

PipeWire

Wim Taymans

Principal Software Engineer

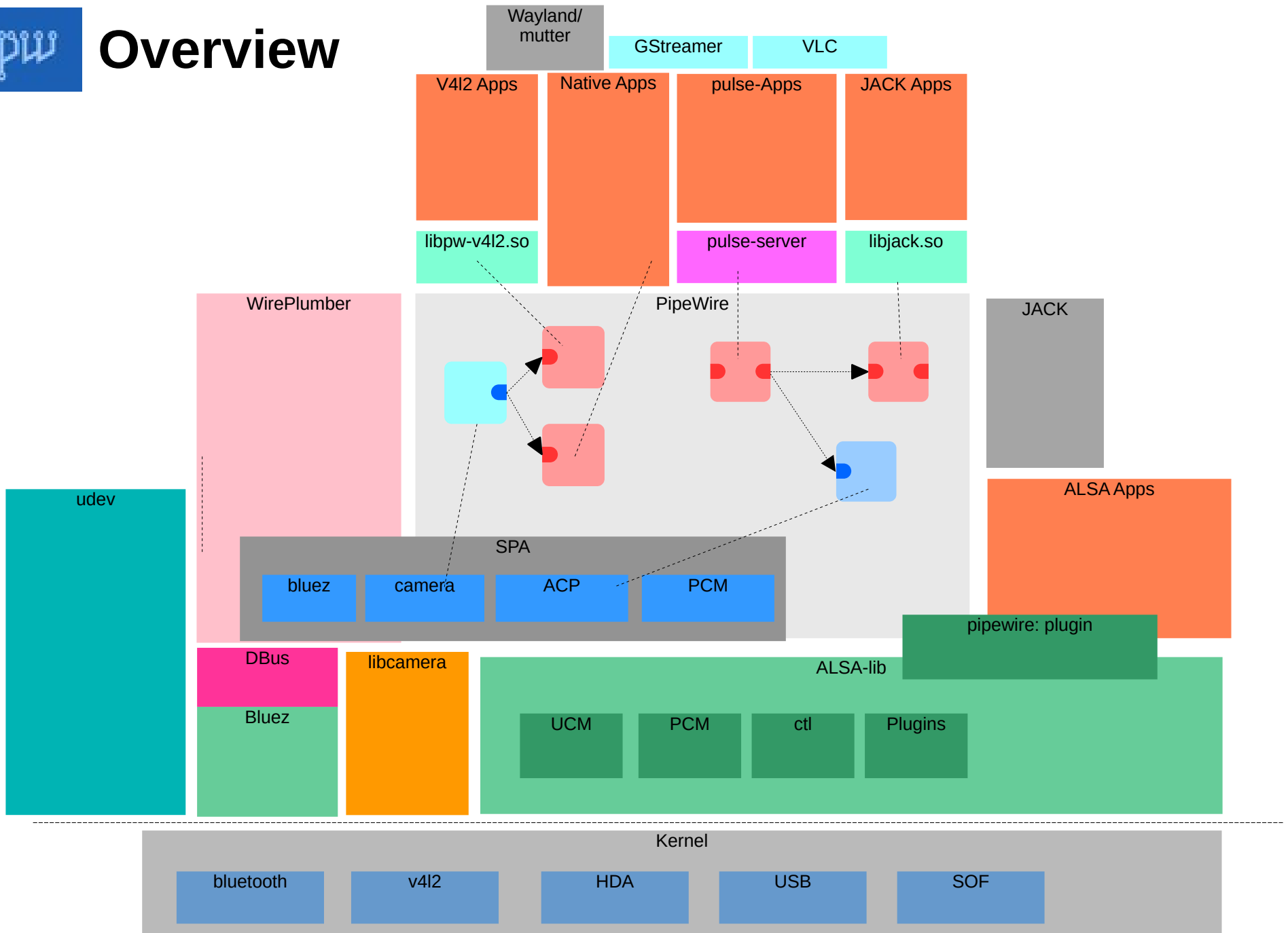
FOSDEM 2025



Multimedia sharing and processing engine



Overview



1.2 was released 27-jun-2024!!





What's new

- Async processing
 - Bad nodes don't block the graph
 - 1 cycle of delay
- `jack_simple_client`
- `PIPEWIRE_PROPS='{ node.async = true }'`
`jack_simple_client`



What's new

- Support for multi-threaded execution in the server
 - Load balancing
 - CPU pinning of threads
 - Thread classes
- Improved start/stop of nodes
 - Less chance for glitches



What's new

- Flatpak security context
- Vulkan blit and convert filters
- Explicit sync
- Bluetooth codecs:
 - Google OPUS, LC3-SWB, AAC-ELD



What's new

- Lazy scheduling
 - Headless server (client pulls frames, server notifies new frames)
 - Frame encoder



Applications

- Camera support in Firefox by default in Fedora
- Using libcamera for complex cameras otherwise older v4l2 plugin

1.4 is almost done





What's upcoming

- MIDI 2.0
 - UMP is now used as native MIDI format.
 - ALSA i/o with new UMP api
 - Conversion where needed (JACK but there are new port format extensions)



What's upcoming

- Videoconvert
 - Videoadapter now for all video streams (but no converters yet)
 - FFMpeg/vulkan video converter can be loaded
 - Needs decoding (encoding)

```
PIPEWIRE_PROPS='{ video.adapt.converter =  
video.convert.ffmpeg }'  
build/src/examples/video-play
```

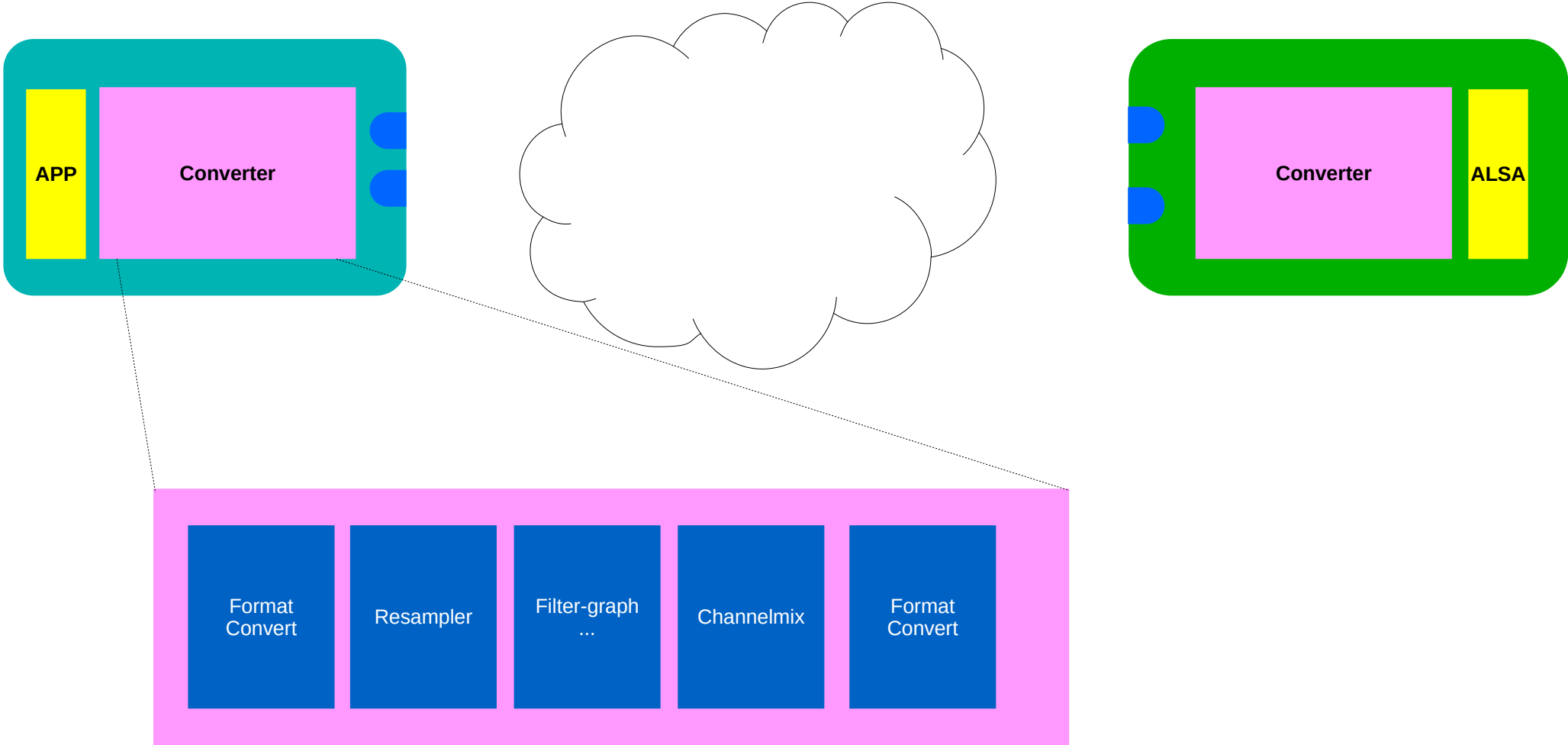


What's upcoming

- Module-filter-chain
 - Now as a SPA plugin filter-graph
 - Usable in all streams with up to 8 processing graphs.



streams





Filter-graph

```
filter.graph = {
    nodes = [
        {
            type = ladspa
            name = sc4
            plugin = sc4_1882
            label = sc4
            control = { "RMS/peak" = 1 "Attack time (ms)" = 1.5
"Release time (ms)" = 401 "Threshold level (dB)" = -12 "Ratio (1:n)" = 6
"Knee radius (dB)" = 5 "Makeup gain (dB)" = 12 }
        }
        {
            type = ladspa
            name = limiter
            plugin = fast_lookahead_limiter_1913
            label = fastLookaheadLimiter
            control = { "Input gain (dB)" = 5 "Limit (dB)" = -10
"Release time (s)" = 0.8 }
        }
    ]
    links = [
        { output = "sc4:Left output" input = "limiter:Input 1" }
        { output = "sc4:Right output" input = "limiter:Input 2" }
    ]
    inputs = [ "sc4:Left input" "sc4:Right input" ]
    outputs = [ "limiter:Output 1" "limiter:Output 2" ]
}
}
```



Filter-graph

- Builtin plugins
 - Convolver, eq, mixer, delay, ebur128, sofa spatializer,...
- LADSPA, LV2 plugins
- Can be loaded into streams/adapter nodes dynamically
 - `pw-cli s 117 Props '{ params = [audioconvert.filter-graph.0 "{ nodes = [{ type=ladspa plugin=retro_flange_1208 label=retroFlange }] n_inputs=2 }"] }'`



What's upcoming

- Bluetooth
 - ASHA hearing aid support
 - BAP broadcast sinks



Current focus

- Bugfixing, small improvements...
- More work on Video side of things (Video routing, vulkan converters, vulkan processing filters, ...)



<http://pipewire.org>
<https://gitlab.freedesktop.org/pipewire/pipewire>

Questions?