed-6
- speex-fixed-7
- speex-fixed-8
- speex-fixed-9
- speex-fixed-10
- ffmpeg
- auto
- copy
- peaks

## Troubleshooting

After an update, the PulseAudio daemon may fail to start, for example:

```
$ uname -rsv
SunOS 5.11 illumos-63982b82e6 Solaris

$ pkg info pulseaudio
    Name: library/audio/pulseaudio
    Summary: Sample Rate Converter for audio
    Category: System/Multimedia Libraries
    State: Installed
    Publisher: openindiana.org
    Version: 10.0
    Branch: 2017.0.0.0
    Packaging Date: Sun Apr 23 08:35:43 2017
    Size: 12.60 MB
    FMRI: pkg://openindiana.org/library/audio/pulseaudio@10.0-2017.0.0.0:20170423T083543Z
    Project URL: http://www.freedesktop.org/wiki/Software/PulseAudio/
    Source URL: http://freedesktop.org/software/pulseaudio/releases/pulseaudio-10.0.tar.gz
```

From syslog:

```
[2017-04-25 14:59:10] xxx pulseaudio[2731]: [ID 295310 user.error] [solaris] sink.c: Assertion '!
pa_thread_mq_get()' failed at pulsecore/sink.c:2229, function pa_sink_set_mute(). Aborting.
[2017-04-25 14:59:10] xxx genunix: [ID 603404 kern.notice] NOTICE: core_log: pulseaudio[2731] core dumped:
/export/tmp/cores/core.pulseaudio.2731
```

and you see no elements in *mate-volume-control-applet* preferences (see ticket: <https://www.illumos.org/issues/8110>).

This is usually due to regressions in PulseAudio for handling modules and configuration databases: the only known workaround is to make sure the configuration files match the default Hipster files and remove the configuration in the user's home directory. Similar issues have been reported in Linux distributions.