

AudioFX

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Agenda

- Aims of the project
- About Audio
- OpenAL
- Further steps

Aims

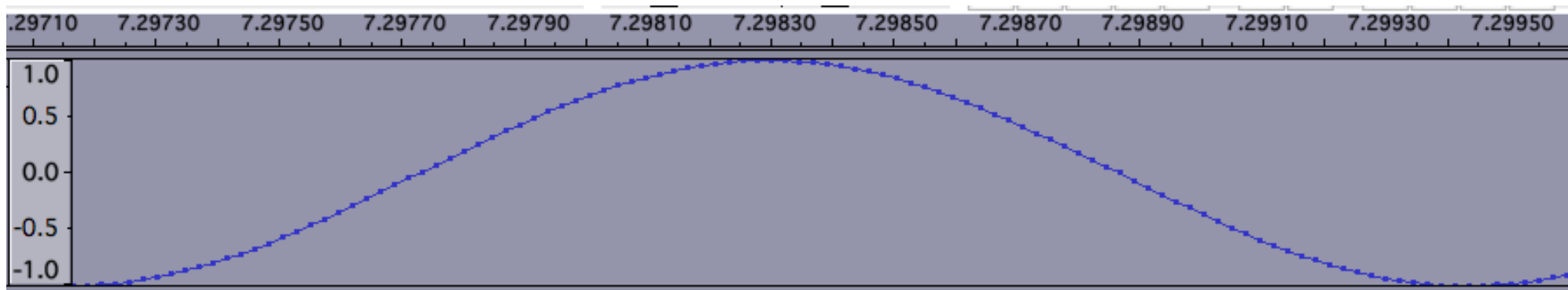
- processing an audio input from a microphone
- adding effects to it (echo/delay, pitch)
- play the processed input signals in realtime

audio devices & drivers

- on windows systems: proprietary audio drivers from manufacturer
- most UNIX systems use OSS (Open Sound System)
- Mac: Intel high definition audio

Audio signal processing

- 1 Sample
- bit rate = Bit / Sample (CD...Bitrate = 16)
- sample rate in Hz, 1 Hz = 1 oscillation/second
 - Common: 44100 Hz
- Mono / Stereo



Our configuration

- Mono
- bit rate = 16 Bit / Sample
- sample rate = 44100 Hz

We have to process 44100 samples a second,
in other words 2250 samples in 50ms

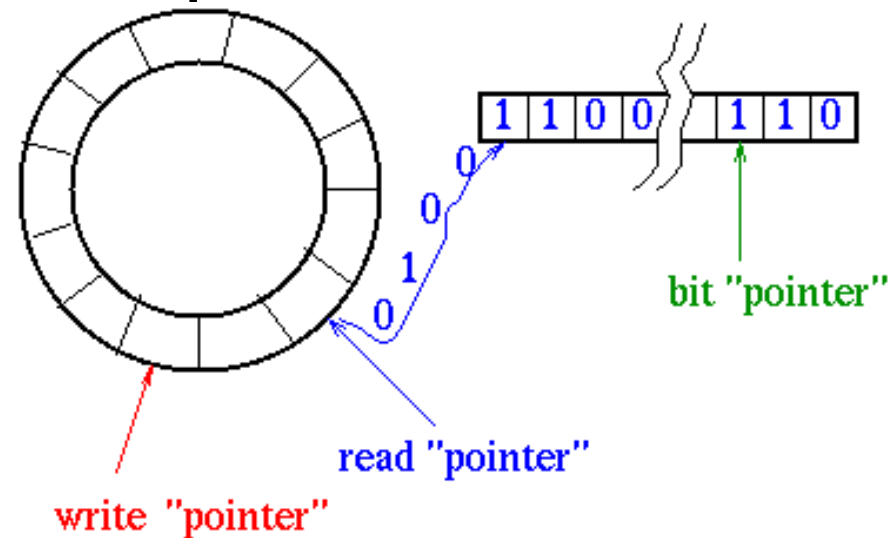
A delay of at least 50ms is audible.

Device

- One or more input buffers
- One or more output buffers
- platform independency with OpenAL

OpenAL

- Cross-platform audio API
- → supports different audio devices
- recording: captured samples are stored in an internal ring buffer



Our Implementation

- one or more sources can be played simultaneously on one device
- a source contains one or more buffers
- `init()`: initialize device, source, buffers
- `capture()`: check #samples of internal ringbuffer, fill buffer from internal ringbuffer
- `play()`: checks play-status, starts playing
- `destroy()`: destroys buffer-, source- and device-objects

OpenAL - Bug

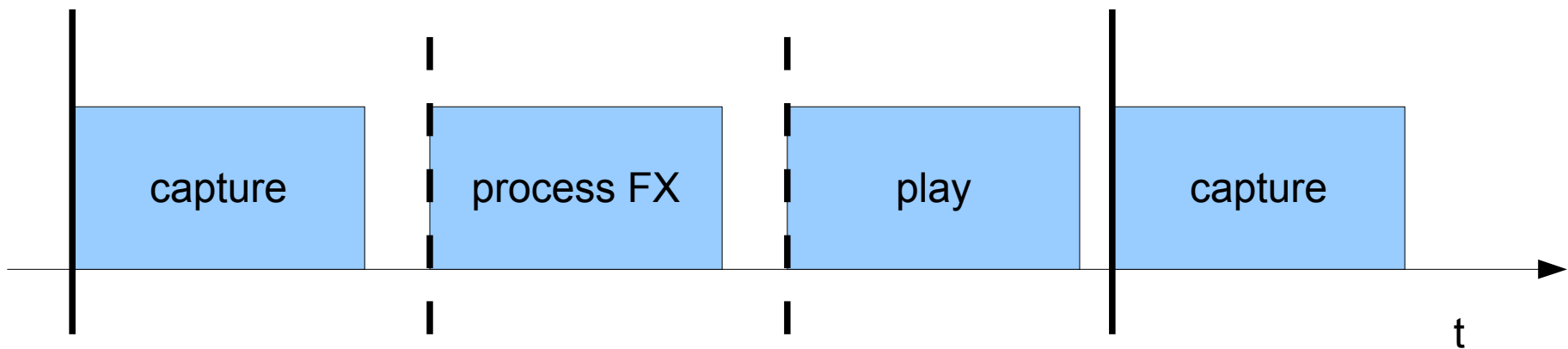
- Bug in OpenAL (reported in December):

The samples that we take from the ringbuffer aren't removed. As a result it is necessary to wait until the ringbuffer is fully filled with new information.

→ 25ms timer, buffersize 1800

Further steps

- solution for ringbuffer-bug
- Time triggered
- GUI
- AudioFX



Audio FX

- echo/delay: adding one or more delayed signals to the original > 50ms
- pitch: shifts a signal up or down in pitch