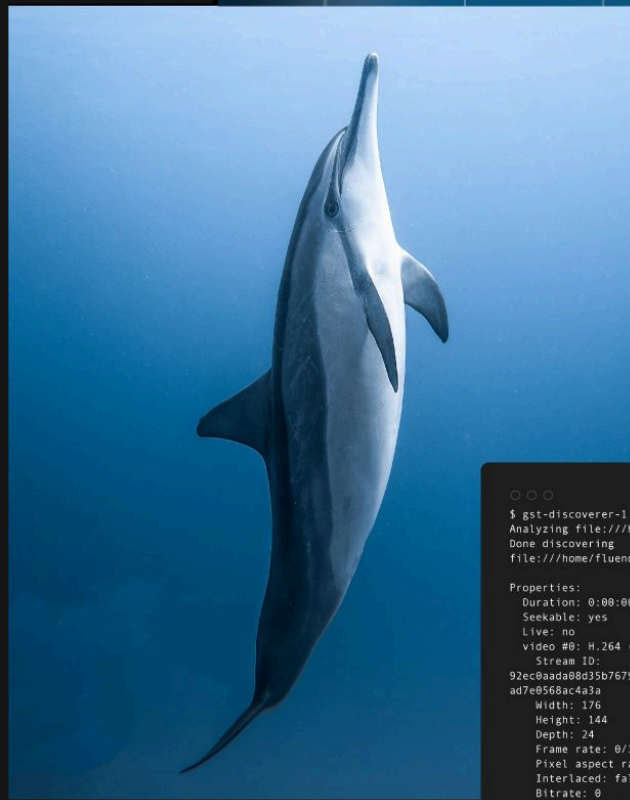




Fluster over the course of 2026

Prague 2026

Rubén González



```
○ ○ ○
$ gst-discoverer-1.0 AUD_MW_E.264
Analyzing file:///home/fluendo/Videos/AUD_MW_E.264
Done discovering
file:///home/fluendo/Videos/AUD_MW_E.264

Properties:
Duration: 0:00:00.000000000
Seekable: yes
Live: no
video #0: H.264 (Constrained Baseline Profile)
Stream ID:
92ec0aada08d35b7679f87a98465b4cf955fbad11d2c8535ec
ad7e09568ac4a3a
Width: 176
Height: 144
Depth: 24
Frame rate: 0/1
Pixel aspect ratio: 1/1
Interlaced: false
Bitrate: 0
Max bitrate: 0
```



Index

- About me and Fluster
- Current status
- New sample comparison method
- Unsupported formats
- Containers
- Releases
- Appreciation



About me and Fluster

Rubén González (@rgonzalez)

- Working at Fluendo for 7 years
- GStreamer user for ~15 years, contributor since 2019

Fluster is a testing framework written in Python for decoder conformance developed by Fluendo

<https://github.com/fluendo/fluster>

In-depth presentation given three years ago in A Coruña:

<https://indico.freedesktop.org/event/5/contributions/246/>



New Test Suites

- **Fluendo-H264-High444**: Fluendo High444 test suite
- **EAC3_ELEMENTARY_STREAMS**: Dolby EC-3 Online Delivery Kit 1.6 elementary stream test suite. Test signals verify correct decoding of Dolby Digital Plus (EAC-3) audio in 2ch, 6ch and JOC configurations.
- **AC4_ELEMENTARY_STREAMS**: The test signals are used in the test procedure to verify the correct operation of a content creation product that packetizes Dolby AC-4 bitstreams into online delivery formats.
- **MPEGH_3D_AUDIO-ED3**: ISO/IEC 23008-9 MPEG-H 3D Audio conformance bitstreams (edition 3)

New Video Decoders

- **MPEG2_VIDEO :**
 - **FFmpeg-MPEG2_VIDEO-v4l2m2m:** FFmpeg MPEG2_VIDEO v4l2m2m decoder
 - **GStreamer-MPEG2_VIDEO-V4L2:** GStreamer MPEG2_VIDEO V4L2 decoder for GStreamer
 - **GStreamer-MPEG2_VIDEO-V4L2SL:** GStreamer MPEG2_VIDEO V4L2SL decoder for GStreamer
 - **Fluendo-MPEG2_VIDEO-VAAPI:** Fluendo MPEG2_VIDEO VAAPI decoder for GStreamer
- **MPEG4_VIDEO :**
 - **Fluendo-MPEG4_VIDEO-VAAPI:** Fluendo MPEG4_VIDEO VAAPI decoder for GStreamer
- **H.264 :**
 - **FFmpeg-H.264-QSV:** FFmpeg H.264 QSV decoder
 - **GStreamer-H.264-QSV:** GStreamer H.264 QSV decoder for GStreamer
 - **GStreamer-H.264-OpenH264:** GStreamer H.264 OpenH264 decoder for GStreamer

New Audio Decoders

- **AC4** :
 - **DolbyPADSReferenceDecoder**: AC-4 Dolby Pro Audio Decoder Software Development Kit reference decoder implementation
 - **Fluendo-AC4-SW**: Fluendo AC4 SW decoder for GStreamer
- **EAC3** :
 - **Dolby_EAC3PRODEC_ReferenceDecoder**: Dolby EC-3 Online Delivery Kit 1.6 elementary stream reference decoder implementation
 - **Fluendo-EAC3-SW**: Fluendo EAC3 SW decoder for GStreamer
- **MPEGH_3DA** :
 - **ISO-MPEGH-3DA**: ISO MPEG-H 3D Audio reference decoder

Fluster Results AVC/H.264



TOTALS	GStreamer-H.264-Libav	GStreamer-H.264-OpenH264	GStreamer-H.264-VA	GStreamer-H.264-Vulkan
CONFORMANCE	284/459	70/459	201/459	153/459
TOTAL TIME	105.672s	65.670s	91.141s	185.666s





Fluster Results HEVC/H.265

TOTALS	GStreamer-H.265-Libav	GStreamer-H.265-VA	GStreamer-H.265-Vulkan
CONFORMANCE	173/316	146/316	138/316
TOTAL TIME	82.276s	67.620s	231.478s





Fluster Results VVC/H.266

TOTALS	GStreamer-H.266-VVdeC	GStreamer-H.266-Libav
CONFORMANCE	235/282	264/282
TOTAL TIME	178.244s	291.084s

Note: GStreamer-H.266-VA is not supported by current hardware (not Intel)





Fluster Results VP9

TOTALS	GStreamer-VP9-Libav	GStreamer-VP9-libvpx	GStreamer-VP9-VA	GStreamer-VP9-Vulkan
CONFORMANCE	309/311	311/311	276/311	269/311
TOTAL TIME	58.318s	44.440s	68.438s	215.630s





Fluster Results AV1

TOTALS	GStreamer-AV1-libaom	GStreamer-AV1-dav1d	GStreamer-AV1-VA	GStreamer-AV1-Vulkan
CONFORMANCE	278/3609	5/3609	278/3609	268/3609
TOTAL TIME	538.931s	404.956s	572.237s	779.511s



– New sample comparison method

For Non-Deterministic Audio Decoders

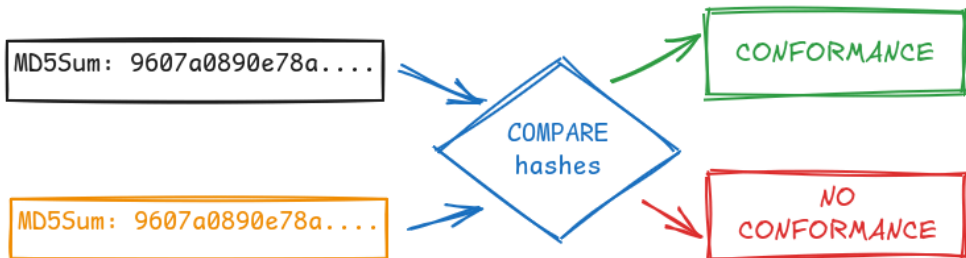
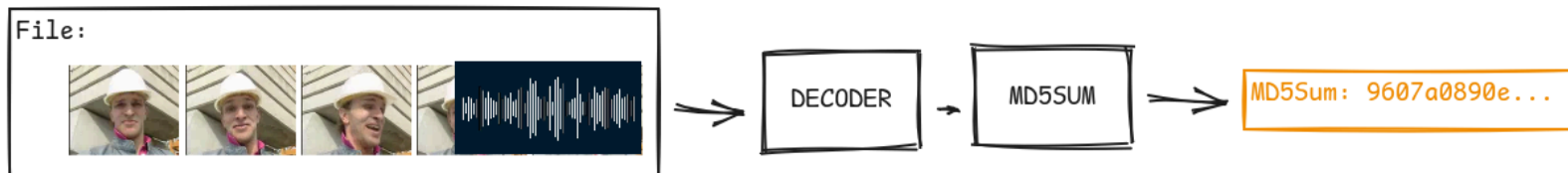
Test Suites



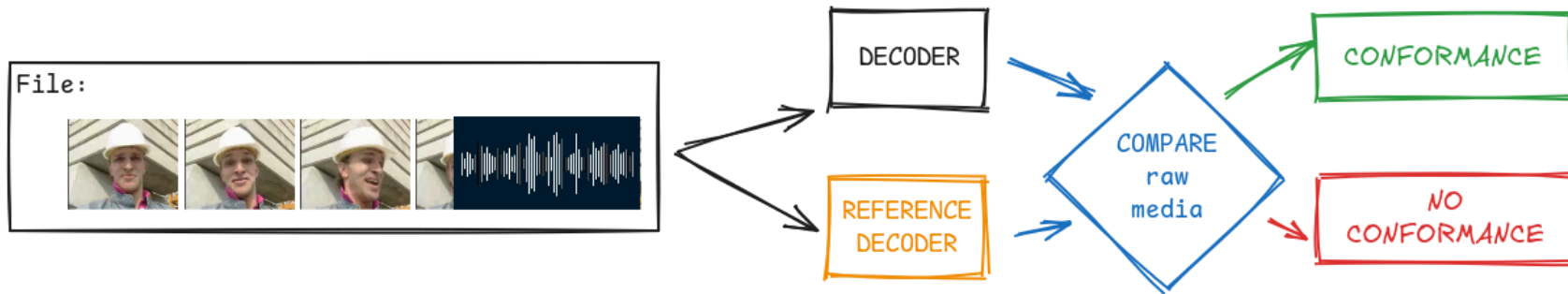
Test Methods:

- **MD5** for Audio and Video
- **Pixel** for Video
- **Sample** for Audio

Classic hash method



Pixel and Sample comparison method



Sample and Pixel comparison method

- Need a reference decoder:

CODEC	H.264/AVC	H.265/HEVC	H.266/VVC	AC4	EAC3	MPEG2_VIDEO	MPEG4_VIDEO	AAC	MPEGH
REFERENCE	JM	HM	VTM	DolbyPADSReferenceDecoder	DolbyPADSReferenceDecoder	ISO-MPEG2-VIDEO	ISO-MPEG4-VIDEO	ISO-MPEG2-AAC	ISO/IEC 23008-6

- Some reference decoders can now be installed with **meson**

```
$ python3 build/download_deps.py
```

```
$ meson setup builddir
```

```
$ ninja -C builddir
```

– Unsupported formats

GStreamer runner to launch pipelines

GStreamer runner to launch pipelines

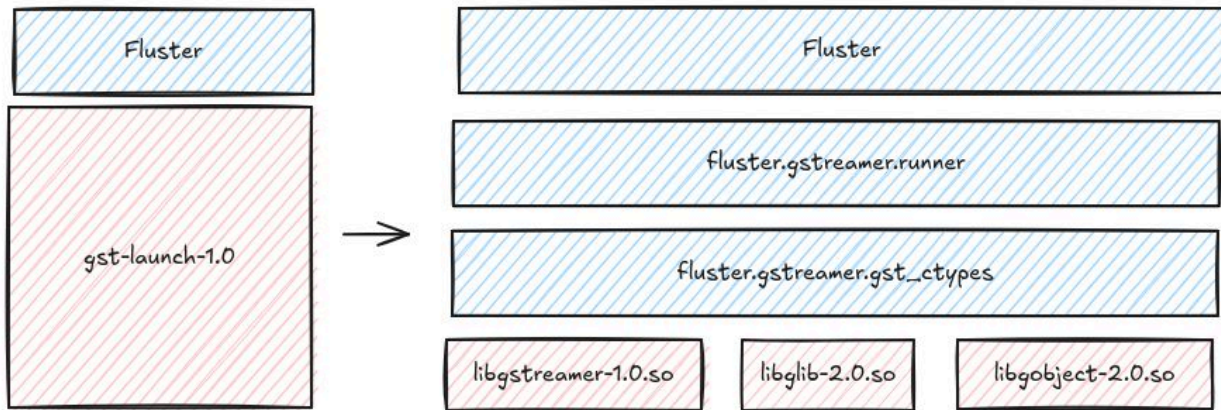
```
[JVT-AVC_V1] (GStreamer-H.264-VA) MR2_MW_A      ... Success
[JVT-AVC_V1] (GStreamer-H.264-VA) MR2_TANDBERG_E ... Success
[JVT-AVC_V1] (GStreamer-H.264-VA) MR3_TANDBERG_B ... Success
[JVT-AVC_V1] (GStreamer-H.264-VA) MR4_TANDBERG_C ... Fail
[JVT-AVC_V1] (GStreamer-H.264-VA) MR5_TANDBERG_C ... Fail
[JVT-AVC_V1] (GStreamer-H.264-VA) MR6_BT_B      ... Success
[JVT-AVC_V1] (GStreamer-H.264-VA) MR7_BT_B      ... Success
...
[JVT-AVC_V1] (GStreamer-H.264-VA) SL1_SVA_B      ... Success
[JVT-AVC_V1] (GStreamer-H.264-VA) SP1_BT_A      ... Not Supported
[JVT-AVC_V1] (GStreamer-H.264-VA) sp2_bt_b      ... Not Supported
[JVT-AVC_V1] (GStreamer-H.264-VA) SVA_BA1_B     ... Success
[JVT-AVC_V1] (GStreamer-H.264-VA) SVA_BA2_D     ... Success
```

Not Supported because Extended profile

GStreamer runner to launch pipelines

CLOSED

gst-launch: returns EX_UNAVAILABLE for unsupported formats !10088



– Containers

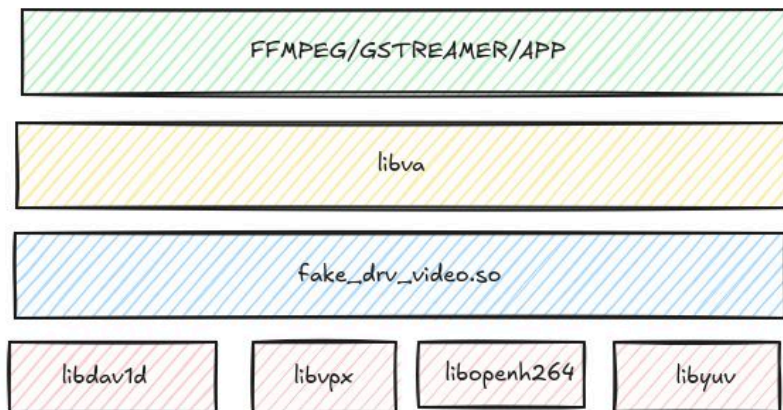
How to mock a hardware video acceleration layer?

TIP

Pure containers with LIBVA

```
$ LIBVA_DRIVER_NAME=fake vainfo
vainfo: VA-API version: 1.24 (libva 2.24.0)
vainfo: Driver version: Chromium fake libva driver
vainfo: Supported config attributes per profile/entrypoint pair
  VAProfileNone                : VAEntrypointVideoProc
  VAProfileH264Main            : VAEntrypointVLD
  VAProfileH264Main            : VAEntrypointEncSlice
  VAProfileH264High           : VAEntrypointVLD
  VAProfileH264High           : VAEntrypointEncSlice
  VAProfileJPEGBaseline        : VAEntrypointVLD
  VAProfileJPEGBaseline        : VAEntrypointEncPicture
  VAProfileH264ConstrainedBaseline : VAEntrypointVLD
  VAProfileH264ConstrainedBaseline : VAEntrypointEncSlice
  VAProfileVP8Version0_3       : VAEntrypointVLD
  VAProfileVP8Version0_3       : VAEntrypointEncSlice
  VAProfileVP9Profile0         : VAEntrypointVLD
  VAProfileVP9Profile0         : VAEntrypointEncSlice
  VAProfileVP9Profile2         : VAEntrypointVLD
  VAProfileVP9Profile2         : VAEntrypointEncSlice
  VAProfileAV1Profile0         : VAEntrypointVLD
```

TIP Pure containers with LIBVA



<https://chromium.googlesource.com/chromiumos/platform/libva-fake-driver/>

<https://github.com/rgonzalezfluendo/libva-fake-driver> (My fork with meson)

Fluster Dockerfile

<https://github.com/fluendo/fluster/blob/master/docker/README.md>

- Customizable Ubuntu version: 20.04, 22.04, or 24.04
- With reference decoders
- With libva-fake-driver *coming soon*
- Three FFmpeg installation options (System packages/Static binaries/Build from source)
- Two GStreamer installation options (System packages/Build from source)
- Hardware Acceleration Support:
 - `VAAPI` (Intel, AMD, NVIDIA (only on Ubuntu 24.04))
 - `VDPAU` (Intel via VA-GL bridge, AMD, NVIDIA)
 - `NVDEC` / `NVENC` (NVIDIA) – Available with system packages on Ubuntu 24.04
 - `Intel QuickSync` (Intel Media SDK, Intel OneVPL)



– Releases

2025–2026



From 0.6.0 to 0.8.0

- **v0.8.0** Oct 7 2026 : Ready for GStreamer conf 2026
- **v0.7.1** Apr 23 2026
- **v0.7.0** Apr 23 2026
- **v0.6.0** Oct 23 2025 : Post GStreamer conf 2025

(Keeping the O-based Versioning release cycle – Fluendo internal Joke)





Other Features

- <https://github.com/canonical/fluster-snap> by Alexandre Esse
- Add summary report generation with multiple formats and system info

```
**OS:** Linux 7.2.8-arch1-2

**CPU:** AMD Ryzen 7 PRO 7840U w/ Radeon 780M Graphics

**GPU:** 00.0 VGA compatible controller: Advanced Micro Devices, Inc. [PRIMARY]

**RAM:** 27.1 GB

**Backends:**
- VA-API: Mesa Gallium driver 26.2.4-arch1.1 for AMD Radeon 780M Graphics (radeonsi) (runtime 1.24)
- Vulkan: radv
```

- Using parsebin with `GST_PLUGIN_FEATURE_RANK=<decoder>:MAX`
- New **Download Manager** to avoid repeated downloads by Stéphane Cerveau
- New man page
- Bugfixing





Future

- More decoders and test suites
- More video codecs: AV2, EVC, LCEVC
- More audio codecs: USAC
- Enhance mirror_sync with plugins (such as radosgw)
- Sub-tool for testing GStreamer typefinders and parsers
- Let us know your ideas
- Version 1.0.0 ?!?



– Appreciation

Thank you

Appreciation

- **Ruben Sanchez** <rsanchez@fluendo.com>
- **Michalis Dimopoulos** <mdimopoulos@fluendo.com>
- Alexandre Esse <alexandre.esse@canonical.com>
- Stéphane Cerveau <scerveau@igalia.com>
- Andoni Morales Alastruey <ylatuya@gmail.com>
- Dmitry Baryshkov <dmitry.baryshkov@oss.qualcomm.com>
- Rubén González <rgonzalez@fluendo.com>
- Alexander Slobodeniuk <aslobodeniuk@fluendo.com>
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- Carlos Falgueras García <cfalgueras@fluendo.com>
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- Hyunjun Ko <zzoon@igalia.com>
- Maciej Sabiniok <msabiniok@fluendo.com>



Q&A

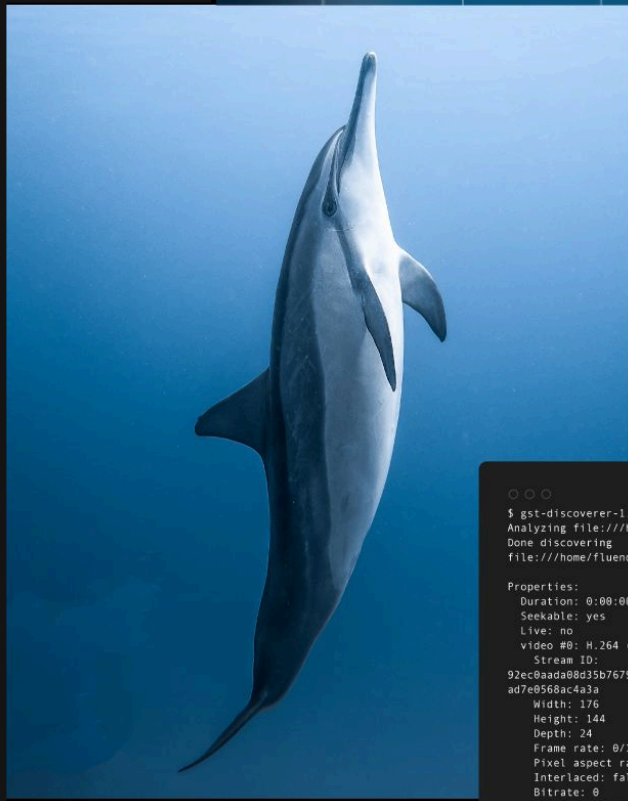
Thank you

<https://github.com/fluendo/fluster>



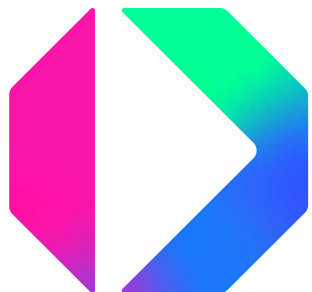
Stop taking risks.
Start finding **solutions.**

Thank you!



```
$ gst-discoverer-1.0 AUD_MW_E.264
Analyzing file:///home/fluendo/Videos/AUD_MW_E.264
Done discovering
file:///home/fluendo/Videos/AUD_MW_E.264

Properties:
Duration: 0:00:00.000000000
Seekable: yes
Live: no
video #0: H.264 (Constrained Baseline Profile)
Stream ID:
92ec0aada08d35b7679f87a98465b4cf955fbad11d2c8535ec
ad7e0568ac4a3a
Width: 176
Height: 144
Depth: 24
Frame rate: 0/1
Pixel aspect ratio: 1/1
Interlaced: false
Bitrate: 0
Max bitrate: 0
```



fluendo

