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GStreamer in the world of Android Camera 3

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Who am I ?

- GStreamer at Collabora since 2007
- Started with VVoIP: Telepathy & Farstream
- Helps our customers use GStreamer
 - Many hardware integration projects

What is Camera 3?

- New Camera API style
- Introduced by Android 5.0 in 2004
- Exposes modern SoC cameras

Modern SoCs?

- Used in all phones
- Multiple hardware blocks
- Configurable hardware pipeline
- Signal level transfer



Features

- Multiple streams from same sensor
 - Different characteristics for each
- Request based
 - Pull instead of push

What is a Request?

- Request to capture one frame
- Per request parameters
- Enables
 - HDR
 - Burst captures
 - Traditional video: timed requests

Existing APIs

- Linux: Media Controller
 - Requires per-hardware userspace code
- Android has HAL for this
 - Generic Linux has nothing
 - Intel has icamerasrc
- Android Java/NDK Camera2 API



Our design

- New base class
 - Not GstBaseSrc
 - We tried, it was a huge pain
- Multiple source pads
 - Request pads
 - Stream APIs on pads

Pad API

- Per stream properties using GObject Properties
- Two types based on Caps frame rate

Caps frame rate = 0 / 1

- Manual request using action signal or Ginterface
- Start/Stop method to start bursts
 - Possibly infinite bursts

Caps Frame rate > 0

- Automatic timed requests based on framerate
- Stop on not-linked
 - Restart on reconfigure

Limitations

- Media Controller not dynamic
 - Only allow caps change in the READY→PAUSED transition
 - Maybe only if more than one stream (pad)
- Some “stream” properties apply globally
 - _(ツ)_/

Android HAL limitations

- Requires single threaded access
- Recommendation:
 - One thread to interact
 - Queues frames for each pad
 - Streaming threads pick up from there
- Specific to Android HAL

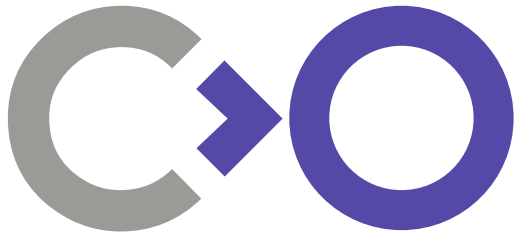


Implementation status

- Only horribly prototype
- Code has no value
 - Based on GstBaseSrc
 - Tested with a single Android HAL
- Will not publish
- Code by Nicolas, Vincent P and Wonchul



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Thank you!