Hi!

I’m Tim and I work on GStreamer.

What's GStreamer?

- Multimedia framework
  - cross-platform, open source
- What does it do?
  - audio, video, text, metadata
  - streaming, encoding, decoding, analytics
  - effects, mixing, cutting, editing

What have we been up to?

New major feature release: 1.28!

https://gstreamer.freedesktop.org/releases/1.28/

Let’s look at some things people have been working on

Codecs

- More **H.266** / VVC support
- Low Complexity Enhancement Video Coding
  - H.265 + H.266, decoding + encoding
- **MPEG-H audio** codec support with MP4 muxing/demuxing

SMPTE 2038 ancillary data

- ST-2038 ancillary data **combiner and extractor**
- Mux **non-caption ancillary data** into **MXF**
- **decodebin3**: new metadata streams type
- **Decklink** capture + output of **ancillary meta**
- **RTP de/payloader** for ST291 anc metadata

Enhanced RTMP + FLV

- Support for modern video codecs such **H.265** and **AV1**
- **Multiple audio and/or video tracks**

HLS stream authoring

- Single media file output for Video on Demand use cases
- I-frame only playlists

Speech + Translations

- Speech to Text, Translations, Text to Speech
- **Voice cloning** with ElevenLabs
- **deepgram** speech-to-text transcription
- New **textaccumulate** element
- **output compression** for speech synthesisers
- demucs **audio source separation** element

Analytics

- New hardware support in **ONNX**
- **LiteRT** inference element
- More **relation metas**
- More **tensor decoders**, **tensordecodebin**
- **Batch meta** plus combiner/splitter elements

WebRTC

- **LiveKit** compatibility improvements
- **webrtcsink**:
  - **renegotiation support**
  - **support for va hardware encoders**

Vulkan

- **Vulkan AV1 and VP9 video decoding** support
- **Vulkan H.264 encoding** support
- **Vulkan H.265 decoder** can do **10-bit** depth now

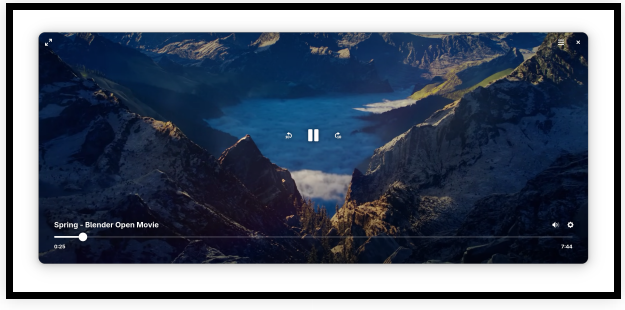
Qt/QML

- New **Qt6 QML qml6 render source element**
- **qml6glovoverlay** supports a direct QQuickItem for the render scene

Wayland

- Parse and set the **HDR10 metadata** and other **color management improvements**
- **udmabuf support** for more efficient software decoder integration
- New **“fullscreen-output”** and **“force-aspect-ratio” properties**

ShowTime replaces Totem



- New **GNOME video player** using **GTK4**
- **hw-accelerated rendering** with OpenGL/Vulkan
- **udmabuf** support in **gtk4paintablesink**

AMD HIP plugin

- AMD's GPU programming API for **portable, CUDA-like development** on **AMD** or **NVIDIA**
- Runs **natively via ROCm on AMD GPUs**
- Thin translation layer **using CUDA runtime on NVIDIA GPUs**

Bindings

- **New C++ bindings** (peel)
- **Go bindings** (go-gst)
- **Python bindings** improvements
- **Rust bindings** improvements

1:N pipeline splitting

- **unixfd** works out of the box in most scenarios
- **inter** improvements
  - more properties for fine-tuning
  - can send upstream events through the wormhole

fallbacksrc

- **multi-stream support** via the Streams API
- Supports **encoded output**, not just raw audio/video

Miscellaneous

- New **VMAF** element to **calculate perceptual video quality assessment scores** using **Netflix's VMAF framework**
- New **icecastsink element with AAC support**
- **Webkit**: New plugin for the "WPE Platform API"

Tracing and debugging

- Enhanced **dots-viewer**
  - send **pipeline graphs directly to a browser**
- GstLogContext to **fine-tune logging output to reduce log message spam**

Editing Services

- has seen a lot of work and **new features**
- **performance improvements** too
  - task pool context support for better resource managements

Windows

- **Direct3D12** integration and performance improvements
  - New elements: interlace, overlaycompositor, fisheyedewarp, remap
- **Windows IPC**: **generic data** not just raw video
- **WASAPI2**: dynamic audio device switching, exclusive mode

Apple macOS + iOS

- **VP9** and **AV1** hardware-accelerated video decoding
- **10-bit HEVC** encoding
- Keyboard, mouse, and scroll wheel **navigation event handling** for the OpenGL Cocoa backend.

Android

- Overhaul of hw-accelerated video codecs detection

Cerbero binary packages

- **Python wheels for macOS and Windows**, soon on PyPi
- Support for **iPhone Simulator on ARM64 macOS**, via the new iOS xcframework
- **Inno Setup** is now used for **Windows installers**
  - New **Windows ARM64** installer
- **GTK4** is now shipped on macOS and Windows (MSVC and MinGW)

The Future …

moar Rust

Media over QUIC (MoQ)

- Builds on top of QUIC (d'oh)
- WebTransport (server-client model)
- Simpler replacement for WebRTC for certain low-latency use cases
- MoQ publisher and subscribe in plugins-rs MR

WebRTC goes Rust

- ICE in Rust: librice
- drive new Rust RTP stack further
- more RTP (de)payloader rewrites coming up
- improve scalability

MPEG-TS goes Rust

- Complete rewrite
- More robust time domain change handling
  - on desync or program changes

More Analytics

- Image formats for science / geoint
  - signed integer
  - floating point
  - complex numbers

More speech + translation

- We support lots of cloud services
- More support for local processing would be nice
  - e.g. Whisper

More formats

- AV2
- HDR10+ support for H.265 and AV1

Playback stack

- multi URI inputs
- Playsink improvements
- Stream selection improvements
  - for variants and enhancement streams
- Timeshift element

Tracing + Debugging

- More tracing, logging and debugging improvements
  - per-pipeline, per-bin
- Support Rust `tracing` ecosystem
- output to e.g. perfetto

… and more!

- tvOS, watchOS, visionOS support
- Digitaly Signed Content (DSC) support

Thank You!

Questions?

GStreamer Conference talks are available at

https://gstconf.ubicast.tv/

Enjoy the rest of FOSDEM!

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