GStreamer
State of the Union
2024 Edition
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FOSDEM'24
Nine bugfix releases

- **GStreamer 1.22 stable**
  - 9 bugfix releases + (+ 13 in bindings / 18 in plugins)
  - 13 security fixes (all in C code)
  - Over 600 backported commits (+ over 600 in )

- **GStreamer 1.23 (under development)**
  - Over 1400 merge requests (+ over 400 in )
  - Over 5400 commits (over 750 in )
  - Getting close to 1.24 stable release
From IRC to matrix
#community:gstreamer.org
From mail to Discourse
discourse.gstreamer.org
Varia

- **GstMeta** serialization and deserialization
- **GstAnalyticsRelationMeta** for analytic sharing interop
- **insertbin** is now exposed in the registry
- **ONNX** inference elements, zero-copy, and refactoring
- ORC now produces **AVX2** op-codes
- **encodebin2**: no longer require muxing
- wpesrc: **WPEWebkit** 2.0 API support
- QML6 Mixer element (compose to display)
CODEC and Parsers

- **h264parse** has compliance **AU** splitting algorithm
- **codec2json** serialize H.264 and VP8 stream headers into JSON
- New **jpegparse** gains primary rank
- mpeg123 MP3 decoder gains primary rank
- **Vulkan Video** H.264 decoder (and Vulkan support improvement)
- mpg123, jpegparse gains **primary** rank
- LC3 audio codec, Speed HQ, **svtav1** encoder
- **NV** codec HDR and stream sharing / **AMF** codec HDR, HEVC and AV1
Streaming WebRTC & RTP

- **webrtcsink**: pre-encoded stream support, **D3D11** and **QSV** encoders.
- **BaseWebRTCSink**
  - **Janus**VRWebRTCSink (VR for VideoRoom)
  - **aws-kvs-webrtcsink**
- **webrtcsrc** with **TURN** server support.
- **WHIPServerSrc** to add to the **WIHPClientSink**
- An HTML5 API on top of webrtcsrc/sink (gstwebrtc-api)
- **rtpjitterbuffer**: Can now sync using your system clock (RFC7273)
More Streaming

- Zero-copy support for ndisrc
- aws3putobjectsink (for small object streaming)
- hls cmafsink for serving fragmented MP4 through HLS
- Fragment ISOMP4 support for VP8 and AV1
- W3C Media Source Extension (MSE)
Rust Bindings

- **GStreamer Edition Services** (GES) with FrameCompositionMeta
- VBI Parser and Encoder
- **PadProbe** Data / PadProbeInfo accessors
- VideoSEIUserDataUnregisteredMeta
- RTPSourceMeta
- and a lot more small improvements.
Video Formats Support

- 20 new pixels formats with minimal software conversion
- 27 new pixels formats with GL conversion support
- 25 new pixels formats with D3D11 conversion support
- Linux DRM Fourcc and Modifiers support (DMA_DRM format)
- Helpers for DRM Modifiers negotiation
- VA, MSDK, and Wayland support for DRM Modifiers
- 10bit WebM Alpha support
- 10/12/14/16 bit bayer support in rgb2bayer
D3D11 support

- d3d11ipcsrc/sink for sharing texture across process
- d3d11overlay overring a draw callback for D3D11
- qml6d3d11sink adds QT6 rendering from d3d11 textures
- Improvement over d3d11tests src
- HLSL, precompilation, and binary shader caching
- nvdecoders D3D11 output
- dwrite: Adds windows subtitle overlay support
D3D12 support

- MPEG-2, H.264, HEVC, VP9 video decoders
- H.264, HECV stateless encoders
- Compositor and Overlay elements
- Screencapture and test pattern generator
- Colorspace Converter with HLSL, precompilation, and binary shader caching
- Zero-Copy
- Threaded decoders
- D3D11 interoperability
OpenGL

- Linux **DRM modifiers negotiation** in glupload
- Passthrough for **Linux DRM modifiers** (DMA_DRM format to sinks)
- Defaults to **GLES2+** API over OpenGL/OpenGL3
- **Surfaceless** Display
- **gtk4paintablesink** support for GL on Windows 🌐
On Linux / BSD / Android

- VA, Wayland and MSDK **DRM Modifiers** support
- VA **AV1** encoder
- **Android Media CODEC** ported to the native API and **AV1** decoder
- **unixdfs/sink** similar to shmsrc/sink but sharing memfd/dmabuf
- **OSS** now have a GstDeviceProvider (BSD audio)
- **waylandsink** DRM Dumb allocator support and 10bit
- Waylandsink uses *wp_single_pixel_buffer_v1* for black borders
On Linux (~ embedded)

- V4L2 AV1 Stateless decoder
- *uvcsink*, a Linux UVC gadget front-end based on *v4l2sink*
- V4L2 stateless decoder CI tested using QEMU and virtual driver *visl*
- *v4l2src* now cares about your framerate
- V4L2 encoders react to keyframe requests
- libgstallocators gained a DMABuf DRM Dumb allocator
- *v4l2src* now support 10/12/14/16 bayer formats
- Improve stateful decoders with DRC and HDR10
Closed Caption

- New `cea608mux` element
- Improvements in ccombiner and `cea608overlay`
- New `cea608tocea708` element
Retired elements

- **OMX** support has been removed (not used any more by Raspberry Pi, Android moved to CODEC2, no contributions for many, many years)

- **Kate** support (based on libtiger) has been removed (the dependant library is no longer packages by major distros, not really used by anyone any more)

- Usage of **GSLice** have been removed (not performing better than system heaps any-more)
Future Plans

- No spoilers here sorry!
- But ...

- **RTP2** a Rust rewrite of our RTP stack getting initial draft
- A multi-year project
- Strongly consider including CODEC parsers rewrites, as it’s a frequent source of security issue
Thank you!