



Intel SMD elements in GStreamer

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Sodaville and Canmore

- ~ Intel CE4100 Media Processor, Sodaville
- ~ Intel CE3100 Media Processor, Canmore
- ~ SoC with HW accelerated codecs
- ~ Targeted to Consumer Electronics devices
- ~ Intel CESDK, a minimalistic Linux system

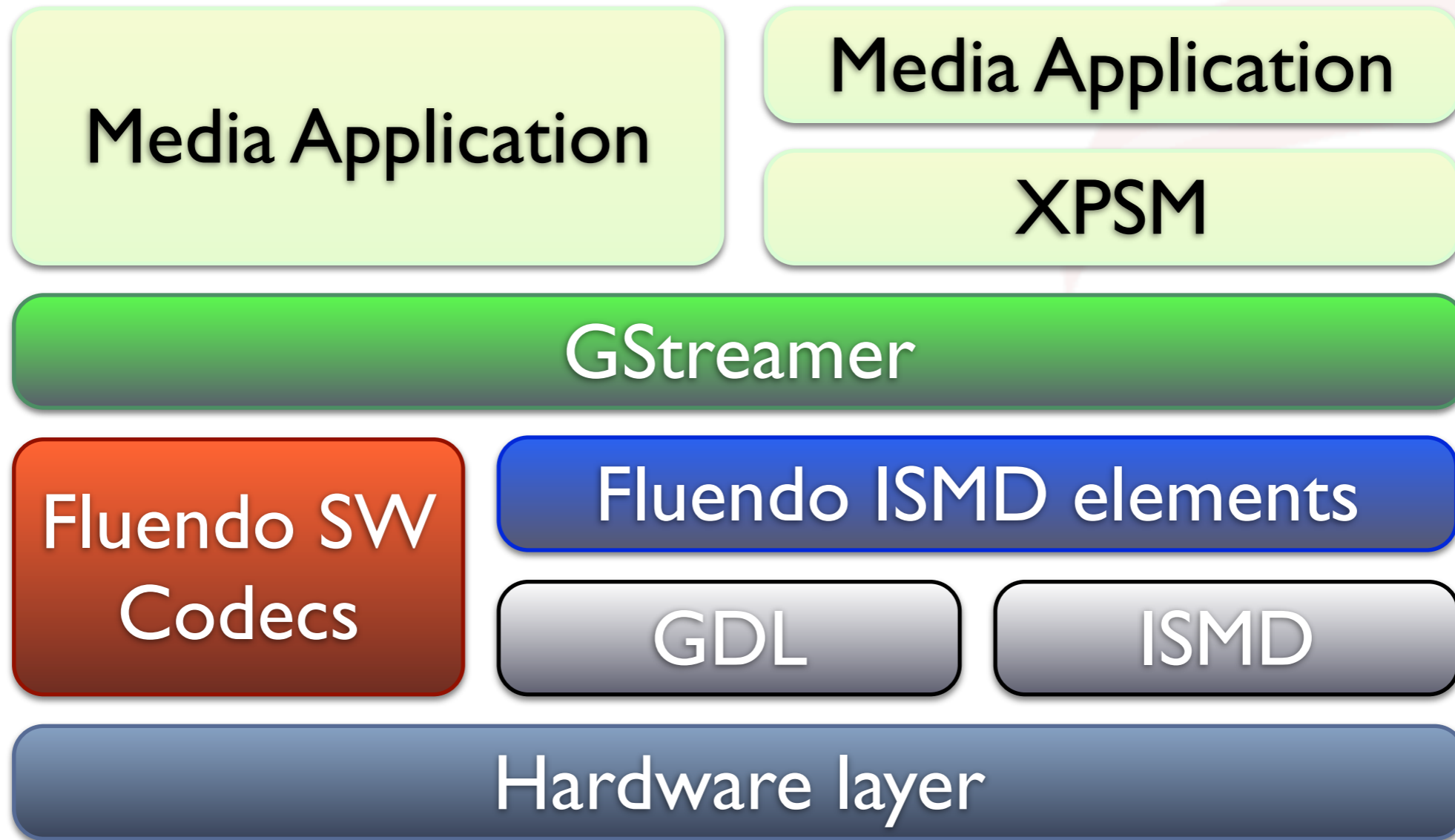
Media capabilities

- ~ Two High Definition video decoders capable of 1080p@60
- ~ HW accelerated audio decoders/encoders on DSPs and 7.1 audio support
- ~ Noise reduction, motion adaptive de-interlacing and scaling in HW Post-Processor
- ~ HW blender for display composition
- ~ OpenGL ES 1.1/2.0 capable GPU

Intel Streaming Media Driver (ISMD)

- ~ Low-level driver which provides an API for application to control media streams.
- ~ Devices, ports, memory ISMD buffers, ISMD events.
- ~ A minimalistic media framework.

Application Block Diagram



Fluendo

ISMD elements (I)

- ~ Wraps ISMD devices
- ~ Configurable through GObject properties
- ~ GstPads connected to ISMD ports
- ~ Converts GstBuffers into ISMD buffers and vice versa
- ~ Wraps the GstStates to ISMD states

Fluendo

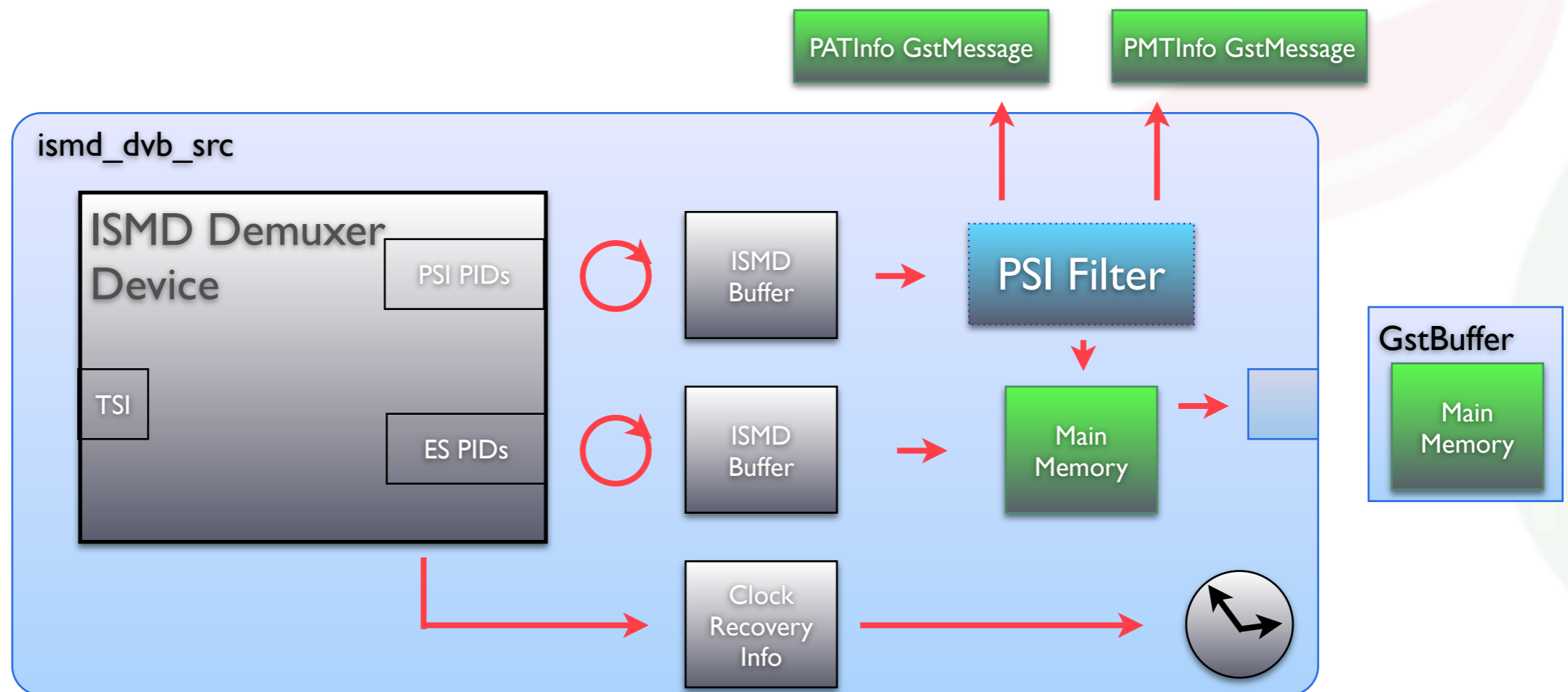
SMD elements (II)

- ~ Integrated with autoplug elements
uridecodebin, decodebin2 and playbin2
- ~ Can be mixed with software elements like
sources, demuxers or video decoders
- ~ Transparent integration with ISMD BufMon
- ~ Advanced features such as trick modes and
handling of live pipelines

DVB Source (I)

- ~ Wraps a ISMD Demuxer wired to TSI
- ~ MPTS to SPTS filtering
- ~ Performs clock recoveries based on PCR samples
- ~ Capable to parse and manage PSI pids
- ~ Integrated with ISMD BufMon

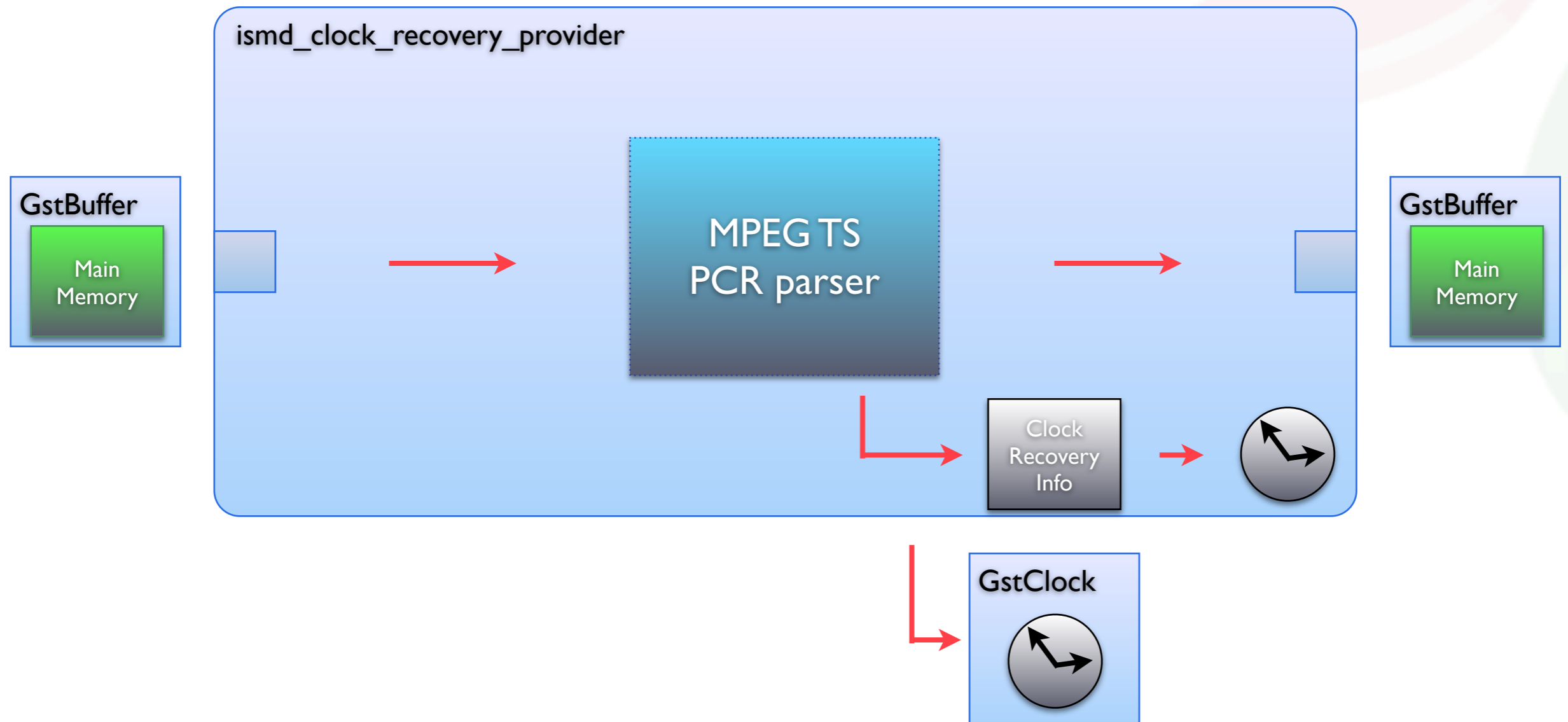
DVB Source (II)



Clock Recovery and Provider (I)

- ~ Provides a ISMD clock
- ~ Integrated with ISMD BufMon
- ~ Capable to parse the PCR samples and perform clock recoveries

Clock Recovery and Provider (II)



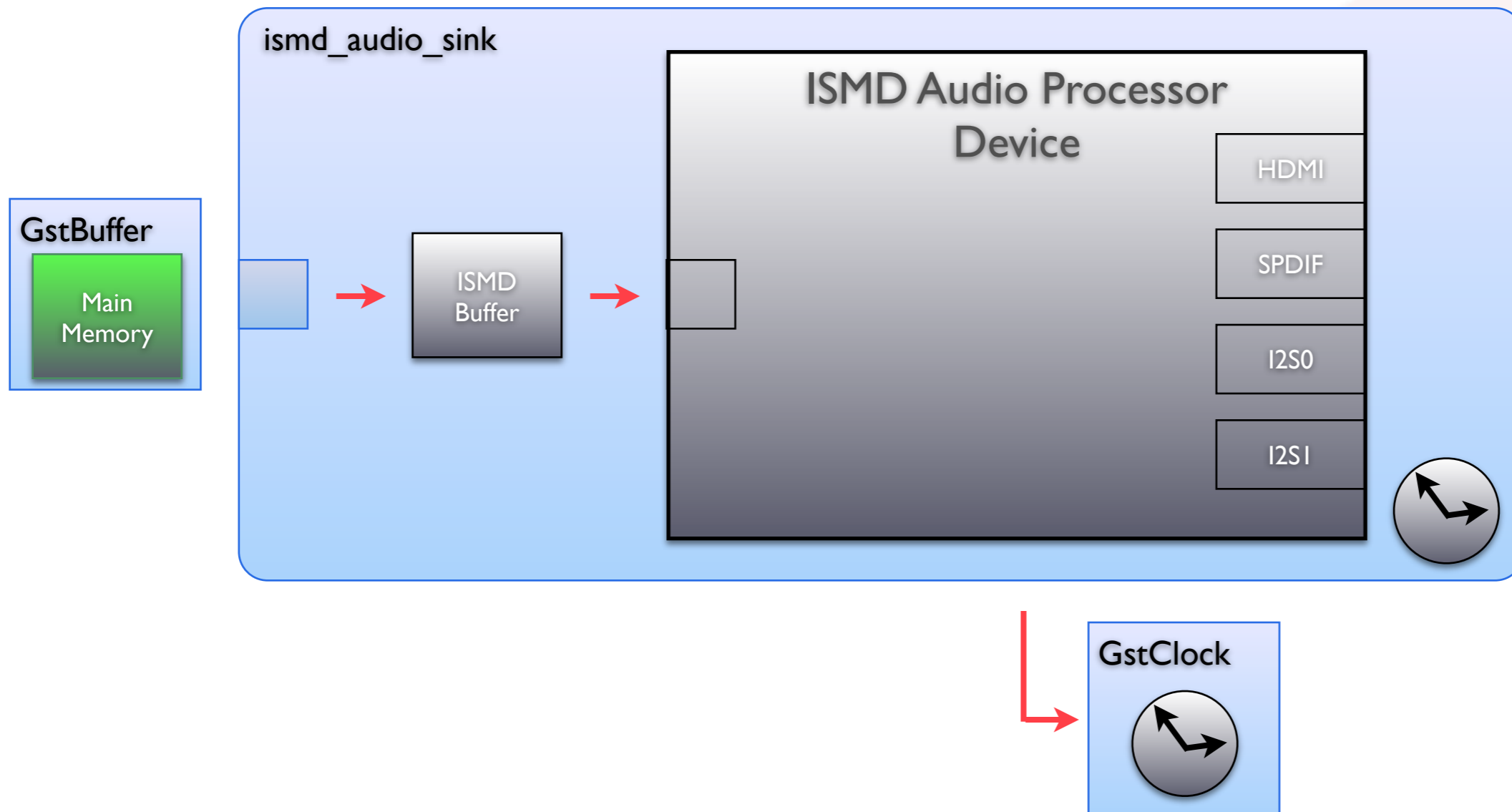
Audio Sink (I)

- ~ Wraps ISMD Audio processors
- ~ Provides audio rendering for raw PCM and compressed formats (MPEG audio, AAC, AC3, DTS, WMA)
- ~ Permits passthrough and encode to AC3 or DTS on digital outputs

Audio Sink (II)

- ~ HDMI, SPDIF, I2S0 and I2S1 outputs
- ~ Integrates with ALSA emulation deamon
- ~ Provides an ISMD clock

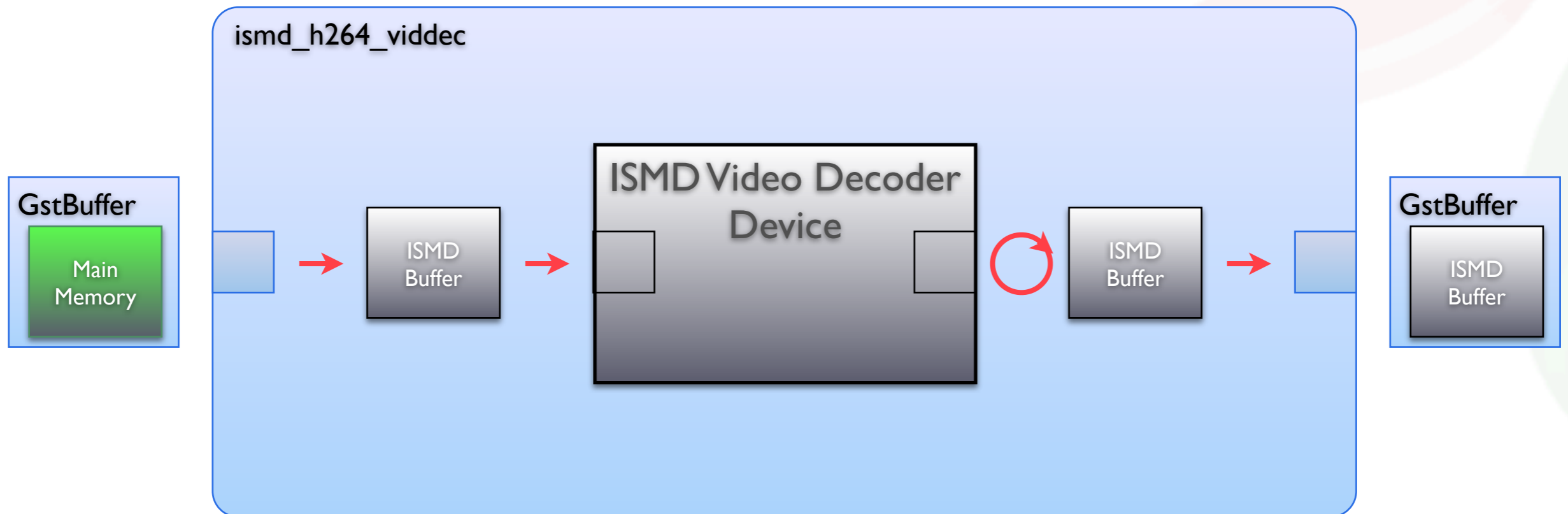
Audio Sink (III)



Video Decoder (I)

- ~ Wraps ISMD Video decoder
- ~ Performs video decoding
- ~ Supported formats are MPEG2, MPEG4 part 2 (only on Sodaville), H264 and VCI
- ~ Frame reordering and PTS interpolation

Video Decoder (II)



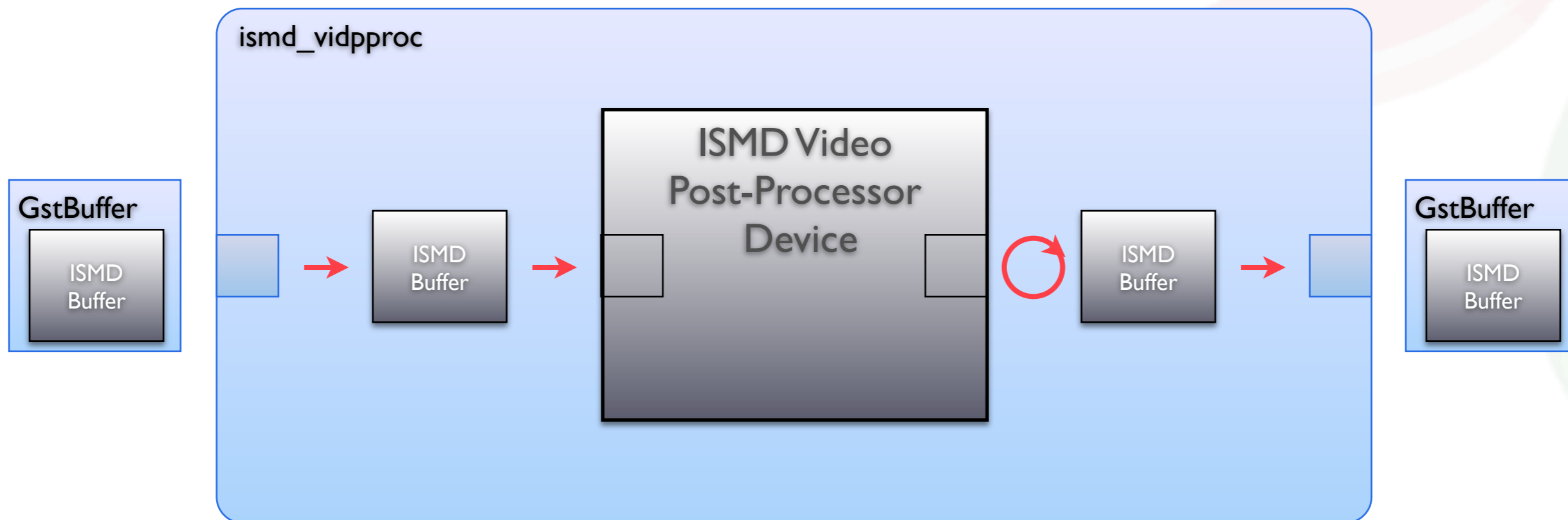
Video

Post-Processor (I)

- ~ Wraps ISMD Video Post-Processor
- ~ Performs chroma up-sampling, noise reduction filtering, de-interlacing, scaling and Pan&Scan
- ~ Converts video frames in standard GstBuffers into ISMD buffers and provides pad alloc capability.

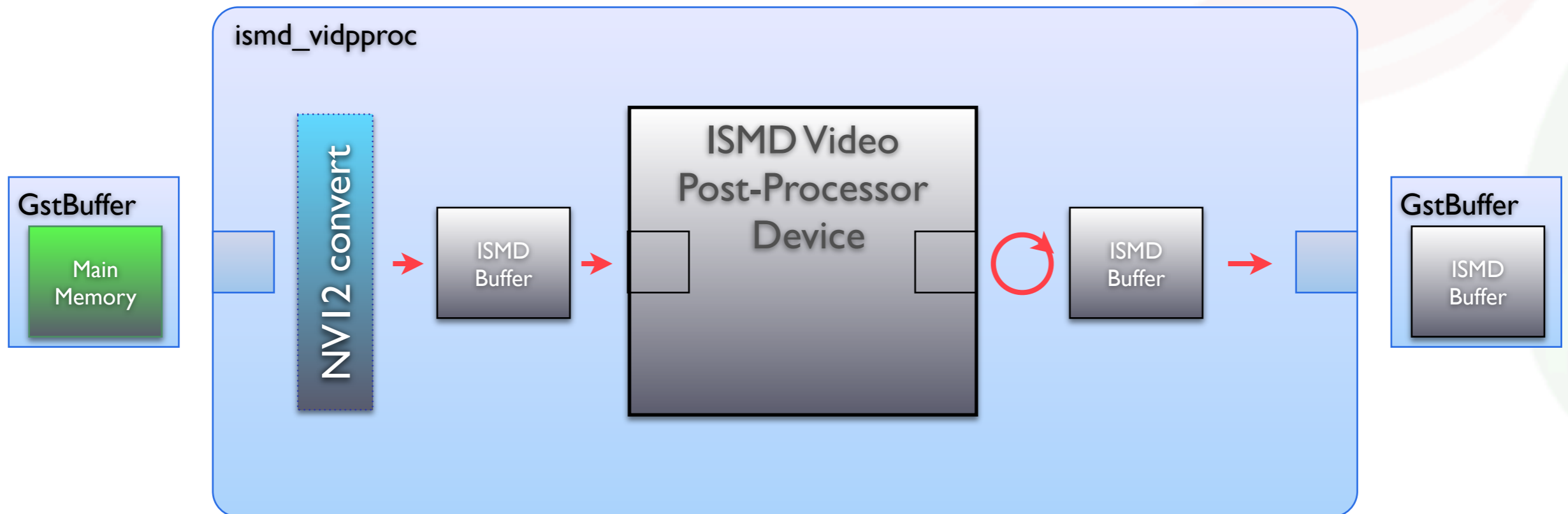
Video

Post-Processor (II)



Video

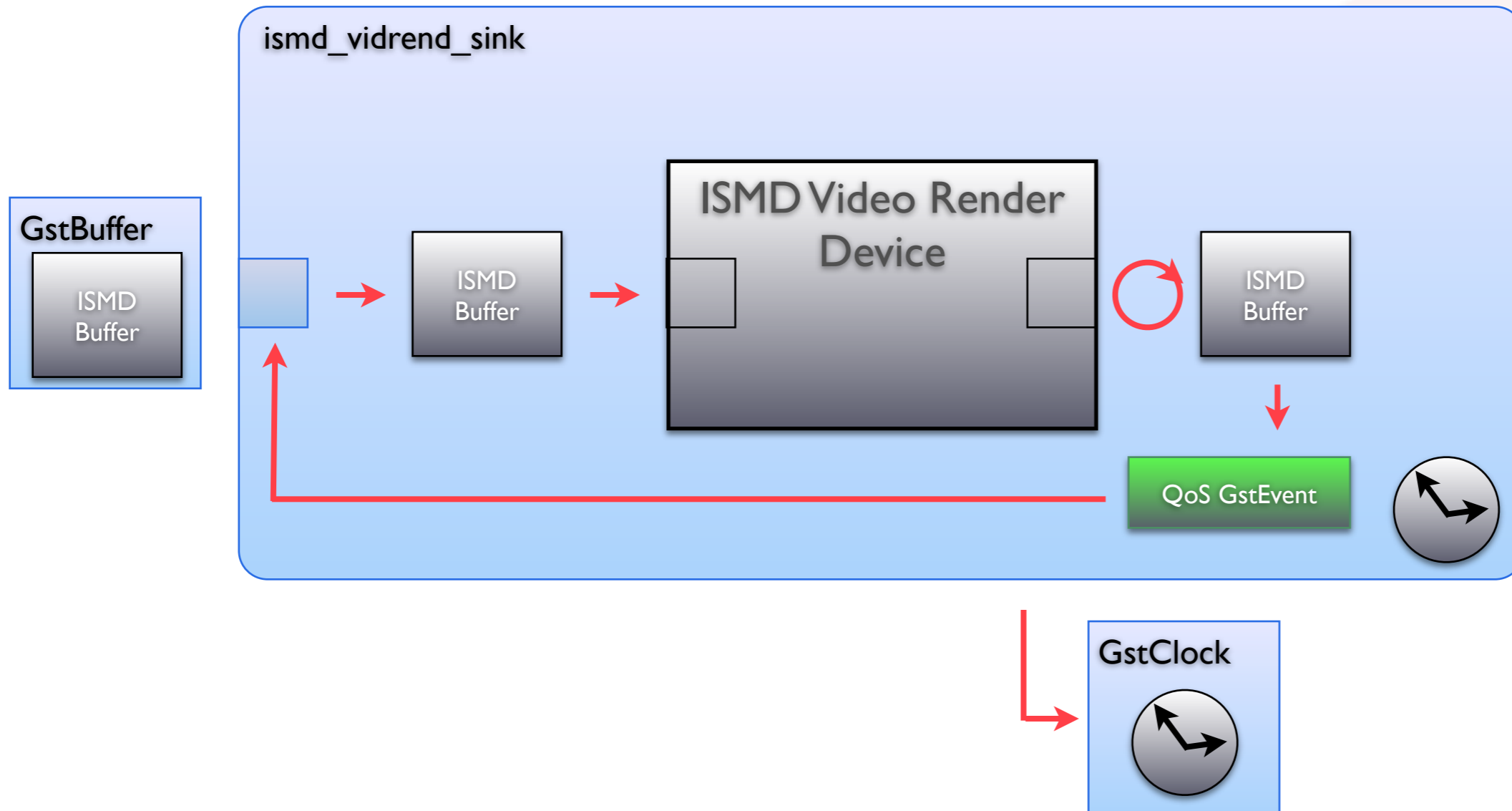
Post-Processor (III)



Video Sink (I)

- ~ Wraps ISMD Video renderer
- ~ Presents the video frames on the selected GDL plane
- ~ Configurable destination rectangle
- ~ Provides an ISMD clock

Video Sink (II)



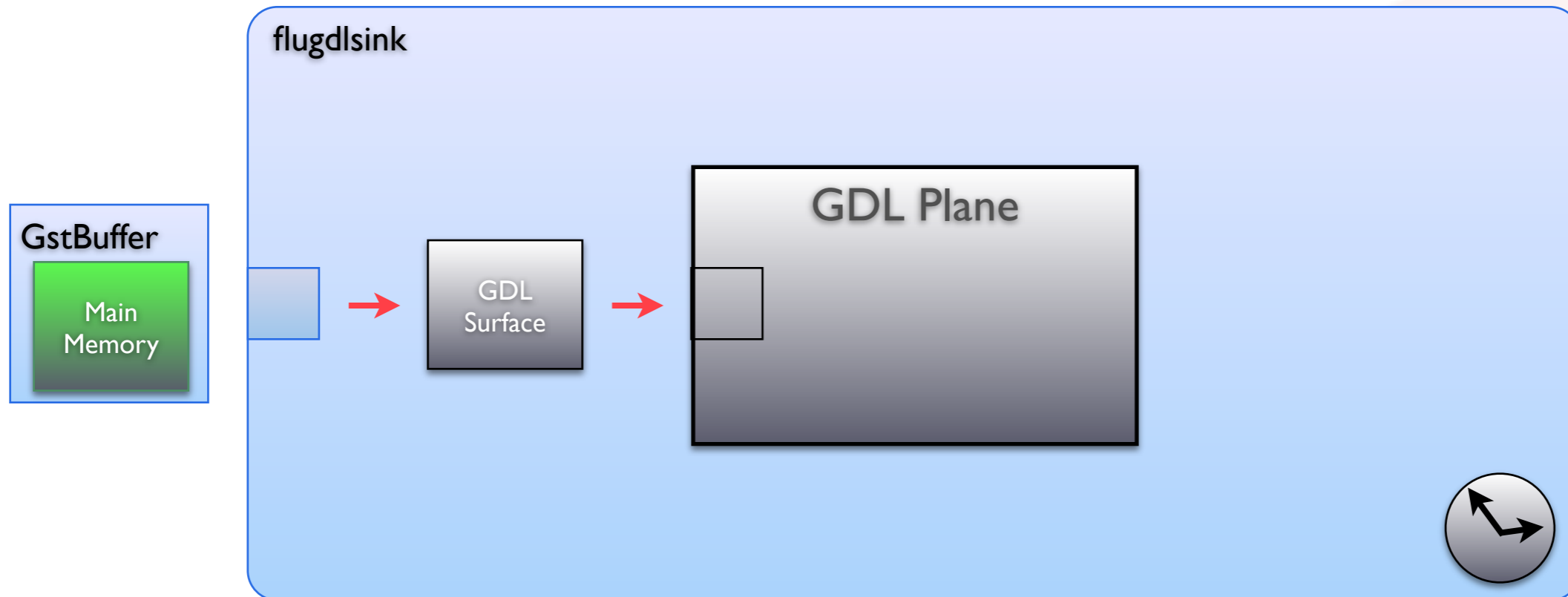
Video Bin

- ~ Helper GstBin for integration with playbin2
- ~ ismd_vidpproc ! ismd_vidrend_sink

GDL Video Sink (I)

- ~ Derived from GstVideoSink
- ~ Presents the ARGB video frames on the selected GDL plane
- ~ Designed to overlay subtitles and subpictures

GDL Video Sink (II)



Source Code

~ Fluendo ISMD elements:

<http://core.fluendo.com/gstreamer/src/>

~ FLUB build system for CESDK

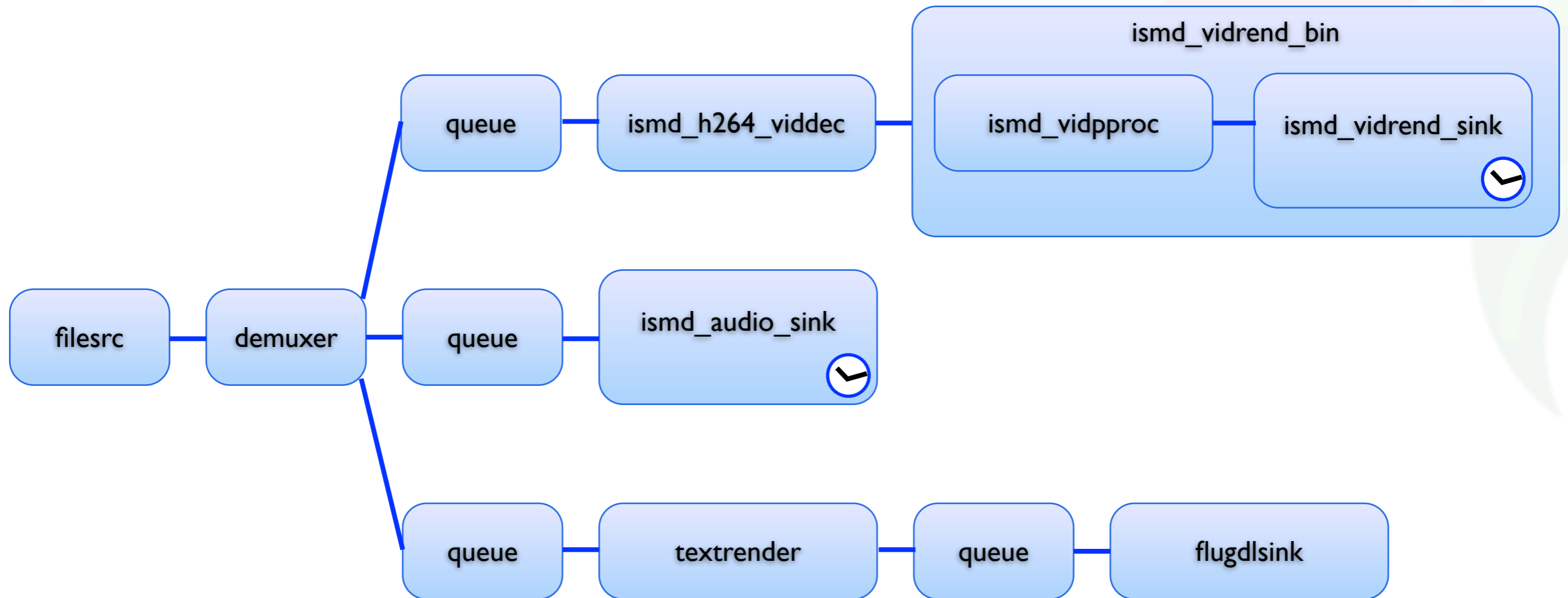
<https://core.fluendo.com/gstreamer/trac/browser/trunk/flub-ismd/>

~ Building guide

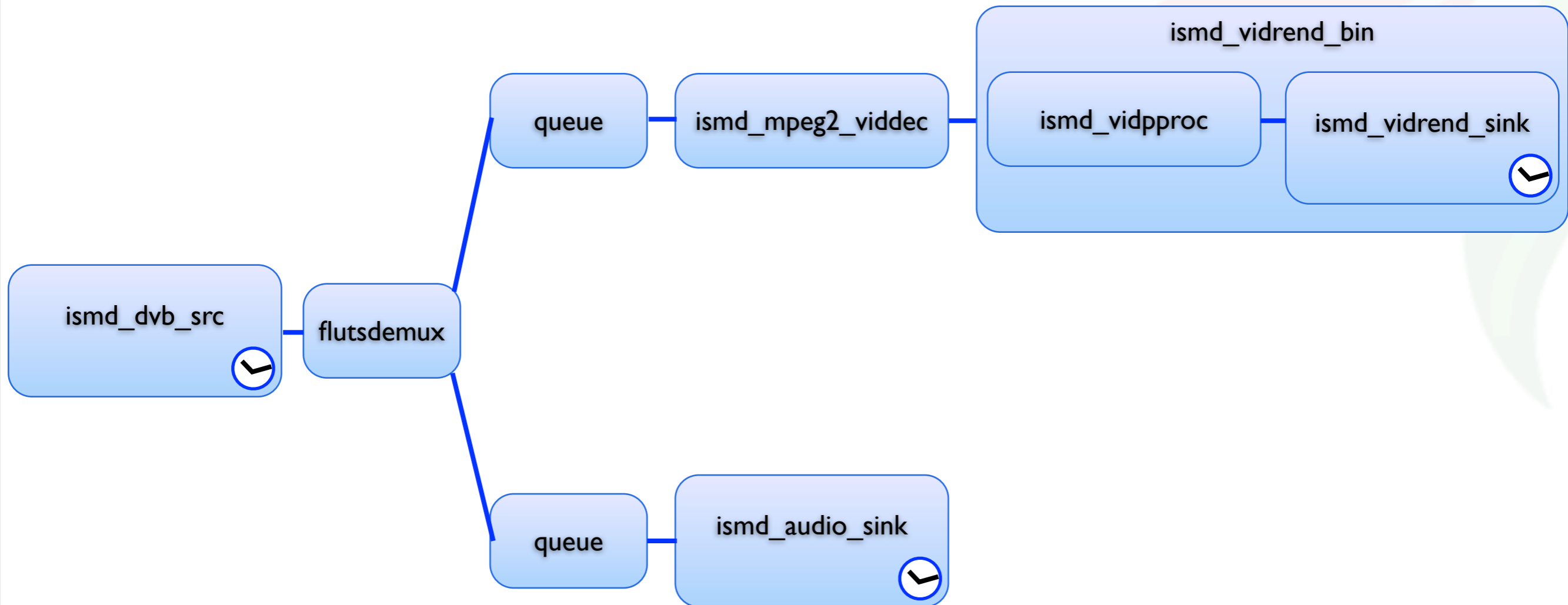
<https://core.fluendo.com/gstreamer/trac/wiki/HowToBuildFromSvn>

Application Use Cases

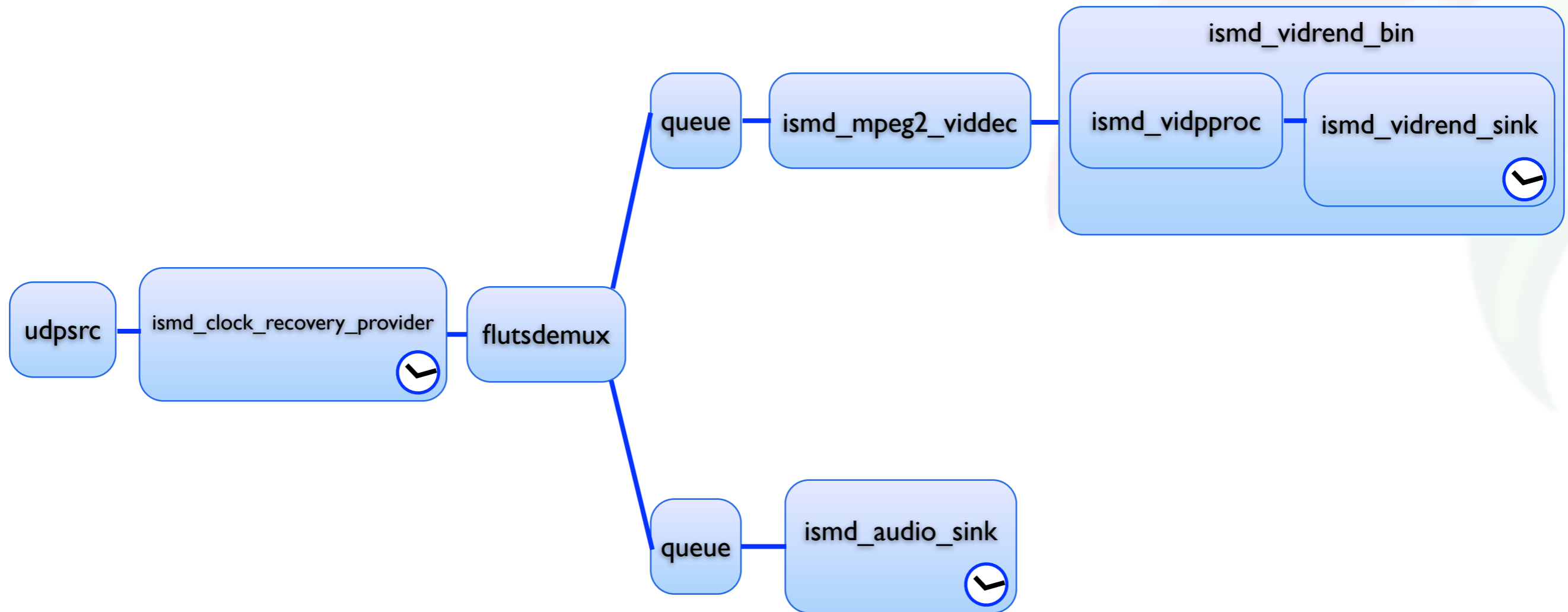
File playback pipeline



Digital TV playback pipeline



IPTV playback pipeline



Conclusions and Future

- ~ Fluendo Media Center aka Moovida
- ~ Fluendo DVD playback engine
- ~ Video playback on 3D surfaces

Q&A

About Fluendo

The Fluendo group was created at the end of 2003 with the very ambitious goal of improving the multimedia experience in the Free Software environment. Indeed at that time there was no reliable solution for multimedia application developers. Existing media players were not legal and there was no media framework to compete with the existing operating systems as an alternative to Microsoft Windows with DirectShow and Mac OS X with Quicktime.

The Fluendo choice was a Free Software project called GStreamer which aimed at being as good as DirectShow or even better and funded a deep refactoring of the framework to bring it up at a professional level. Based on this multimedia expertise Fluendo started to develop products around GStreamer such as: Flumotion Streaming Server, Fluendo codec pool, Fluendo DVD player and Fluendo Media Center (aka Moovida).

Nowadays Fluendo provides a wide range of products and solutions on top of the GStremaer framework and offers its expertise in the form of consultancy services to the main industry players.

The garden (1977)

Joan Miró i Ferrà (April 20, 1893 – December 25, 1983); was a Catalan painter, sculptor, and ceramicist born in Barcelona.

