V4L2 Explicit Synchronization

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Explicit Synchronization

userspace

execbuf  fence  atomic ioctl  fence

GPU driver

DRM/KMS
Explicit Synchronization
Explicit Synchronization
V4L2 Explicit Synchronization

- Add fences to CAPTURE and OUTPUT queues
- In-fence: fences to wait before using the buffer
- Out-fence: signals when the buffer is ready
V4L2 – Before Fences

1: QBUF()
2: QBUF()
START_STREAMING()
3: QBUF()
1: DQBUF()
2: DQBUF()
3: DQBUF()
1: QBUF()

1: vb2_core_qbuf()
2: vb2_core_qbuf()
start_streaming()
3: vb2_core_qbuf()
1: wake up
2: wake up
3: wake up

1: __enqueue_in_driver()
2: __enqueue_in_driver()
3: __enqueue_in_driver()
1: buffer_done()
2: buffer_done()
3: buffer_done()
V4L2 - in-fences

- in-fence: Passed in QBUF() fence_fd field
- V4L2_BUF_FLAG_IN_FENCE should be set
- Can’t be queued to driver before fence signal
V4L2 – out-fences

- QBUF() should have V4L2_BUF_FLAG_OUT_FENCE
- Remember: No guarantee of ordering
- new V4L2 event: V4L2_EVENT_OUT_FENCE
- Call VIDIOC_SUBSCRIBE_EVENT()
- Receive event with DQEVENT()
- Event provide buffer index and out_fence_fd
V4L2 – After fences
V4L2 – current RFC

• V4L2-event changes
• ordered_in_driver flag (requirement for now)
• ordered_in_vb2 flag (OUTPUT/some m2m queues)
V4L2 - usecases

- Android/ChromeOS HAL3/Camera App
- Color converter and scalers (ordered)
- m2m/encoders
- Synchronize audio/video - Gstreamer
- Capture to networking (partial fences)
Thank you!

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