GStreamer State of the Union

2024 Edition

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COLLABORA

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** serialisation 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: WPE**Webkit** 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
- **WHIP**ServerSrc 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 **ndi**src 
- **aws**s3putobjectsink (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
- Video**SEI**UserDataUnregisteredMeta
- 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 **d3d11testsrc**
- 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
- **unixdfsrc/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 cea608**to**cea708 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!