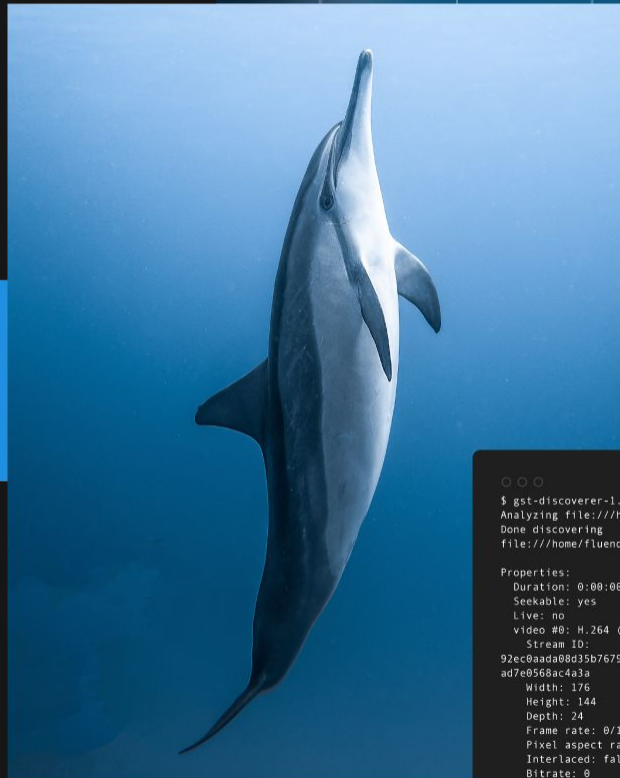


Fluster news

London 2025

Ruben 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
ad7e0568ac4a3a
  Width: 176
  Height: 144
  Depth: 24
  Frame rate: 0/1
  Pixel aspect ratio: 1/1
  Interlaced: false
  Bitrate: 0
  Max bitrate: 0
```

Index

- About Fluster
- New pixel comparison method
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- Releases
- Appreciation

About Fluster

Fluster is a testing framework written in Python for decoder conformance

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

In depth presentation done two years ago in A Coruña:

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

Fluster Results AVC/H.264

TOTALS	GStreamer-H.264-Libav	GStreamer-H.264-VA	GStreamer-H.264-VAAPI	GStreamer-H.264-Vulkan
-----	-----	-----	-----	-----
CONFORMANCE	195/204	170/204	163/204	125/204
TOTAL TIME	7.581s	7.899s	7.834s	17.661s

Fluster Results HEVC/H.265

TOTALS	GStreamer-H.265-Libav	GStreamer-H.265-VA	GStreamer-H.265-VAAPI	GStreamer-H.265-Vulkan
-----	-----	-----	-----	-----
CONFORMANCE	141/147	144/147	142/147	124/147
TOTAL TIME	5.374s	5.329s	5.903s	41.351s

Fluster Results VVC/H.266

TOTALS	GStreamer-H.266-Libav	GStreamer-H.266-VVdeC
-----	-----	-----
CONFORMANCE	263/282	236/282 *
TOTAL TIME	76.777s	57.826s

Note: GStreamer-H.266-VA not supported by current hardware

Fluster Results VP9

TOTALS	GStreamer-VP9-Libav	GStreamer-VP9-VA	GStreamer-VP9-VAAPI	GStreamer-VP9-libvpx
-----	-----	-----	-----	-----
CONFORMANCE	309/311 ?	276/311	276/311	311/311
TOTAL TIME	6.524s	7.794s	9.537s	3.819s

Note: GStreamer-VP9-Vulkan not supported by current hardware

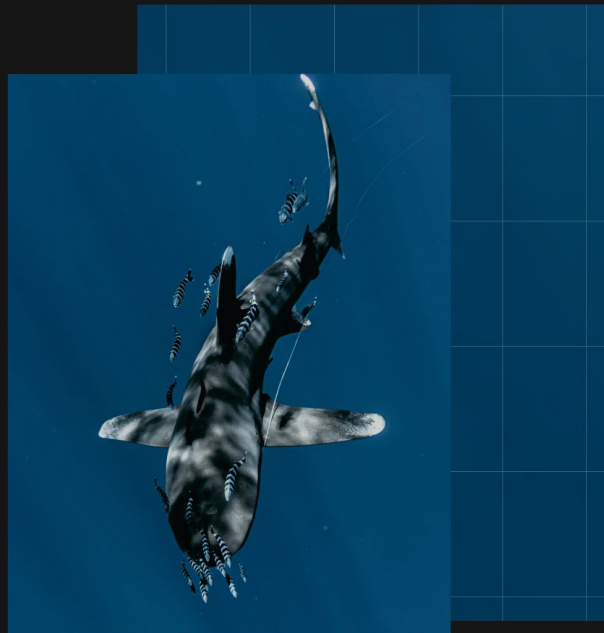
Fluster Results AV1

TOTALS	GStreamer-AV1-VA	GStreamer-AV1-dav1d	GStreamer-AV1-libaom
-----	-----	-----	-----
CONFORMANCE	275/278	273/278 *	273/278
TOTAL TIME	4.372s	1.714s	1.973s

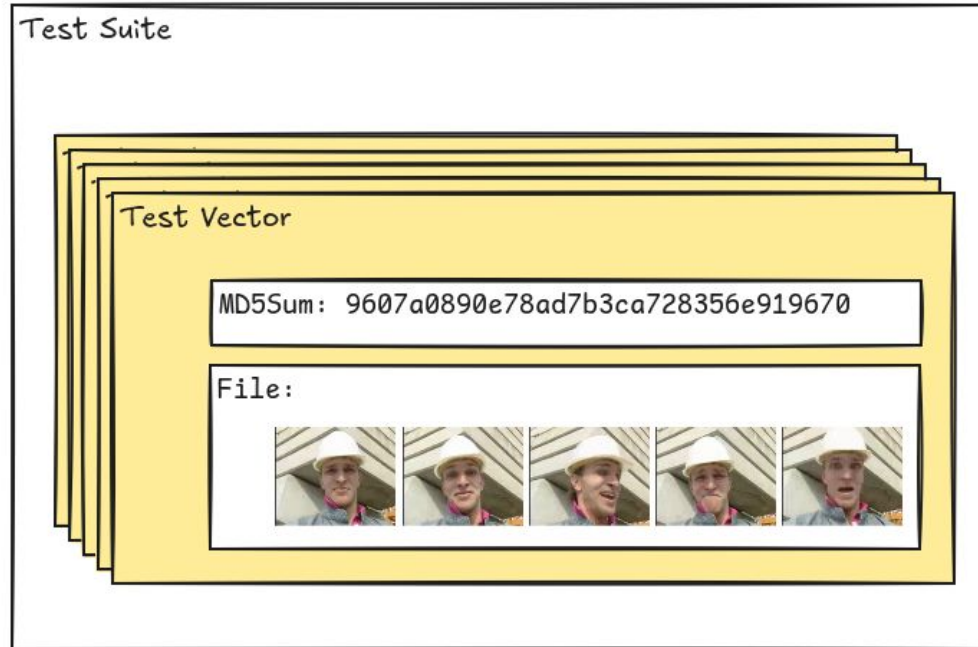
Note: GStreamer-AV1-Vulkan not supported by current hardware/software

New pixel comparison method

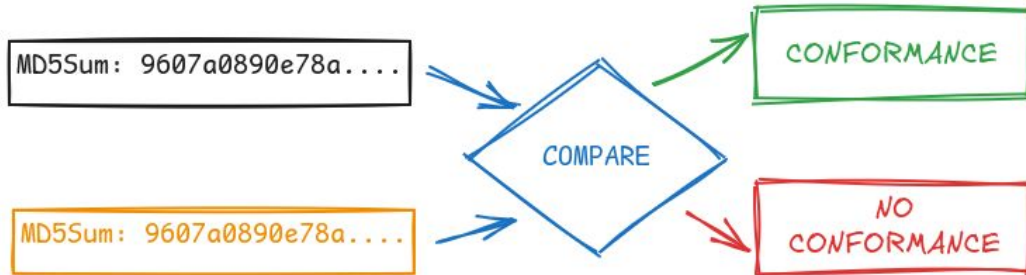
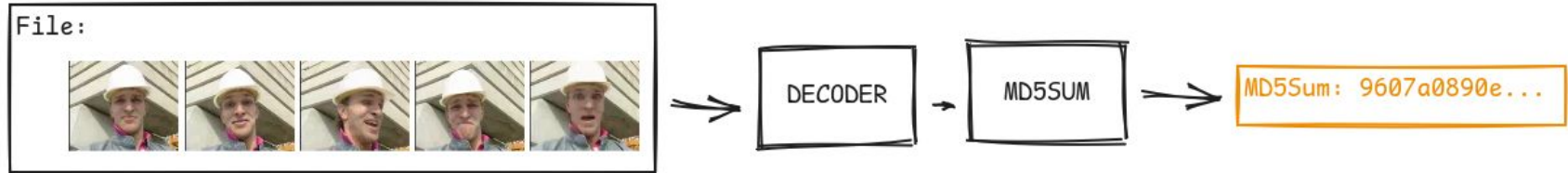
For Non-Deterministic Decoders



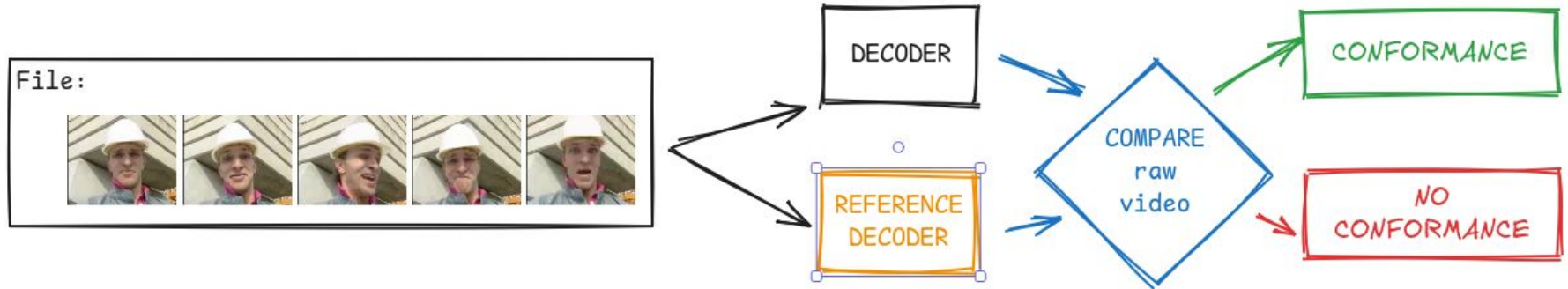
Test Suites



Classic hash method



Pixel comparison method



Pixel comparison method

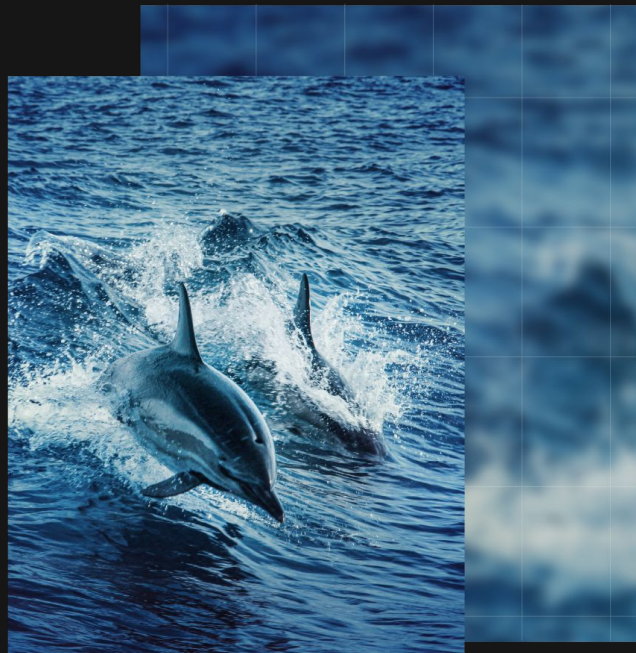
- Need a reference decoder, no a reference MD5sum.

CODEC	H.264/AVC	H.265/HEVC	H.266/VVC	EVC
REFERENCE	JM	HM	VTM	ETM

- Slower process.
- Allow testing non deterministic decoders: codecs that don't generate identical outputs.
- A new parameter to define the tolerance to compare.

Profiles

Roadmap



Profiles

- A video codec profile is a defined *subset of features* within a codec standard that specifies which tools, algorithms, and constraints are used when encoding or decoding video.

test_suites/h264/JVT-FR-EXT.json		
8	8	"source": "https://www.itu.int/wftp3/av-arch/jvt-site/draft_conformance/FRExt/alphaconformanceG.zip",
9	9	"source_checksum": "db4b2cf836e932bf726501a5040793dc",
10	10	"input_file": "alphaconformanceG/alphaconformanceG.264",
11	+	"profile": "Main",
12	12	"output_format": "yuv420p",
13	13	"result": "661772a357c4163dce1c5373786fc24f"
14		},
16	16	"source": "https://www.itu.int/wftp3/av-arch/jvt-site/draft_conformance/FRExt/brcm_freh10.zip",
17	17	"source_checksum": "fea884e5bc2741e598604fa54004278e",
18	18	"input_file": "freh10.264",
20	+	"profile": "High",
21	21	"output_format": "yuv420p",
22	22	"result": "3a852255a47ea049fdf9c60aa40f7e48"
23		},
24	24	"source": "https://www.itu.int/wftp3/av-arch/jvt-site/draft_conformance/FRExt/brcm_freh11.zip",
25	25	"source_checksum": "d37886ccdf88ecfa67fce8945f2aef63",
26	26	"input_file": "freh11.264",
29	+	"profile": "High",
30	30	"output_format": "yuv420p",
31	31	"result": "14aed89a66de597e5dd11525aa7dcefa"
32		},
32	32	"source": "https://www.itu.int/wftp3/av-arch/jvt-site/draft_conformance/FRExt/brcm_freh3.zip",
33	33	"source_checksum": "d39ebac565200d8c26be848a7908182b",
34	34	"input_file": "freh3.264",
38	+	"profile": "High",

Example

```
./fluster.py run -d GStreamer-H.264-VA-Gst1.0 -s
```

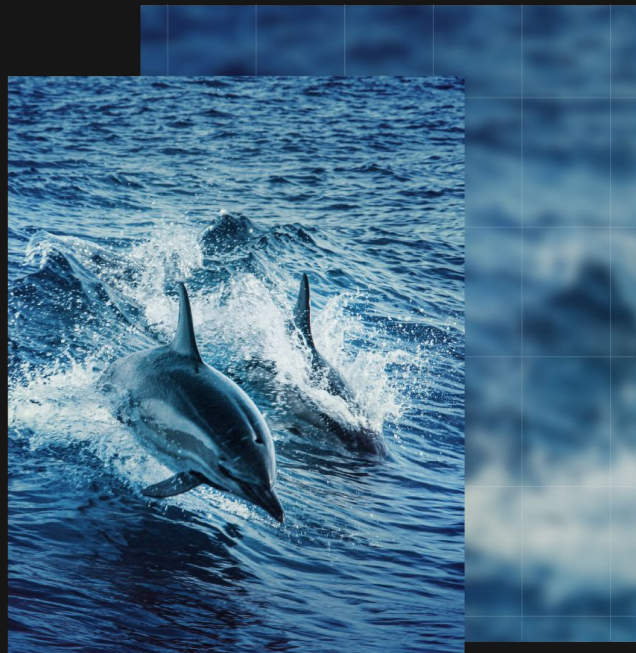
```
...  
|HPCVNL_BRCM_A|OK|  
|HVLCFI0_Sony_B|OK|  
|HVLCMFF0_Sony_B|OK|  
|HVLCPFF0_Sony_B|OK|  
|-|-|  
|Test|GStreamer-H.264-VA-Gst1.0|  
|TOTAL|46/69|  
|TOTAL TIME|2.842s|  
  
|-|-|  
|Profile|GStreamer-H.264-VA-Gst1.0|  
|MAIN|1/1|  
|HIGH|45/45|  
|HIGH_10|0/2|  
|HIGH_4_2_2|0/21|
```

```
# GLOBAL SUMMARY  
|TOTALS|GStreamer-H.264-VA-Gst1.0|  
|-|-|  
|TOTAL|171/204|  
|TOTAL TIME|7.858s|  
|-|-|  
|Profile|GStreamer-H.264-VA-Gst1.0|  
|BASELINE|2/7|  
|CONSTRAINED_BASELINE|33/33|  
|EXTENDED|3/6|  
|HIGH|45/45|
```

Profile	GStreamer-H.264-VA-Gst1.0
BASELINE	2/7
CONSTRAINED_BASELINE	33/33
EXTENDED	3/6
HIGH	45/45
HIGH_10	0/2
HIGH_4_2_2	0/21
MAIN	88/90

Semantic commits

And automatic releases



Semantic commits

```
* 80fc8e0 - (HEAD -> master, origin/master, origin/HEAD) ci: update "github_token" to create new release (5 hours ago) <rsanchez>
* 812ebbd - ci: Delete incorrect args from release.yml (6 hours ago) <rsanchez>
* 89e06d3 - build: bump version to 0.6.0 (8 hours ago) <Michalis Dimopoulos>
* becaeecc - feat: add -c option to download command (8 hours ago) <Stéphane Cerveau>
* 2f0617a - feat: add a progress bar to download (24 hours ago) <Stéphane Cerveau>
* f71bd26 - (tag: v0.5.0) docs: Add release notes for version 0.5.0 (25 hours ago) <github-actions>
* 30de83d - ci: fix message prefix of automated commit for CHANGELOG.md (25 hours ago) <Michalis Dimopoulos>
* d1819d2 - (gstconf2025) build: bump package version to 0.5.1 (5 days ago) <Michalis Dimopoulos>
* b91c614 - ci: fix version of Windows Server runner to 2022 (5 days ago) <Michalis Dimopoulos>
* fa4f726 - feat: add support for V4L2 AV1 stateful video decoder (5 days ago) <Deepa Guthyappa Madivalara>
* d83e9dd - build: add AV1 argon error test suites (6 days ago) <Michalis Dimopoulos>
* dda4b9a - docs: update README.md (6 days ago) <Michalis Dimopoulos>
* 89f5d42 - chore: normalise parallel jobs in run, reference and download modes (6 days ago) <Michalis Dimopoulos>
* b40d7e9 - fix: Add logic to handle expected errors correctly for pass/fail metrics (7 days ago) <Michalis Dimopoulos>
* 28ac58b - style: correct log message in GStreamer-based decoders (7 days ago) <Michalis Dimopoulos>
* 807e475 - fix: Split AV1 argon non-annex B error test vectors (7 days ago) <mcesariniflu>
* d5eb4fb - fix: Add missing output format in AV1 Argon Profile 0 test suite vectors (3 weeks ago) <mcesariniflu>
* 2b3bf8f - style: Add test_method and profile to Chromium test suites (4 weeks ago) <rsanchez>
* fb4c129 - fix: Read format and profile from ffprobe for av1 chromium (4 weeks ago) <rsanchez>
* ec60fd1 - fix: Add missing output format to AV1 Argon Profile 2 test vectors (5 weeks ago) <Michalis Dimopoulos>
* a899540 - fix: Add missing output format in AV1 Argon Profile 1 test suite vectors (5 weeks ago) <Michalis Dimopoulos>
* 1cc278c - fix: Replace broken link for AV1 argon test vectors (5 weeks ago) <Michalis Dimopoulos>
* bb7d273 - fix: Improvements in download process (5 weeks ago) <rsanchez>
* 59e4048 - fixup! fix: calculate AV1 Argon checksums based on output of reference decoder (5 weeks ago) <Michalis Dimopoulos>
* 9865a39 - fix: calculate AV1 Argon checksums based on output of reference decoder (5 weeks ago) <Michalis Dimopoulos>
* 192b221 - feat: Add global summary table per profile (6 weeks ago) <rsanchez>
* 6fff185d - ci: Update release workflow to automatic CHANGELOG.md generation (6 weeks ago) <rsanchez>
* f2d7198 - build: Automate CHANGELOG.md generation (6 weeks ago) <rsanchez>
* e8af0cc - fix: Add missing profiles to MPEG2v test suites (6 weeks ago) <rsanchez>
* 946c7c7 - fix: Resolve undefined output format in MPEG4 and H.266 vectors (6 weeks ago) <rsanchez>
* cead88b - fix: Set method pixel in MPEG4 video test suites (6 weeks ago) <rsanchez>
* 523f06f - refactor: Remove is_single_archive argument and related functions (6 weeks ago) <rsanchez>
* d4389aa - fix: Add av1parse element for low rank GStreamer av1 decoders (6 weeks ago) <Michalis Dimopoulos>
* e8aaaad3 - feat: add vp9 decoder for vulkan ffmpeg (6 weeks ago) <Stéphane Cerveau>
* 36814f3 - fix: add missing output formats to GStreamer mapping (7 weeks ago) <Michalis Dimopoulos>
* 837fdd - fix: do not fail when output format is not mapped (GStreamer decoders) (7 weeks ago) <Michalis Dimopoulos>
* 2250a56 - fix: Add pixel method to generators for mpeg2/4 video (8 weeks ago) <rsanchez>
* acc314d - fix(gstreamer): do not fail when output_format is None (9 weeks ago) <Carlos Bentzen>
* 3dad9c7 - chore: rename h26x to h.26x in test_suites (9 weeks ago) <Stéphane Cerveau>
* 953feaa - (tag: v0.4.1) fix: correct upload of CHANGELOG.md to pypi (2 months ago) <rsanchez>
* 1e64e79 - (tag: v0.4.0) docs: CHANGELOG.md and pyproject.toml updated manually to new 0.4.0 release (2 months ago) <rsanchez>
* bae0b64 - docs: Update documentation for a new release 0.4.0 (2 months ago) <rsanchez>
* 83b2a13 - docs: add MPEG4_VIDEO info to README.md (2 months ago) <rsanchez>
* 1f4b33d - fix: add provider "FLuendo" to FLuendoMPEG4V1deoDecoder (2 months ago) <rsanchez>
```

Semantic commits

Based on <https://www.conventionalcommits.org>

```
<type>[optional scope]: <description>  
  
[optional body]  
  
[optional footer(s)]
```

Types:

- **`feat`**: (new feature for the user, not a new feature for build script)
- **`fix`**: (bug fix for the user, not a fix to a build script)
- **`docs`**: (changes to the documentation)
- **`style`**: (formatting, missing semi colons, etc; no production code change)
- **`refactor`**: (refactoring production code, eg. renaming a variable)
- **`test`**: (adding missing tests, refactoring tests; no production code change)
- **`chore`**: (updating grunt tasks etc; no production code change)
- **`build`**: (build scripts for reference decoders)
- **`CI`**: (continuous integration)

Releases

2025



From 0.2.0 to 0.6.0

Releases	Tags
Tags	
v0.6.0 ...	
🕒 3 hours ago ↻ e5693b9  zip  tar.gz  Notes  Downloads	
v0.5.0 ...	
🕒 yesterday ↻ f71bd26  zip  tar.gz  Notes  Downloads	
v0.4.1	
🕒 on Aug 6 ↻ 953feaa  zip  tar.gz  Notes  Downloads	
v0.4.0	
🕒 on Aug 5 ↻ 1e64e79  zip  tar.gz  Notes	
v0.3.0	
🕒 on Apr 17 ↻ 15c9b2b  zip  tar.gz  Notes  Downloads	
v0.2.0	
🕒 on Jan 27 ↻ 59d70e7  zip  tar.gz  Notes  Downloads	
v0.1.0 ...	
🕒 on Dec 20, 2022 ↻ 1bfcfe2  zip  tar.gz  Notes	

zer0ver

Software's most popular versioning scheme!

[About](#) [Submissions](#) [Source](#)

ZeroVer: 0-based Versioning

Cutting-edge software versioning for minimalists

With software releases at an all-time high, the consensus has never been clearer: **Major versions are over**. So what does the past, present, and future of software versioning look like? Welcome to ZeroVer 0.0.1.

Contents

1. [Overview](#)
2. [Notable ZeroVer Projects](#)
3. [Featured Use Cases](#)
 1. [HashiCorp Vault and Terraform](#)
 2. [TOML](#)
 3. [Apache Kafka](#)
 4. [OpenSSL](#)
4. [Selected Emeriti](#)
5. [More info](#)

Overview

Unlike other versioning schemes like [Semantic Versioning](#) and [Calendar Versioning](#), ZeroVer (AKA [Over](#)) is simple: **Your software's major version should never exceed the first and most important number in computing: zero.**

A down-to-earth demo:

YES: 0.0.1, 0.1.0dev, 0.4.0, 0.4.1, 0.9.8n, [0.999999999](#), [0.0](#)

Semantic Versioning 2.0.0

Summary

Given a version number MAJOR.MINOR.PATCH, increment the:

1. MAJOR version when you make incompatible API changes
2. MINOR version when you add functionality in a backward compatible manner
3. PATCH version when you make backward compatible bug fixes

Additional labels for pre-release and build metadata are available as extensions to the MAJOR.MINOR.PATCH format.

Introduction

In the world of software management there exists a dreaded place called "dependency hell." The bigger your system grows and the more packages you integrate into your software, the more likely you are to find yourself, one day, in this pit of despair.

In systems with many dependencies, releasing new package versions can quickly become a nightmare. If the dependency specifications are too tight, you are in danger of version lock (the inability to upgrade a package without having to release new versions of every dependent package). If dependencies are specified too loosely, you will inevitably be bitten by version promiscuity (assuming compatibility with more future versions than is reasonable). Dependency hell is where you are when version lock and/or version promiscuity prevent you from easily and safely moving your project forward.

As a solution to this problem, we propose a simple set of rules and requirements that dictate how version numbers are assigned and incremented. These rules are based on but not necessarily limited to pre-existing widespread common practices in use in both closed and open-source software. For this system to work, you first need to declare a public API. This may consist of documentation or be enforced by the code itself.

New Decoders

- **VKVS-H.264**: Vulkan Video Samples H.264 decoder
- **VKVS-H.265**: Vulkan Video Samples H.265 decoder
- **VKVS-VP9**: Vulkan Video Samples VP9 decoder
- **VKVS-AV1**: Vulkan Video Samples AV1 decoder
- **GStreamer-AV1-V4L2-Gst1.0**: GStreamer AV1 V4L2 decoder for GStreamer 1.0
- **GStreamer-AV1-Vulkan-Gst1.0**: GStreamer AV1 Vulkan decoder for GStreamer 1.0
- **GStreamer-AV1-libaom-Gst1.0**: GStreamer AV1 libaom decoder for GStreamer 1.0

- **FFmpeg-VP9-Vulkan**: FFmpeg VP9 Vulkan decoder
- **GStreamer-VP9-Vulkan-Gst1.0**: GStreamer VP9 Vulkan decoder for GStreamer 1.0

- **ISO-MPEG2-AAC**: ISO MPEG2 AAC reference decoder
- **ISO-MPEG4-AAC-ER**: ISO MPEG4 AAC ER reference decoder

New Test Suites

- AV1-ARGON-PROFILE0-CORE-ANNEX-B
- AV1-ARGON-PROFILE0-ERROR-NON-ANNEX-B
- AV1-ARGON-PROFILE0-NON-ANNEX-B
- AV1-ARGON-PROFILE0-STRESS-ANNEX-B
- AV1-ARGON-PROFILE1-CORE-ANNEX-B
- AV1-ARGON-PROFILE1-ERROR-NON-ANNEX-B
- AV1-ARGON-PROFILE1-NON-ANNEX-B
- AV1-ARGON-PROFILE1-STRESS-ANNEX-B
- AV1-ARGON-PROFILE2-CORE-ANNEX-B
- AV1-ARGON-PROFILE2-ERROR-NON-ANNEX-B
- AV1-ARGON-PROFILE2-NON-ANNEX-B
- AV1-ARGON-PROFILE2-STRESS-ANNEX-B
- JVT-MVC
- MPEG2_AAC-ADIF (from ISO_IEC_13818-4_2004)
- MPEG2_AAC-ADTS
- MPEG2_VIDEO-422
- MPEG2_VIDEO-MAIN
- MPEG4_AAC-ADIF (from ISO_IEC_14496-26_2010)
- MPEG4_AAC-ADTS
- MPEG4_AAC-MP4
- MPEG4_AAC-MP4-ER
- MPEG4_VIDEO-AdvancedSimpleProfile
- MPEG4_VIDEO-SimpleProfile
- MPEG4_VIDEO-SimpleScalableProfile
- MPEG4_VIDEO-SimpleStudioProfile

Other Features

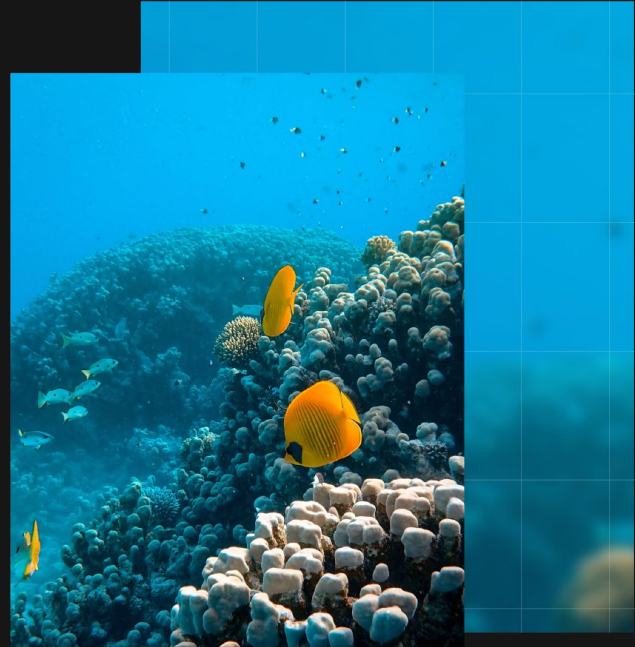
- <https://pypi.org/project/fluster-conformance/>
- Add the codec option in list and dw commands to perform only selected codecs

```
fluster list -d H.265  
fluster download -c H.265
```

- ffmpeg: Detect and fail on software decoder fallback
- `ruff` and `pre-commit`
- New Changelog file and release pages
- Bugfixing

Appreciation

Thank you

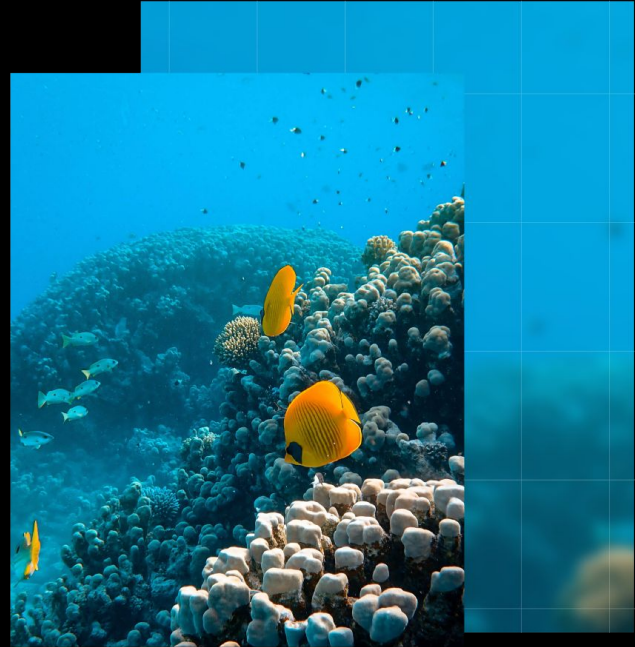


Appreciation

- Michalis Dimopoulos
- Martín Cesarini
- Ruben Sanchez
- Stéphane Cerveau
- Carlos Bentzen
- Diego Nieto
- Nicolas Dufresne
- Benjamin Gaignard
- Carlos Falgueras García
- Deepa Guthyappa Madivalara

Q&A

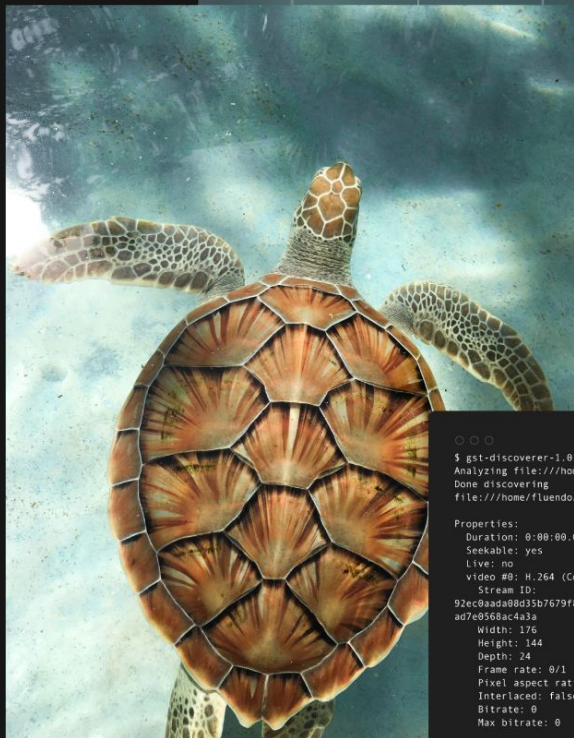
Thank you





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

Thank you!



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

Properties:
Duration: 0:00:00.000000000
Seekable: yes
Lives: no
video #0: H.264 (Constrained Baseline Profile)
Stream ID:
92ec9aada08d35b7679f87a98465b4cf955fbad11d2c8535ec
ad7e0560ac4a3a
Width: 176
Height: 144
Depth: 24
Frame rate: 0/1
Pixel aspect ratio: 1/1
Interlaced: false
Bitrate: 0
Max bitrate: 0
```

