

GStreamer in the living room and in outer space

FOSDEM 2015, Brussels
Open Media Devroom
31 January 2015

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Introduction

Who?

- Long-term GStreamer core developers and maintainers since 2005/6
- Founders of Centricular Ltd
 - Consultancy offering services around GStreamer, graphics and multimedia related software



What is this all about?

- What is GStreamer?
- Cool stuff people are doing with it
- The Future

GStreamer? What is it?



GStreamer

- Pipeline-based multimedia framework
- Basic building blocks: elements connected via pads



- Set of libraries with abstract API
- Plugins for specific features
 - Often wrapping other libraries, e.g. libav/ffmpeg, OpenCV, various codec libraries

GStreamer (cont'd)

- Open Source, LGPL v2.1+
 - Proprietary applications and plugins allowed
- Cross-platform
 - Linux, embedded Linux, Windows, OSX, iOS, Android, ...
 - Binary SDKs for Windows, OSX, iOS, Android
 - x86, ARM, PowerPC, SPARC, ...
- Stable GObject based C API/ABI
- Bindings for many languages
 - Python, C++, JavaScript, .NET, ...



GStreamer (cont'd)

- Not a media player or playback library
- Not a codec and protocol library
- Not a transcoding tool
- Not a streaming server

- *But can be (and is) used to implement all that*

GStreamer (cont'd)

- Goals
 - Flexible and extensible design
 - Easy to integrate with other software (in both directions)
- Large, active developer and user community
- Large commercial ecosystem
 - Users
 - Contributors
 - Consultancies

Cool stuff people
are doing with GStreamer



Desktop Environments and Apps

- GNOME, Enlightenment, XFCE, KDE
 - Media players, screen capturing, camera usage, ...
 - First larger scale usage
- Qt
- OpenJDK
- Libre/OpenOffice

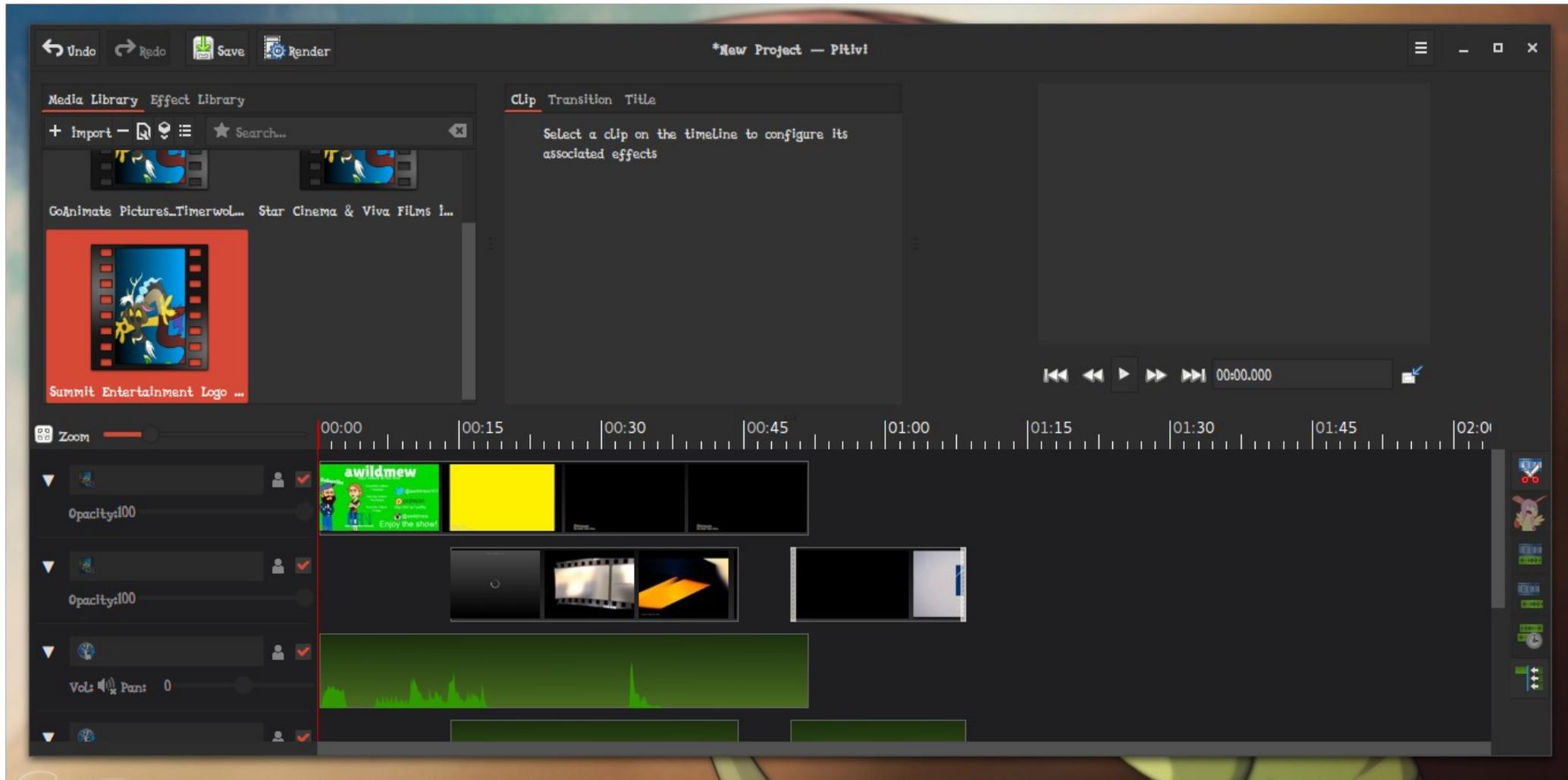
The Web

- WebKit
 - GTK+, EFL, Qt, Windows/Cairo ports
- Firefox
- Blink (Chrome) extension
- OpenWebRTC
 - New WebRTC client-side implementation by Ericsson
 - Available with sample apps for Linux, Android, iOS and OSX
 - Work in progress, WebKit integration planned

Server Side

- Kurento
 - WebRTC / HTML5 streaming server
- Streaming & transcoding servers
 - RTSP, DASH/HLS, etc.
 - Commercial hardware boxes
- DLNA server implementation Rygel

Video Editing



Video Editing

- PiTiVi
 - Non-linear video editor
 - Fundraiser still running: <http://fundraiser.pitivi.org>
- GStreamer Editing Services Library
 - Used in PiTiVi
 - Even used in commercial products

Video Editing

Activities Iceweasel Fri 18:33

PluralEyes | Red Giant Software – Iceweasel

Encap... x GStre... x Tag ... x SSA/... x Add ... x CFP ... x Trello x Asan... x The s... x Secu... x Plura... x

www.redgiant.com/products/pluraleyes/#prodJump Google



**FAST,
ACCURATE, &
AUTOMATIC**

With the touch of a single button, PluralEyes analyzes the audio from your cameras and audio devices and syncs them up, in seconds. No clapboards or timecode are needed.



Chat now

Music Composing & Audio Editing

- Buzztrax: Sequencer, synthesizer & tracker
- Put together various instruments graphically, define control curves for properties and let them run

Music Composing & Audio Editing

The screenshot displays the Buzztard audio software interface. The main window is titled "303-2 (ungespeichert) - Buzztard". The interface includes a menu bar (Datei, Bearbeiten, Ansicht, Wiedergabe, Hilfe) and a toolbar with various icons. Below the toolbar, there are tabs for "Geräte", "Fragmente", "Sequenz", "Wellenformtabelle", and "Songinformationen".

The central area shows a signal flow graph with several audio processing machines connected by arrows. The machines include:

- Jeskola-Bass-3
- sonik-s-Saturat
- side-Tracker-M
- skola-NiNJA-dEi
- FSM-Kick
- skola-Bass-3 C
- master

A "volume -> master Analyse" window is open, showing a waveform and a spectrum analyzer. The waveform has a time axis from 0 to 2000. The spectrum analyzer has a frequency axis from 100 to 75. Below the spectrum analyzer, there are two dropdown menus for "spectrum frequency", both set to "log.". The "master" machine is connected to the "volume -> master Analyse" window.

At the bottom of the interface, there is a status bar with the text: "Add new machines from right click context menu. Connect machines with shift+drag from source to target." On the right side of the status bar, there are three time display boxes: "CPU: 0 %", "00:00.000", "00:07.920", and "00:23.040".

Classroom Presentations

- Broadcast teacher's screen or single student screen
- Remote control of student screens
- Tablets, phones and desktops
- Video on demand
- Easy in theory, but tricky in practice
 - WiFi, lots of devices in a small area, no useful multicast, ...

Classroom Presentations



Classroom Presentations



Ingest / Playout Servers

- Live recording, broadcasting, mixing
 - Defined latency
- Scheduling of recorded shows
- Overlaying, subtitling, new ticker
- GPU usage
- Needs to run reliably 24/7
- SDI input/output, file or network
 - Blackmagic Decklink cards and many others

Ingest / Playout Servers



Set-top Boxes

- Live TV, DVB, IPTV
- Personal Video Recorder
- Catch-up and video on demand

- Low-cost embedded SoCs
- YouView/BBC, Dreambox, free.fr, ...

Set-top Boxes



TVs

- Basically the same as for set-top boxes
- LG WebOS, Samsung Tizen

TVs



Integrated Entertainment Systems

- In-flight entertainment (IFI)
- In-vehicle infotainment (IVI)
- Video-on-demand
- Sharing between users
- Public announcements
- Synchronized multi-device playback

- GENIVI Alliance

Integrated Entertainment Systems



Controls



Sources



Connectivity



Displays



Sound



Third Party Equipment

Integrated Entertainment Systems



Video Walls & distributed speaker systems

- Frame-accurate synchronized output
 - Also for audio
- Aurena: <https://github.com/thaytan/aurena>
- Control & command rooms
- Video walls
- Digital signage

Video Walls & distributed speaker systems



Drones / UAV

- Most known for military and espionage use
- Increasingly non-military, civil use cases
 - Rescue & emergency
 - Law enforcement
 - Packet delivery

Drones / UAV



Augmented Reality



Home Security Systems

- Security cameras
- Motion detection
- Recording & streaming

IP Conferencing & Communication

- Low-latency, multi party conferencing
 - Also in commercial products
- WebRTC, SIP

Event Recording & Broadcasting

- Timvideos
 - e.g. used by LCA2014 for presentation recording
- Ubcast
 - Company providing services using a proprietary application

Media Management & Publishing

- Mediagoblin
 - Deploy your own YouTube, Flickr, SoundCloud
- Rdio
 - US service similar to Spotify
 - Uses GStreamer in the streaming backend

Media Management & Publishing

mediagoblin Log in

❖ Browsing media by [cwebber](#)

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16 hours, 32 minutes ago

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Caminandes: Gran Dillama

Caminandes is an independently produced short animated series, inspired by the good old Chuck Jones cartoons. Caminandes is produced using FLOSS (Free/Libre Open Source Software) such as Blender, the GIMP, Krita and GNU/Linux.

You can find out more about Caminandes at <http://caminandes.com!>

Mobile & Embedded Devices

- Various iOS and Android apps
 - Also integrated in some Android devices, e.g. Samsung Galaxy Xcover
- Part of many embedded Linux SDKs
 - Raspberry Pi, Freescale iMX, RDK, TI, ...
- Support for lots of hardware and APIs
 - OpenGL integration, V4L2, OpenMAX, OpenSL, ...

Gravitational Wave Research

- LIGO
 - Laser Interferometer Gravitational-Wave Observatory
 - Trying to detect gravitational waves of collisions of neutron stars
- Large scale signal processing
 - Pipelines with 1000s of filters
- Large parts free software

International Space Station

- *“Hi! Over the last few months I've been working on a project for the European Space Agency that is scheduled to be launched next year for use on the International Space Station, providing astronauts with a mobile procedure viewer in the form of a slightly modified Nexus 5 smartphone.”*
- Scheduled to go up in Q1/2015

The Future

Development Tools

- Tracing subsystem, better debugging facilities
- Debug log viewer
- Continuous integration
 - Automated QA and builds
- More QA tools
 - gst-validate, GstHarness
- More convenience APIs

Features

- Improved trick mode support
 - Incl. DLNA & adaptive streaming
- Stereoscopic 3D support
- Improved audio/video editing support
- DASH/HLS streaming server
 - And generic file segmenting
- More cross-platform improvements
- Better APIs and support for metadata extraction

Thanks!

Any questions?

Find more information at
<http://gststreamer.freedesktop.org>

