

Resampler Viewed from 10,000 Feet High

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Outline

This slide tries to understand the practical uses of resampler method in PulseAudio. This is **not** an explanation of complicated algorithms for resampler.

- 1 Experiment
- 2 Result
- 3 Summary

Hardware Configuration

- Lenovo ThinkPad T410
- Intel(R) Core(TM) i5 CPU M 560 @ 2.67GHz (4 cores)
- 2.8 GB Memory

Software Configuration

- Kernel: 2.6.40-4.fc15.i686 #1 SMP Fri Jul 29 18:54:39 UTC 2011 i686 i686 i386 GNU/Linux
- PulseAudio: 16147ae8283cb634f55e76f63395a599a69b78b5 (Mon Aug 15 22:31:55 2011 +0530)

Test Script

```
# $1: directory to put the output data
# $2: #nr of clients to pulseaudio
# $3: resampler method

### pulseaudio ###
pulseaudio -k
sudo sed -i -r "s/(resample-method = ).*/\1$3/" /usr/etc/pulse/daemon.conf
pulseaudio &
sleep 1

### clients ###
for i in `seq 1 $2`;
do
    sndfile-play music/16_WAV_48000Hz_stereo_16bit.wav &
done
sleep 1

### stat ###
perf record -p `pidof pulseaudio` &
pidstat -p `pidof pulseaudio` -u 1 > cpu.txt &
sleep 25

### cleanup ###
kill -USR1 perf && kill pidstat
mkdir $1 && mv perf.data $1/ && mv cpu.txt $1/
kill sndfile-play
pulseaudio -k

wait
```

Things to be studied - Variables

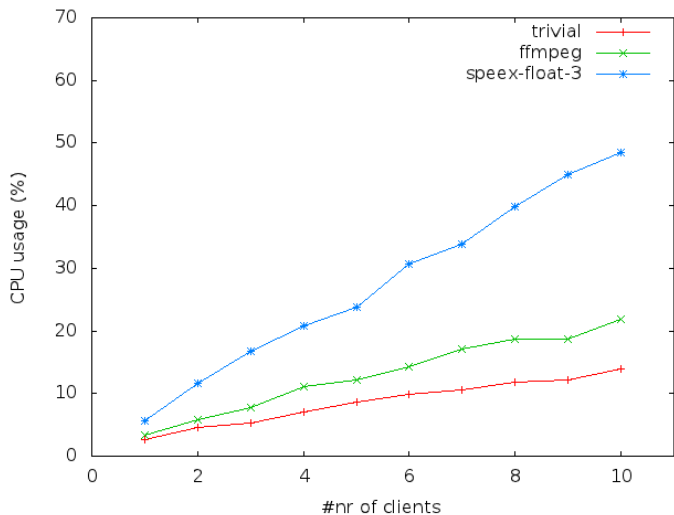
- Different resampler method
- The number of connections

These two above variables could both impact CPU utilization. The gut feeling for us is:

- The more complicated the resampler method is, the more CPU will be used.
- The more number of connections are established to PulseAudio, the more CPU will be used.

Is it true? If positive, then to what degree?

That's true!



Analysis

The default resampler method specified in PulseAudio takes a lot of CPU utilization, however it can be lowered to use 'trivial' or 'ffmpeg' respectively. Thus, CPU usage is about 70% and 56% off compared with the default CPU usage (down to 14% and 21%) with 10 clients connected!

What about the sound quality? As a normal user, I can't tell the differences. ;)

Closing

So we need to change the resampler method for PulseAudio in order to reduce CPU usage in later projects. Modify the line in */etc/pulse/daemon.conf*:

```
resample – method = trivial
```

Thank you!

Thank you!