

What's new in GStreamer Land

The last 2 years and the future

FOSDEM 2017, Brussels
Open Media Devroom
5 February 2017

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Introduction

Who?

- Long-term GStreamer core developers and maintainers since 2005/6
- Founders of Centricular Ltd
 - Consultancy offering services around GStreamer, graphics and multimedia related software and Free Software in general

What is this all about?

- GStreamer? What is it?
- Two Years of Changes
- What Comes Next?

GStreamer? What is it?

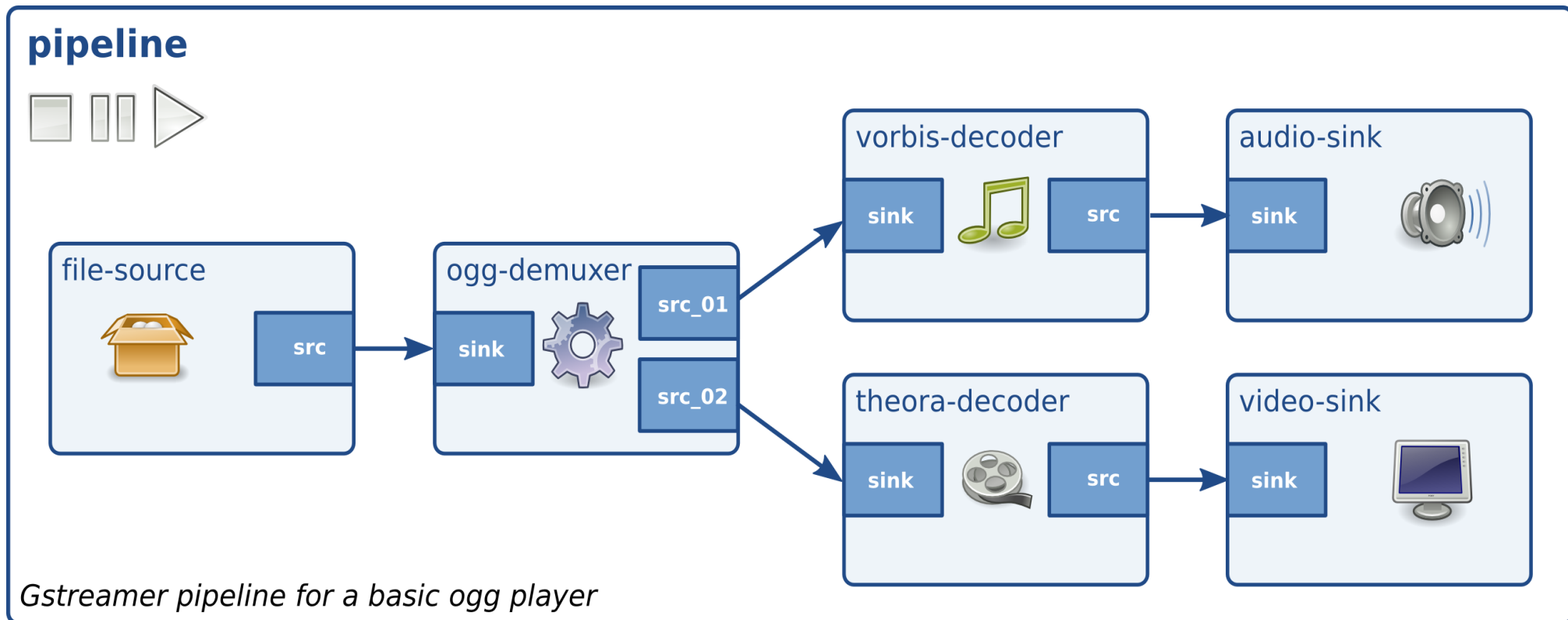
AKA: **Very** short introduction!

<https://gstreamer.freedesktop.org> for more details



GStreamer

- Free software, pipeline based multimedia framework



GStreamer (cont'd)

Goals

- ✓ Flexible and extensible design based on simple concepts
- ✓ Easy to integrate with other software (in both directions)
- ✓ Stable API

GStreamer (cont'd)

gstreamer tools

gst-inspect
gst-launch
gst-editor

multimedia applications

media player

VoIP & video conferencing

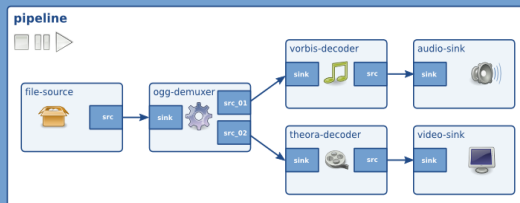
streaming server

video editor

(...)

gstreamer core framework

pipeline architecture



media agnostic
base classes
message bus
media type negotiation
plugin system
data transport
synchronization

protocols

- file:
- http:
- rtsp:
- ...

sources

- alsa
- v4l2
- tcp/udp
- ...

formats

- avi
- mp4
- ogg
- ...

codecs

- mp3
- mpeg4
- vorbis
- ...

filters

- converters
- mixers
- effects
- ...

sinks

- alsa
- xvideo
- tcp/udp
- ...

gstreamer plugins

gstreamer includes over 250 plugins

3rd party plugins

GStreamer (cont'd)

- Community-driven free software, LGPL v2.1+
- Cross-platform
- Stable GObject based, object-oriented C API/ABI

GStreamer (cont'd)

- Bindings for many languages
- 250+ plugins for various features available
- Batteries included!

GStreamer (cont'd)

- Not a media player or playback library
- Not a codec and protocol library
- Not a transcoding tool
- Not a streaming server

But can be (and is) used to implement all that

Two Years of Changes

A lot has happened since FOSDEM 2014

Lots of new Major Releases

- 1.4 – July 2014
 - 1.6 – September 2015
 - 1.8 – March 2016
 - 1.10 – November 2016
 - 1.12 – March 2017?
-
- Every ~6 months
 - Several bugfix releases for each

Device Probing

- Simple API
- List devices and their capabilities
- Create pre-configured elements

- Think: Cameras, audio inputs/outputs, CD/DVD/Bluray drives, ...

Codec Support

- H.265
- VP9
- TTML (experimental)
- Major Opus improvements

- libav → ffmpeg
- OpenH264, libde265, FDK AAC, ...

Live Mixing / Muxing

- Base class with proper live stream support
- Audio mixer, channel interleave
- Video mixer/compositor (software + GL)
- MXF muxer, FLV muxer soon, ...

- Used in professional broadcast products already

Video Rendering APIs

- Vulkan
- Wayland
- GL
 - GTK+, Qt/QML, CoreAnimation toolkit integration
 - X11, Wayland, EGL, CoreGL, WGL, RPi

Improved Hardware Codec Support

- Android MediaCodec
- iOS/macOS VideoToolbox
- VA-API
- OpenMAX IL (→ RPi, others)
- Video4Linux2
- Nvenc
- Intel MediaSDK

- All with “zerocopy” rendering/input

HTTP Adaptive Streaming

- Base class with implementations for
 - MPEG DASH
 - Apple HLS
 - Microsoft Smooth Streaming
- Support for many advanced playback features
- Creation of HLS streams supported
 - MPEG DASH coming soon

RTP, RTSP & WebRTC

- Retransmissions
- WebRTC building blocks all there now
 - SRTP & DTLS
- Remote clock synchronization
 - RFC7273 (→ AES67, SMPTE 2110, VSF TR4)
 - NTP & PTP
- RTSP RECORD support

Convenience & Support APIs

- GstPlayer
- Audio/video conversion APIs
- Usability, bindings improvements
- More to come

Meson based build system

- New build system for GStreamer
- Finally a real replacement for autotools
 - But much better!
- Faster builds, less weird syntax, better cross compilation support
- Microsoft Visual Studio support
- See <http://mesonbuild.com> for details

Improved Documentation

- New documentation on
 - <https://gstreamer.freedesktop.org/documentation/>
- Tutorial-style documentation for basic uses
- Cleaned up old documentation
- More visibility for design documentation

- Example GIT repository
 - <https://cgit.freedesktop.org/gstreamer/gst-examples>

QA & Debugging

- Tracing framework
- gst-validate integration testing
- Continuous Integration, fuzz testing & Coverity

Misc

- Cross-platform improvements
- Improved stream selection API
- Stereoscopic video, 3D cameras (Kinect)
- KLV metadata & SMPTE timecode support
- GStreamer Editing Services + PiTiVi

What Comes Next?

Software is never finished!

Soon? For sure!

- Move more code from -bad to -good/-ugly/-base/core
- OpenCV library
- Make muxers more reliable in live cases
- Merge GstTranscoder
- Rust-based GStreamer plugins
- Meson as primary build system
 - MSVC Windows binaries!

Further away

- SDI-over-IP (SMPTE 2022, 2110, VSF TR3/4)?
- Showcase Android, iOS/macOS, Windows player applications?
- Out of the box WebRTC support?

- New website?

Thanks!

Any questions?

Find more information at
<https://gstreamer.freedesktop.org>