FOSDEM’17
OPEN MEDIA
DEV ROOM

Review and Wrap Up!
A. Kouadio - EBU
This year’s Topics

- **Codecs**
  - AV1

- **Frameworks for Multimedia applications**
  - Upipe
  - Gstreamer
  - GPAC

- **Standards**
  - Subtitles (TTML)
  - Audio - AES67/AES70

- **Quality Control**
  - MedialInfo
  - Kaitai Struct

- **(Stress) Testing**
  - Fuzzing…

- **Use Cases**
  - Streaming (Live Demo)
    - Kaltura
    - Transcoding - Trace TV
KALTURA - 10 Years open source innovation.

- 10 years of open source innovation in online video delivery

- **KALTURA** - End to End VOD and live Media management platform

- Kaltura start in 2006 following youtube UGC cultural change.

- Primary Goal: youtube meets wikipedia! Missing collaborative video editing platform

- 2008/9 Open video alliance created to provide open video standards especially html5 >video>

- Video starts catching up in education - html5 takes shares in flash adoption

- 2009 - variety of video sources. rich metadata attached to the contributed videos. how to handle these large sets of videos.

- 2012 - major support from Apple on HTML5 and ban on Flash by Steve Jobs.
  - Early deployments in Moocs and basic video delivery - Growth in telemedicine and healthcare -

- **Next steps**
  - New player / realtime video delivery
  - VR / 360 support / Quicker app deployment.
**KALTURA: Using NGINX RTMP and Kaltura platform**

- Live demo of video stream supporting DASH and HLS performed by Jess Pornoy from Kaltura.

- RTMP over SSL could be used to enforce stream encryption.

- Streaming done over RTMP and playback over HLS.

- Kaltura-Nginx best choice for Kaltura as NGINX web server used across the company - also recommended if you want to use RTMP. For WEB RTC there are other solutions available (e.g. Mediasoup).
IRT - Timed Text Markup Language
Subtitles support in OS SW

• Andreas Tai - IRT

• W3C standard - started in 2003, 2nd Edition in 2013
  • SMPTE TT disappearing, (EBU-TTD) **IMSC1 is the most promising subtitling profile for web delivery.**
  • TTML is not yet widely supported by browsers mainly WebVTT but TTML is supported by most video players as it is preferred by content producers

• Where is TTML supported?
  • Production : SubtitleEdit
    • Amara - FanSub community : online subtitle editor., Subtitle Conversion Framework (opensource project for subtitle archiving and transport of subtitles.) supports :
      • TTT (timetext toolkit) and EBU-tt-live-toolkit. support streaming of subtitles and pushed by BBC.
  • For Distribution : MP4Box supports TTML
    • Presentation : VLC player latest version support TT-ML may need to support more features such that color styling and need to rename the subtitle file into .txt.

• Broad support of TTML through OSS project.
  • Open for comments and bug reports. all supporting tools are listed in the presentation.
TRACETV - Transcoding platform with OS tools

• **Trace TV - Emmanuel Aldegguer** -(20 Production center in the world)

• Transcoding platform based on open source tools (FFmpeg, Node.js, Jquery, etc).
  
  • Web interface uses PIPE and Script to run an FFMPEG task.

  • Created to *address the general need for most employees to transcode files without knowing the technical details of each formats and codecs*. Main users community managers and broadcast production.

  • High level simple language and tracking web interface.

  • Less advanced that professional platforms.

  • Not a distributed transcoder, Small virtual machine are used of each transcoding task.

• Source content are not contributed in the correct formats and need a thorough QC check.

• **Next steps :**
  
  • *share with the community (.git) and improve duplication of the platform.*
Gstreamer - Status update

• Sebastian Dröge - http://gstreamer.freedesktop.org

• Gstreamer: pipeline based multimedia framework and dynamically reconfigurable (while data is flowing).

• Goal: make it easy to build complex multimedia applications via a simple core framework, easy to integrate in other applications. Very stable API.
  • Community driven OS project - LGPLv2.1 proprietary software can be built on top. written in C bindings for Java, Go, python etc… exist.

• Clarifying The Confusion: it is Not a codec a streaming server / transcoder / codec etc…

• Current Version 1.12 -
  • Device probing available (lists device capabilities etc…)
  • Codec support (H.265 / VP9 / etc…) major OPUS improvements. support for TTML.
  • Support of live mixing and mixing of live sources. used in professional broadcast products.
  • Major Video rendering API’s supports (wayland, Vulkan, GL, etc…)
  • WebRTP (hot topic) supported. with remote clock synchronization.
  • New build system for Gstreamer (Meson - replacing Autotools).

• Next steps - merge GstTranscoder and integrate openCV, support for SDI over IP.
GPAC for VR and 360 video delivery - A. R. Sekkat

- GPAC - open source multimédia framework - LGPL licence
  - MP4Box - file segmentation, encryption and procession for DASH Streaming.
  - MP4Client - support for VR/360 video.

- 4K image format for be streamed, therefore need efficient bandwidth management
  - Tile the image and transmit different qualities for each tile depending on the one in view.

- Different quality degradation strategies are possible as there are no standards available.
  - Current MP4Box supports different Tiling quality strategies that allowed graceful quality improvement of the picture in view.
UPIPE - status update.

- C pipeline based multimedia Framework, started in 2012 growing fast! funded by OpenHeadEnd.
  - Focus of broadcast and professional applications.
  - mostly MIT licensing and some modules in LGPL.

- What’s New?
  - TS compliant according to the packet delivery constraints / HLS client / H.265 / VANC support in SDI etc… LUA Bindings.
  - AES encryption available as well as https.
  - UPiPe inputs for broadcast
    - support for main PCIe ASI cards - Decklink/DVEO
  - Native Support for v210 (10bit Video format) and EBU R128 among others.

- Important - Upipe Framers (similar to AVcodec parsers)
  - act as bitstream filters to reshape streams.
  - Dynamic changes: propagation of stream threads.
  - Efficient threading: you decide where to allocate your threads.

- Use cases (some of them are available on the
  - Video Player 1 / TS Remux / Recording / Mosaic (one pipeline per input) / live encoder/decoder / transcoder /MPTS mix
MediaInfo - Media file quality control.

- Jerome Martinez - jerome@mediaarea.net - @mediaarea_net
- mediaArea.net

- Different media community needs to be address - Fix incorrect metadata in source files and perform QC on decoded content and verify conformance.

- **MediaInfo - Metadata extraction and review tool** developed by mediaArea.
  - BSD2 License / 6K downloads per day.
  - Detect all « weird » transport layer. for individual and professional usage.
  - supports IMF and distribution formats such matroska etc…
  - Allows export of metadata in different professional metadata frameworks (PBcore, EBUCore etc.)

- **MediaConch - File Conformance checker** (GPLv2 and MPLv2 License). support FFV1, Matroska and PCM by default
  - can be extended with plugins (pdf, tiff) for report generation.

- **MediaTrace** (under development)
  - Deep check of bytes i.e. provide a meaning for each byte in the bitstream

- **QCTools** - based on FFMpeg (GUI) to **perform quality control on the decoded based band signal** (PSNR / SSIM etc..)
KAITAI Struct - file parser

- **Issue**: multitude of more complex file formats not necessarily well documented. Parsing binary files is difficult.

- **Mission**: Create a human readable description of the file format by parsing the file binary.
  - Dumping tools embedded by developers for debugging purposes.
  - Errors in file format library can be used as vulnerability for DoS errors or information leaks.
  - No Wireshark for file format library debugging, at least universally accepted.

- **Kaitai Struct**: Declarative file format specification language (.ksy)

- **Workshop on KAITAI struct** to be arranged if growing interest contact:
  - http://kaitai.io/
  - Twitter: @kaitai_io
AV1 - a new codec


- **AV1 Codec**
  - First codec of **Alliance of Open Media** - Consortium of large internet video streaming companies
    - **Royalty free** - optimized for the internet supported by many companies (Amazon, Netflix etc…) - Still contains some IP - trying to bypass these with new clever tricks.
  - Reference encoder based on libvpx (without )
    - **Currently assessing the different coding tools** that will contribute to the optimal performance of the codec (while avoid IP).
      - all tools are assess in experiments before addition to the codec. (50 currently ongoing. example Deringing filter import from Dalla or PVQ tool…
    - **Bitstream to be frozen Q4/2017** (maybe?).
      - Currently better than H.265 around several metrics (PSNR /SSIM / etc…)
  - **Something to look forward to !**
FUZZ - Stress testing your projects/API/libraries

- Max Moroz

- Generator for library / API testing

- Several Fuzzing tools and techniques presented (see slides)

- Continuous Fuzzing is encouraged especially after patches are applied.

- Fuzzing-as a Service available based on ClusterFuzz (Free of charge) - OSS Fuzz has 6000 Cores available for Fuzzing.

- Recommended to increase software project security and reduce vulnerabilities, crashes and security breaches.
AES67 - Standard for Audio over IP interop!

AES70 - Controlling audio Devices

- Conrad Bebbington - Focusrite

- AES67
  - Audio standards for Audio over IP interoperability between different technologies.
    - mainly uses existing open networking Standard IT technology
    - Audio Format linear PCM - with different qualities
    - Packetization over RTP, no CSRC
    - Synchronization: IEEE 1588-2008 PTP clock. Explained

- Standardisation Improves interoperability!

- AES67 is supported in Upipe and Gstreamer except Connection management.
See you at IBC’17 and FOSDEM’18…Of course!

- **Christophe Massiot** - Open Head End
- **Kieran Kunhya** - Open Broadcast systems
- **Adi Kouadio** - EBU
- **Frans De Jong** - EBU