What's next for Bluetooth in PulseAudio?

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What is PulseAudio?

- ▶ Network capable sound server program
- ▶ Initial release on 17 July 2004
- ▶ First appeared for users in Fedora Linux with version 8

Bluetooth Profiles

- ► What is a profile?
- ► Some of the widely used bluetooth profiles
    - ► Advanced Audio Distribution Profile (A2DP)
    - ► Audio/Video Remote Control Profile (AVRCP)
    - ► Hands-Free Profile (HFP)
    - ► Headset Profile (HSP)

Bluetooth Codecs

- ▶ Available codecs?
    - ▶ Low-complexity subband codec (SBC)
    - ▶ Audio Processing Technology (aptX, aptX-HD)
    - ▶ Advanced Audio Coding (AAC)
    - ▶ LDAC
- ▶ So which is better?

Current State

- ▶ Upstream only supports SBC :(
- ▶ HSP/HFP support via ofono
- ▶ Out of tree community effort with https://github.com/EHfive/pulseaudio-modules-bt
- ▶ In progress work by Pali Rohár

Challenges

▶ Profile and codec switching
▶ Patent encumbered licenses?
▶ How to support multiple encoders or decoders?

GStreamer

- ▶ What is GStreamer?
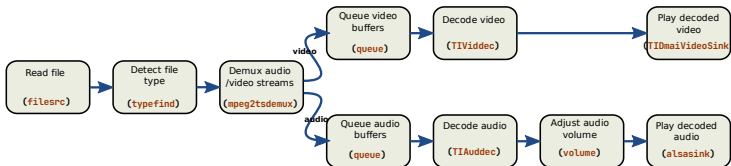- ▶ Why?

Example Pipeline

Example GStreamer Pipeline

The goals of GStreamer are to seprate the application (e.g. Video player, Video editor, etc.) from the streaming media complexity (e.g. hardware acceleration, remoteness)
GStreamer – streaming media
D-Bus – inter process communication
Use **gst-launch** command to create the GStreamer pipeline

    gst-rtsp-server - v4l2src ! video/x-raw,width=1280,height=720 ! omxh264enc ! video/x-h264,profile=baseline ! h264parse config-interval=1 ! rtph264pay name=pay0 pt=96


```
gst-launch filesrc location="video.ts" ! typefind ! mpeg2tsdemux name=demux \
        demux. ! 'video/x-h264' ! queue ! TIViddec ! TIDmaiVideoSink \
        demux. ! 'audio/mpeg'   ! queue ! TIAuddec ! volume volume=5 ! alsasink
```

Figure 1: GStreamer Pipeline

Progress so far

- ▶ LDAC support upstreamed in GStreamer
- ▶ Support for Low-Overhead MPEG-4 Audio Transport Multiplex (LATM) AAC in GStreamer
- ▶ GStreamer wrapper around Pali Rohár's *libopenaptx*
- ▶ Implementing profile and codec switching
- ▶ Proof of concept with GStreamer tested

Conclusion

What's next?