



GStreamer State of the Union

2025 Edition

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FOSDEM^{'25}

COLLABORA

25 years later

... 140K commits made

... 2K contributors

... 3M lines of code

The statistics

Number of Contributors

Zoom **1yr** 3yr 5yr 10yr All




Commits per Month




Zoom **1yr** 3yr 5yr 10yr All



Releases

- GStreamer Release
 - **3** bug fix releases in **1.22** (currently at **1.22.12**)
 - **13** bug fix releases in **1.24** (currently at **1.24.12**)
 - **1.25.1 development** (alpha) release (preparation for **1.26**)
- GStreamer **Rust** Releases 
 - **14** gstreamer-rs releases on crates.io (currently at **0.23.4**)
 - **18** gst-plugin-rs releases on crates.io (currently at **0.13.4**)

Merge Requests

- Over **1200** merge requests to the **gstreamer** mono repository
 - **477** backports in **1.24 stable** branch
 - **6** backports in **1.22 stable** branch
- Over **160** merge requests to the **gstreamer-rs** the Rust bindings 
- Over **380** merge requests to the **gst-plugins-rs** the Rust plugins 
- Over **230** merge request to the **cerbero** the cross-plaform build system 

Security Fixes

- **Improved** security fix process using the GitLab **protected** repository
- **29** Security Fixes (**backported** and into **1.22** and **1.24** stable)
 - **25** reported in the **GitHub Security Lab** (GHSL)
 - **2** reported under the **Japan Security Notes** (JVN/JPCERT)
 - **1** reported under the **Zero-day Initiative** (ZDI-CAN)
- For more details visit <https://gstreamer.freedesktop.org/security/>

Core Libraries

- **GstVecDeque** to reduce the allocation overhead
- **GstMessage “details”**, a **GstStructure**, can be access for all messages
- Tag List **Container Specific Track ID** (1.24)
- **Nested GstCaps** support
- **GArray, GByte, GstAllocationParam, Encoding Profile** Serialization
- **GstIdStr** as an alternative to **GQuark** (using static 16-char array)




Libraries

- SMPTE ST-291M **GstAncillaryMeta** (1.24)
- Navigation mouse **double-click** and **scroll** events
- Video Convert has more **10bit fast path** and **GRAY10_LE16** support
- Video **QoS deadline** handling improved



Audio/Video filters

- **videorate** “drop-out-of-segment” property (1.24)
- **cutter** **GstAudioLevelMeta** support (1.24)
- **videorate** & **pitch** support **reverse playback**
- **videoflip** **Y444_16LE/BE** support
- **Pango overlays** display **response time** compensation
- **volume** unlimited **gain** factor
- **audioconvert** can handle **more than 64 channels**
- **scaletempo** “fit-down” fit to **GstScaletempoTargetDurationMeta**

Analytics Meta & ML

- Design Documentation
- Segmentation Meta
- Tensor Meta
- Generalization of **Tensor Decoders** (was in ONNX)
- **Rotation** to Object Detection Metadata
- **Relation** meta to **OnvifMeta** converter 
- **originalbuffer** lets you **save** and **restore** buffers preserving **Metas** 
- Python Binding support 

Stream Containers

- **MPEG TS:** segment seek & seek with stop time, **JPEG XS**, **PES Metadata** Stream, **SCTE Null** made optional, **SMPTE ST-2038 VANC**, **SMPTE ST-302M (AES3)**, Synchronous **KLV**, Custom **VP9** mapping, **AV1**, **VVC (H.266)**
- **ISOMP4:** **CENC** Sample grouping, **Lagarith** Lossless Video, **M1V fourcc (MPEG Video 1)**, **ISO/IEC 23003-5** (uncompressed audio), hopefully more uncompressed video.
- **Rust base fMP4/MP4:** **FLAC**, **AV1**, **Language & Orientation** tags, **GstAudioClipMeta**, Split at  running-time signal, Caps change, **uncompress** streams and more.
- **Rust based dashmp4mux** prefers in **dashsink** 
- **Matroskademux** is now a **GstAggregator** (live muxing)


Windows D3D12 APIs

- **Helper library in `gst-libs`, `libgstd3d12` & `libgstd3dshader` (HLSL)**
- **Windows Graphics Capture (WGC), IPC src & sink, Device Remove Extended Data (DRED), MinGW Cross-Compilation, convert-frame, controllable number of in-flight GPU commands, mipmapping, converter & scaler, deinterlace**
- **`d3d12videosink`: disable the error on close, implement new mouse navigation events, window handle updates, “overlay” signal**
- **Color Balance** in various elements (hue, saturation, brightness)
- **HDR video capture**
- **More Pixel Formats**, but I didn't count this time !
- **`d3d12swapchainsink`: MSAA and sampler filters**
- **VP8 Encoder**
- **Ready for prime time, codecs/sinks ranked as PRIMARY**

Other Windows APIs

- **webview2: source element and D3D12 interoperability**
- **dwrite: D3D12 interoperability**
- **QSV: D3D12 interoperability**
- **D3D11: Some pixel formats, new mouse navigation events**

CODECS: Parsers, SW codec

- AV1 codec fixed to use **TU alignment** explicitly
- h264parse now supports **AVCDecoderConfigurationRecord**
- h264parse attempt to add a proper **backlog failed**, got reverted :-)
- VVC (H.266) parsers, type finder, mime type
- LCEVC decoder and encoder
- SVT JPEG XS software codec (with interlaced support)
- FFMPEG based **M101** / Matrox uncompressed video
- dav1d exposes **colorimetry** 
- fakevideodec – snake pattern generator

CODECS: Vulkan, VA, MSDK, V4L2

- Vulkan Video H265 decoder
- VA Encoders: JPEG, VP8, VP9, QVBR & ICQ rate control, render delay, i965 disabled
- VA Decoders: VVC / H.266
- VA VPP scaling interpolation (limited to iHD)
- MSDK HEVC 12bit support, VPP interpolation
- V4L2 now implements and prefers DMA_DRM
- V4L2 Stateful Encoders: dynamic frame-rate (0/1), colorimetry negotiation improved
- V4L2 Stateless Decoders: VP9 interframe resolution change, lower HEVC memory usage





CODECS: Nvidia, Android, MacOS

- **NVidia** Codec gains more **NVMM** integration
- **NVidia Encoder: AV1, HEVC RGB** formats
- **NVidia Encoder: D3D12** interoperability
- **CUDA** asynchronous memory allocation
- **AMC: NDK** codec implementation, more H.264/5 **profiles** and **levels**
- **Magic Leap: removed** from Android Media CODEC
- **VT Decoder:** threaded output
- **VT Encoder: CBR & ABR** rate control, HEVC **alpha, HLG**
- MacOS **AAC** encoder

RTP Streaming

- RTP payloaders “**extensions**” property to list enabled extensions (1.24)
- **rtpbin** improved **synchronization**
- **rtpbin** “**post-session-aux-sender**” signal
- RTSP Server “**ensure-keyunit-on-start**” property
- **rtpsrc** “**force-non-compliant-url**” to return to old / bad URL
- **webrtcbin** support **renegotiation** (needed for add/remove/mute)
- **webrtcbin** implement RFC5576 **early CNAME**

More Streaming


- **rtmp2**: source support “**librtmp**” style connect command
- **rtmp2**: supports **Limelight Networks Authentication**
- **quinn**: source and sink for **QUIC** protocol 
- **mpegtslivesrc**: exposes a **clock** from MPEG-TS PCR 
- **spotifylyricsrc** gets Lyrics from Spotify 
- **hlsmultivariantsink**: fourths hlssink, with multi-variants support 

The rewrite of the RTP stack in Rust




- Initial merge of `rtpbin2` plugin
- New **RTSP** client plugin (`rtspsrc2`)
- RTP payload: **AV1, AC-3, KLV, JPEG, MPEG-4 Audio, PCMU/PCMA, VP8, VP9, MPEG-TS, AMR**
- `webrtcsrc` transmit **navigation** events using **data channel**
- WebRTC **LiveKit** source element
- WebRTC source “**do-retransmission**” property
- WebRTC **SDP Munging**
- WebRTC RFC 7273 **Clock Signalling & Synchronisation**
- WebRTC **AV1 & Raw** Support
- WebRTC **dynamic resolution** and **frame-rate**, more **encoders**
- WebRTC **signal** to let application **balance bitrate**







Display, Accelerators

- **qt/qt6**: NV12 format offload, texture-eos target, 16bit RGB
- **waylandsink** supports “**rotation-method**”, dumb allocator **DMABuf**, NV15 10bit
- **glsinkbin** can pass through memory:DMABuf
- **wayland-egl**: disable **SwapInterval** to workaround **inter-blocking**
- **gtk4**: **gst-launch window**, **DMA_DRM** & **DMABuf** offload, **rotation/flip** 
- **glcolorconvert** more **high depth**, **low subsample** and **planar to planar** conversion
- **gldownload** can wrap **DMABuf** from **downstream** pools
- **kmssink** detects **STM32**, **Mediatek**, **IMX 8MQ**, **8M plus** and **DMA_DRM**
- **gtk3**: Windows **GL** support


Video Capture and varia

- `qml6src` now uses **downstream** GL pool
- **AJA** audio/video **source** and **sink**
- **DeckLink** HDR support
- `imagefreeze` and `livesync` supports **compressed** images
- `gopbuffer` a queue that buffers **gops**
- **PCAP** tracer 
- `streamgrouper` let you modify **group-id** in stream-start events
- GStreamer Editing Service gains **reverse -playback**

Closed Caption and Transcribes

- `tttocea708` to encode CEA 708 caption 
- `cea708mux` with CEA 608 **compat** over CEA 708 
- `cea708overlay` that **renders** CEA 708 
- `transcriberbin` CEA 708 support 
- `speechmatics` AI based transcriber 
- `transcriberbin` gain speech **synthesis** support 
- `cea608mux` have a new “**force-live**” property
- `cccombiner` have a new “**preserve-caption-meta**” property

Cerbero Cross-Platform Build System

- **Analytics** library, insertbin, ivfparse, QR Overlay, quinn, SVT JPEG XS, transcode, x265
- **Android:** Rust bindings & plugins, NDK R25C
- **Linux:** tinyalsa
- **Rust:** Inter & RTSP plugin 
- **Windows:** ASIO, D3D12, webview2, d3dsader library, GObject Introspection (MSVC)
- **Libproxy** added to complete **glib-networking** support
- Return of the **unit tests**

ORC Just-in-Time SIMD Compiler

- Improved **MacOS** with better Apple ARM64 support
- **Cleanup** and **refactoring**
- **Sanbox detection** and fallback (e.g. SELinux or noexec)
- Security Fixes

Need help?

<https://discourse.gstreamer.org>

<https://matrix.to/#/#community:gstreamer.org>

Found a bug ?

<https://gitlab.freedesktop.org/gstreamer/gstreamer/-/issues/new>

Wants to contribute ?

<https://gstreamer.freedesktop.org/documentation/contribute/index.html?gi-language=c#precommit>

Thank you!

We are hiring - col.la/careers