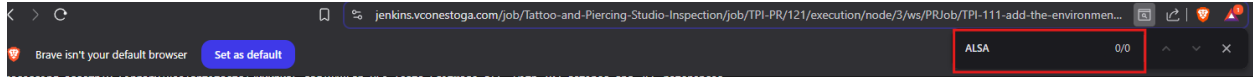


# ALSA Issue on Building a WebGL on Linux

- VARLAB 2025 S5 -

## Bug Description - This bug is already fixed



### Jira Ticket

The WebGL build seems to be failing to import the audio into the simulation

: <https://varlab-dev.atlassian.net/browse/CORE-1522>

### What is ALSA?

: ALSA stands for Advanced Linux Sound Architecture, and it is Linux default audio driver.

### Error Logs

1. ALSA lib confmisc.c:855:(parse\_card) cannot find card '0'
2. ALSA lib conf.c:5178:(\_snd\_config\_evaluate) function snd\_func\_card\_inum returned **error**: No such file or directory
3. ALSA lib confmisc.c:422:(snd\_func\_concat) error evaluating strings
4. ALSA lib conf.c:5178:(\_snd\_config\_evaluate) function snd\_func\_concat returned **error**: No such file or directory
5. ALSA lib confmisc.c:1334:(snd\_func\_refer) error evaluating name
6. ALSA lib conf.c:5178:(\_snd\_config\_evaluate) function snd\_func\_refer returned **error**: No such file or directory
7. ALSA lib conf.c:5701:(snd\_config\_expand) Evaluate **error**: No such file or directory
8. ALSA lib pcm.c:2664:(snd\_pcm\_open\_noupdate) Unknown PCM default

### Error Logs Analyzing

1. **ALSA lib confmisc.c:855:(parse\_card) cannot find card '0'**
  - ALSA is trying to find a sound card with ID 0, but no such card exists
  - This happens when there is no configured or detected sound device in the system
2. **ALSA lib conf.c:5178:(\_snd\_config\_evaluate) function snd\_func\_card\_inum returned error: No such file or directory**
  - ALSA is evaluating the sound configuration and calling snd\_func\_card\_inum.
  - This function failed because it couldn't find the required configuration file or sound card.
3. **ALSA lib confmisc.c:422:(snd\_func\_concat) error evaluating strings**
  - ALSA encountered an error while trying to concatenate or process configuration strings.
  - This could be due to a missing or incorrect configuration entry in the ALSA configuration file.
4. **ALSA lib conf.c:5178:(\_snd\_config\_evaluate) function snd\_func\_concat returned error: No such file or directory**

- ALSA tried to execute `snd_func_concat`, but it failed because a required configuration file or entry is missing.
- This likely happened due to an incomplete or incorrect ALSA configuration.

**5. ALSA lib confmisc.c:1334:(snd\_func\_refer) error evaluating name**

- ALSA attempted to reference a configuration entry, but it failed due to an incorrect or missing reference.
- This usually means that a required ALSA setting is not properly defined.

**6. ALSA lib conf.c:5178:(\_snd\_config\_evaluate) function snd\_func\_refer returned error: No such file or directory**

- ALSA configuration file(`asound.conf`) is missing

**7. ALSA lib conf.c:5701:(snd\_config\_expand) Evaluate error: No such file or directory**

- ALSA tried to expand its configuration, but the required configuration file or device does not exist.
- Usually occurs when ALSA cannot read the default configuration (`/usr/share/alsa/alsa.conf`).

**8. ALSA lib pcm.c:2664:(snd\_pcm\_open\_noupdate) Unknown PCM default**

- LSA tried to open the default PCM device (default) but couldn't find it.
- Usually happens when there is no virtual audio device (`snd-dummy`, etc.) or the default sound card settings are wrong.

# Bug Fix

## Steps to Fix the Bug

: This document will be useful for reviewing this bug fix process

### 1. Install [libasound2](#)

```
sudo apt update
```

```
sudo apt install libasound2
```

```
ldconfig -p | grep libasound.so.2 (Check the installation)
```

#### Troubleshooting

**System::init** returns **FMOD\_ERR\_PLUGIN\_MISSING**:

This can happen if your machine is missing the ALSA library `libasound.so.2` for the desired architecture, almost any version of it will be sufficient. Please note that if you are on an `x86_64` platform running an `x86` application using FMOD you will need the `x86` version of ALSA installed also.

```
jenkins-ubuntu-dev-test@jenkins-ubuntu-dev-test:~$ ldconfig -p | grep libasound.so.2
libasound.so.2 (libc6,x86-64) => /lib/x86_64-linux-gnu/libasound.so.2
```

### 2. Install [PulseAudio](#)

```
sudo apt update
```

```
sudo apt install pulseaudio
```

```
ps aux | grep pulseaudio (Check the installation and Process running)
```

#### Device Selection

FMOD defaults to using PulseAudio if available if no device is specified via **System::setOutput**. The environment variable `FMOD_ALSA_DEVICE` can be used to override this behavior, causing FMOD to use ALSA by default. It will also select the device specified by the variable value, if found, by default. Device names are as specified by the output of `aplay -L`.

```
jenkins-ubuntu-dev-test@jenkins-ubuntu-dev-test:~$ dpkg -l | grep pulseaudio
ii pulseaudio          1:15.99.1+dfsg1-1ubuntu2.2      amd64      PulseAudio sound server
ii pulseaudio-utils    1:15.99.1+dfsg1-1ubuntu2.2      amd64      Command line tools for the PulseAudio sound server
ii xfce4-pulseaudio-plugin:amd64 0.4.3-1                         amd64      Xfce4 panel plugin to control pulseaudio
```

`pactl list sinks` (A list of output devices (sinks) currently recognized by PulseAudio)

```
jenkins-ubuntu-dev-test@jenkins-ubuntu-dev-test:/var/lib/jenkins/workspace$ pactl list sinks
Sink #0
    State: SUSPENDED
    Name: auto_null
    Description: Dummy Output
    Driver: module-null-sink.c
    Sample Specification: s16le 2ch 44100Hz
    Channel Map: front-left,front-right
    Owner Module: 10
    Mute: no
    Volume: front-left: 65536 / 100% / 0.00 dB, front-right: 65536 / 100% / 0.00 dB
           balance 0.00
    Base Volume: 65536 / 100% / 0.00 dB
    Monitor Source: auto_null.monitor
    Latency: 0 usec, configured 0 usec
    Flags: DECIBEL_VOLUME LATENCY SET_FORMATS
    Properties:
        device.description = "Dummy Output"
        device.class = "abstract"
        device.icon_name = "audio-card"
    Formats:
        pcm
```

It's not a problem that it's SUSPENDED now

When FMOD starts initializing and playing, it will change to RUNNING normally

3. Make sure ALSA is correctly configured to route audio through PulseAudio.

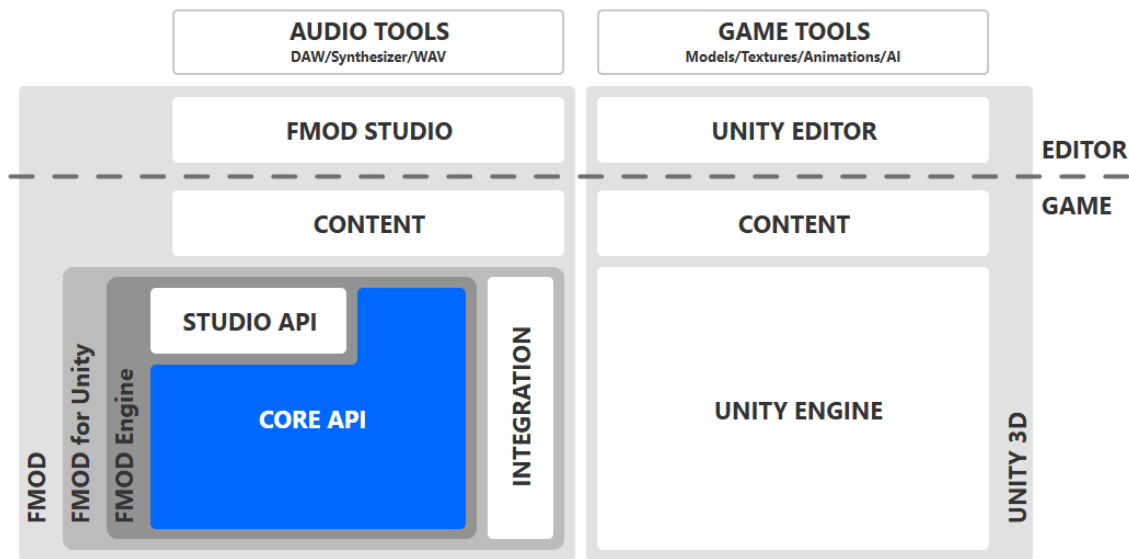
```
jenkins-ubuntu-dev-test@jenkins-ubuntu-dev-test:/etc/pulse$ aplay -L
null
    Discard all samples (playback) or generate zero samples (capture)
samplerate
    Rate Converter Plugin Using Samplerate Library
speexrate
    Rate Converter Plugin Using Speex Resampler
jack
    JACK Audio Connection Kit
oss
    Open Sound System
pulse
    PulseAudio Sound Server
upmix
    Plugin for channel upmix (4,6,8)
vdownmix
    Plugin for channel downmix (stereo) with a simple spacialization
default
    Playback/recording through the PulseAudio sound server
```

# Analyzing

## Why we WebGL needs 'ALSA'?

: Unity's built-in audio system is powered by **FMOD Core API**, which handles low-level audio management.

This is **separate and independent from** the **FMOD Studio** system, which is a full-featured **audio middleware** that integrates with Unity via an external plugin (FMOD Studio Unity Integration).



**Core API:** An interface to the low level features of the FMOD Engine, ideal for adding custom features and providing deeper access to hardware functionality.

Unity initializes **FMOD Core API**, the low-level audio engine that powers Unity's built-in audio system. As part of this initialization, FMOD Core API directly interfaces with the underlying audio architecture of the host operating system — **WASAPI** on Windows, **ALSA** on Linux, and **CoreAudio** on macOS.

[Discussions of Unity Base Audio Engine]

>> <https://qa.fmod.com/t/is-unitys-audio-system-actually-fmod-core/17463>

>> <https://discussions.unity.com/t/unitys-base-audio-engine/829921>

[Article for running and trouble shutting about Unity on Linux headless environment]

>> [Running Unity3D in a Virtualized Headless Ubuntu Environment | by Jon Ibasco | Medium](#)

For more details about FMOD features on different operating systems, please refer to [this FMOD documentation](#) and [This YouTube video](#) can give a better understanding of the relationship between 'FMOD' and 'Unity'.

In conclusion, ASLA and FMOD related issue may occur if we change our target player WebGL to other, but it is not a big deal right now

Target Platform Whether to use FMOD	
WebGL	Doesn't use FMOD Core API (replaces Web Audio API)
Windows	Use FMOD Core API
macOS	Use FMOD Core API
Linux	Use FMOD Core API
Android	Use FMOD Core API
iOS	Use FMOD Core API