

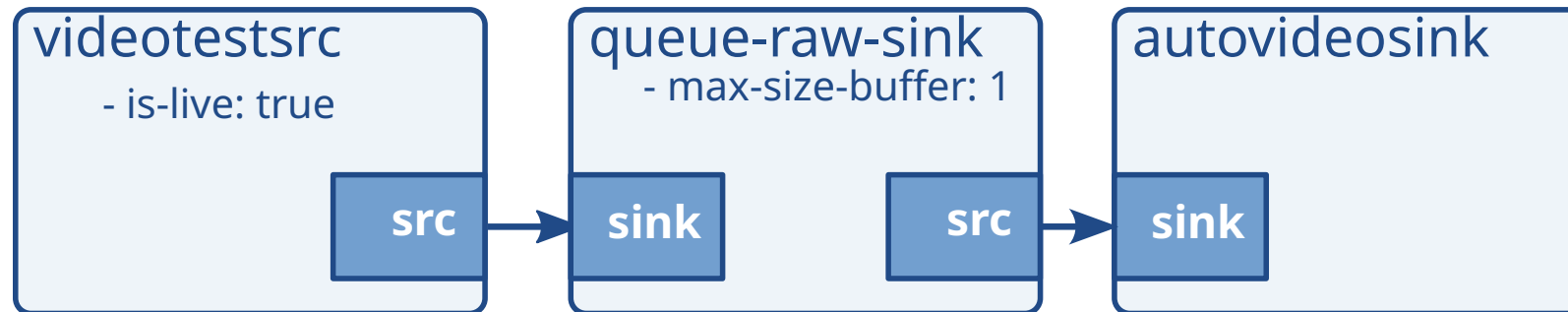
Showing the invisible

analysing buffer flow with tracers

GStreamer Conference 2025

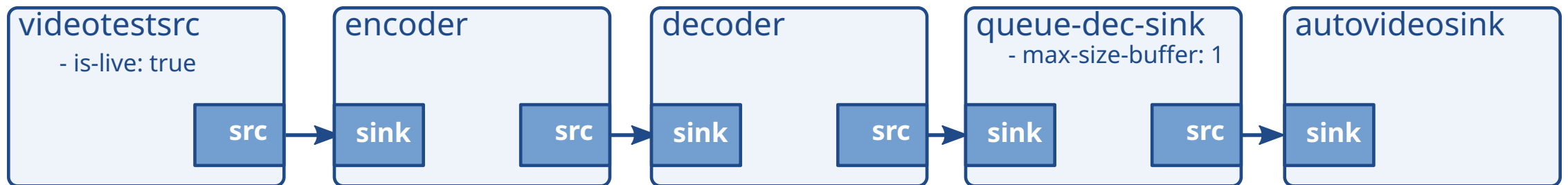
101 - a raw video stream

```
gst-launch-1.0 videotestsrc is-live=true pattern=ball ! video/x-raw,framerate=25/1 \  
! queue name=queue-raw-sink max-size-buffers=1 max-size-time=0 max-size-bytes=0 \  
! autovideosink
```



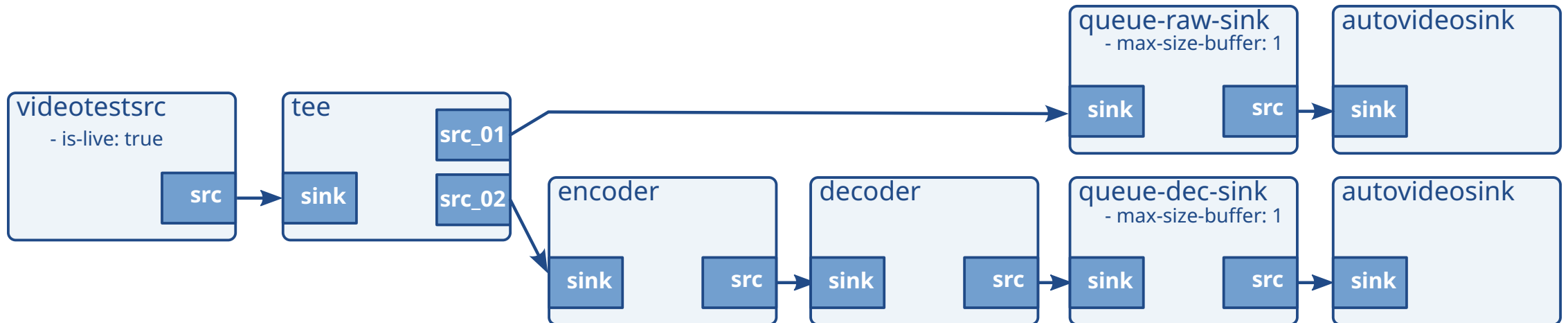
101 - encoding the video stream

```
gst-launch-1.0 videotestsrc is-live=true pattern=ball ! video/x-raw,framerate=25/1 \
! x264enc speed-preset=ultrafast \
! vah264dec \
! queue name=queue-dec-sink max-size-buffers=1 max-size-time=0 max-size-bytes=0 \
! autovideosink
```



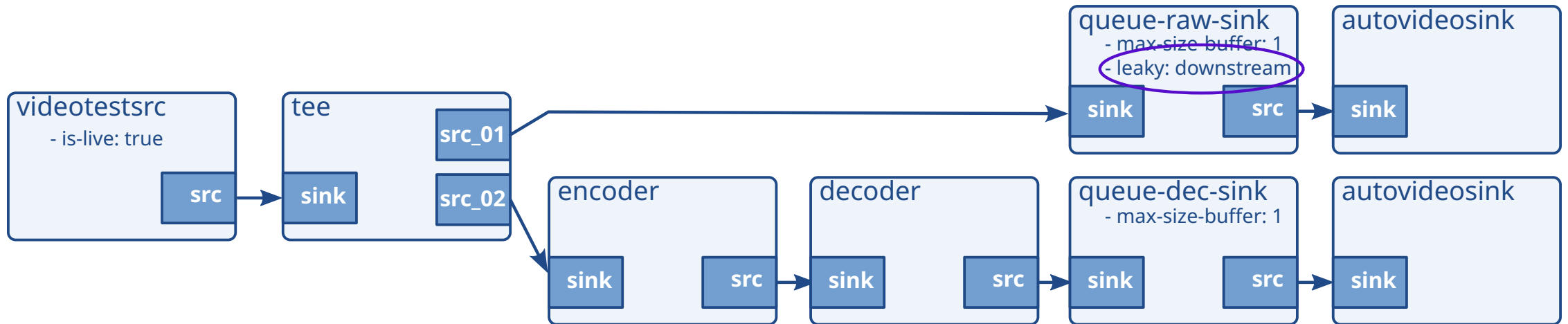
tee ing both: oh noes!!

```
gst-launch-1.0 videotestsrc is-live=true pattern=ball ! video/x-raw,framerate=25/1 \
! tee name=tee \
tee. ! queue name=queue-raw-sink max-size-buffers=1 max-size-time=0 max-size-bytes=0 \
! autovideosink \
tee. ! x264enc speed-preset=ultrafast \
! vah264dec \
! queue name=queue-dec-sink max-size-buffers=1 max-size-time=0 max-size-bytes=0 \
! autovideosink
```



Better, but still: oh noes!!

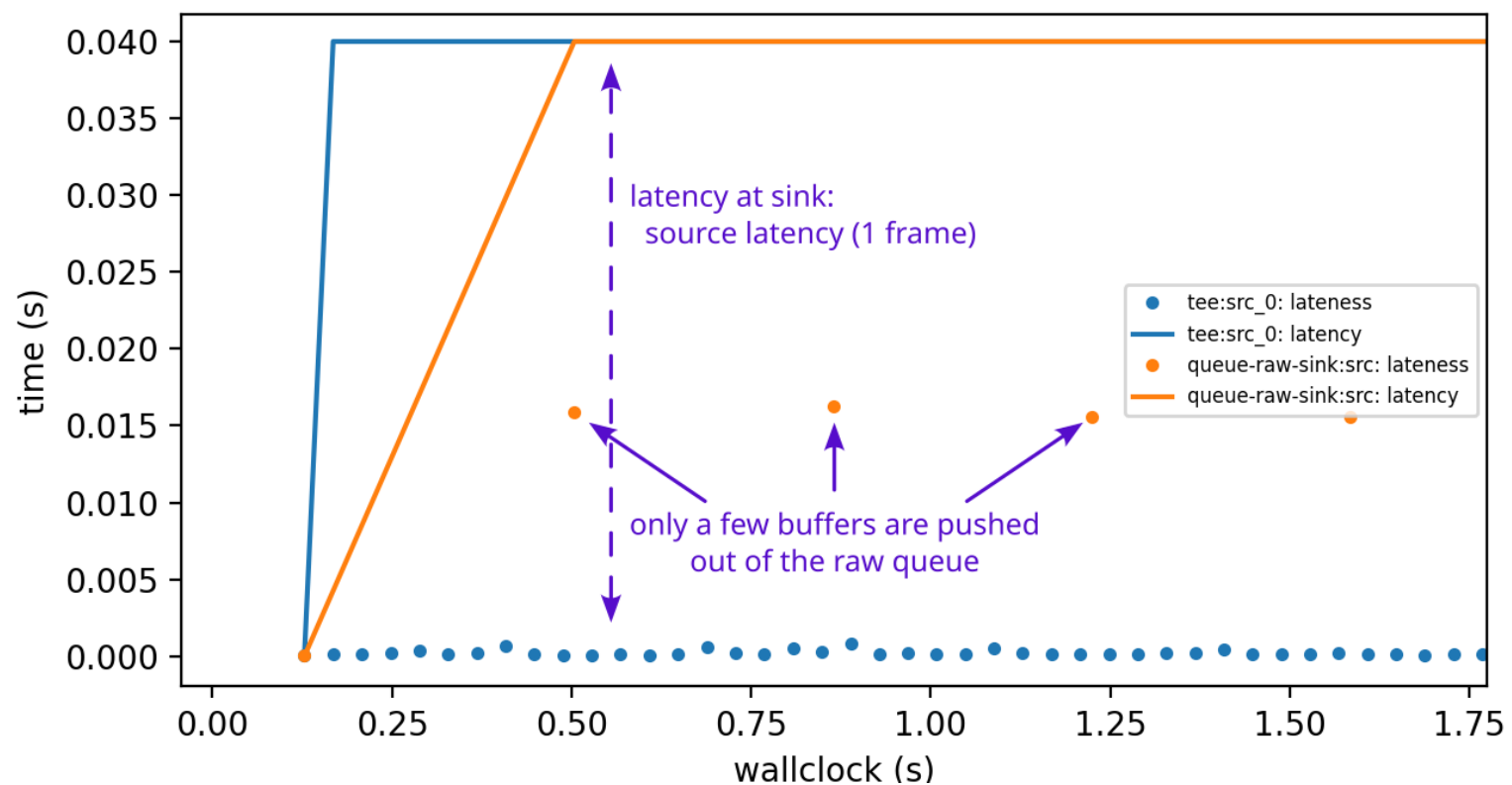
```
gst-launch-1.0 videotestsrc is-live=true pattern=ball ! video/x-raw,framerate=25/1 \  
! tee name=tee \  
tee. ! queue name=queue-raw-sink max-size-buffers=1 max-size-time=0 max-size-bytes=0 leaky=downstream \  
! autovideosink \  
tee. ! x264enc speed-preset=ultrafast \  
! vah264dec \  
! queue name=queue-dec-sink max-size-buffers=1 max-size-time=0 max-size-bytes=0 \  
! autovideosink
```



Lateness tracer - raw branch: 1 frame latency

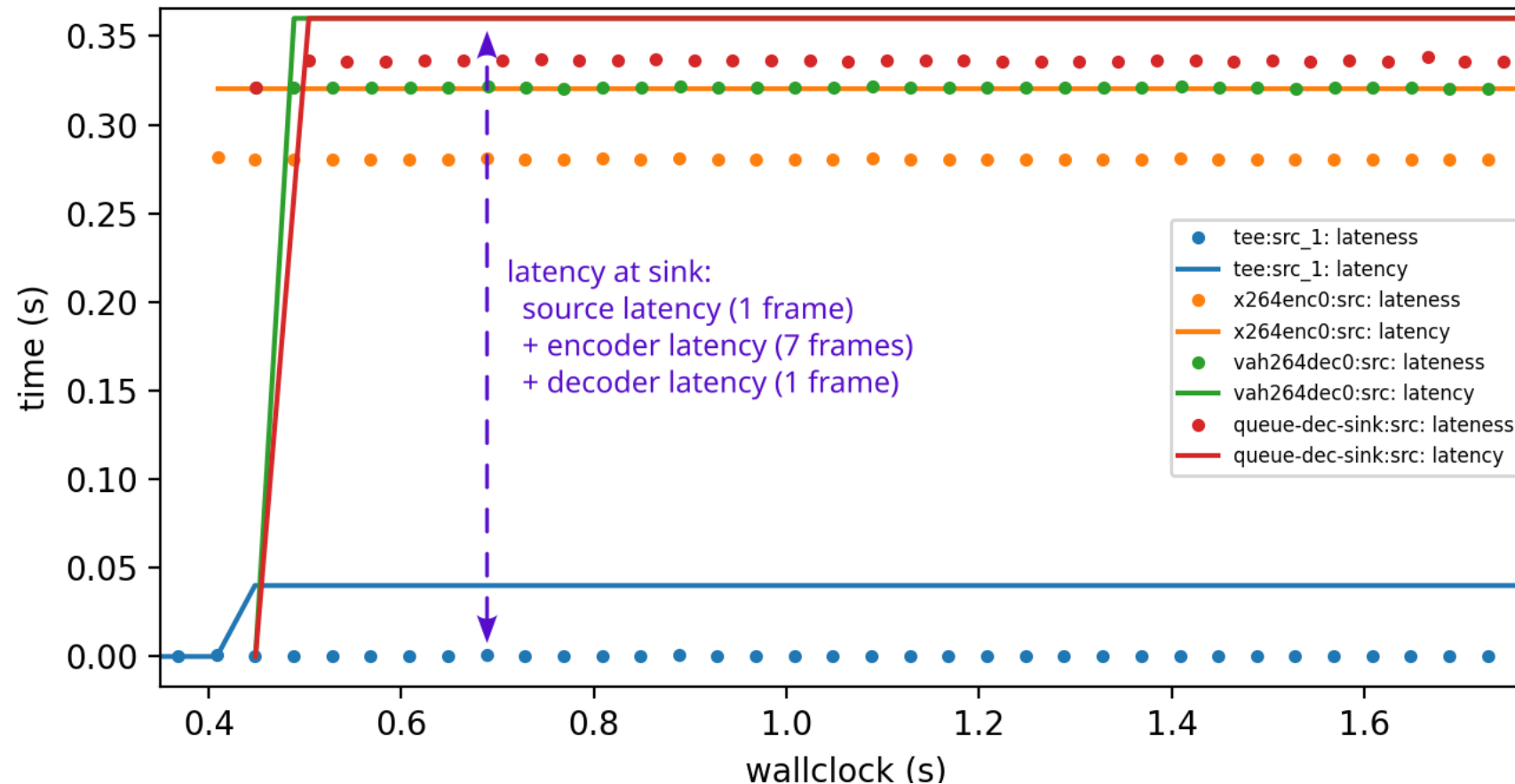
```
GST_TRACERS='buffer-lateness(file="buffer_lateness.log")' gst-launch-1.0 ...
```

```
gst-plugins-rs/utils/tracers/scripts/buffer_lateness.py \  
  --include-filter="tee.src_0|queue-raw" \  
  buffer_lateness.log
```



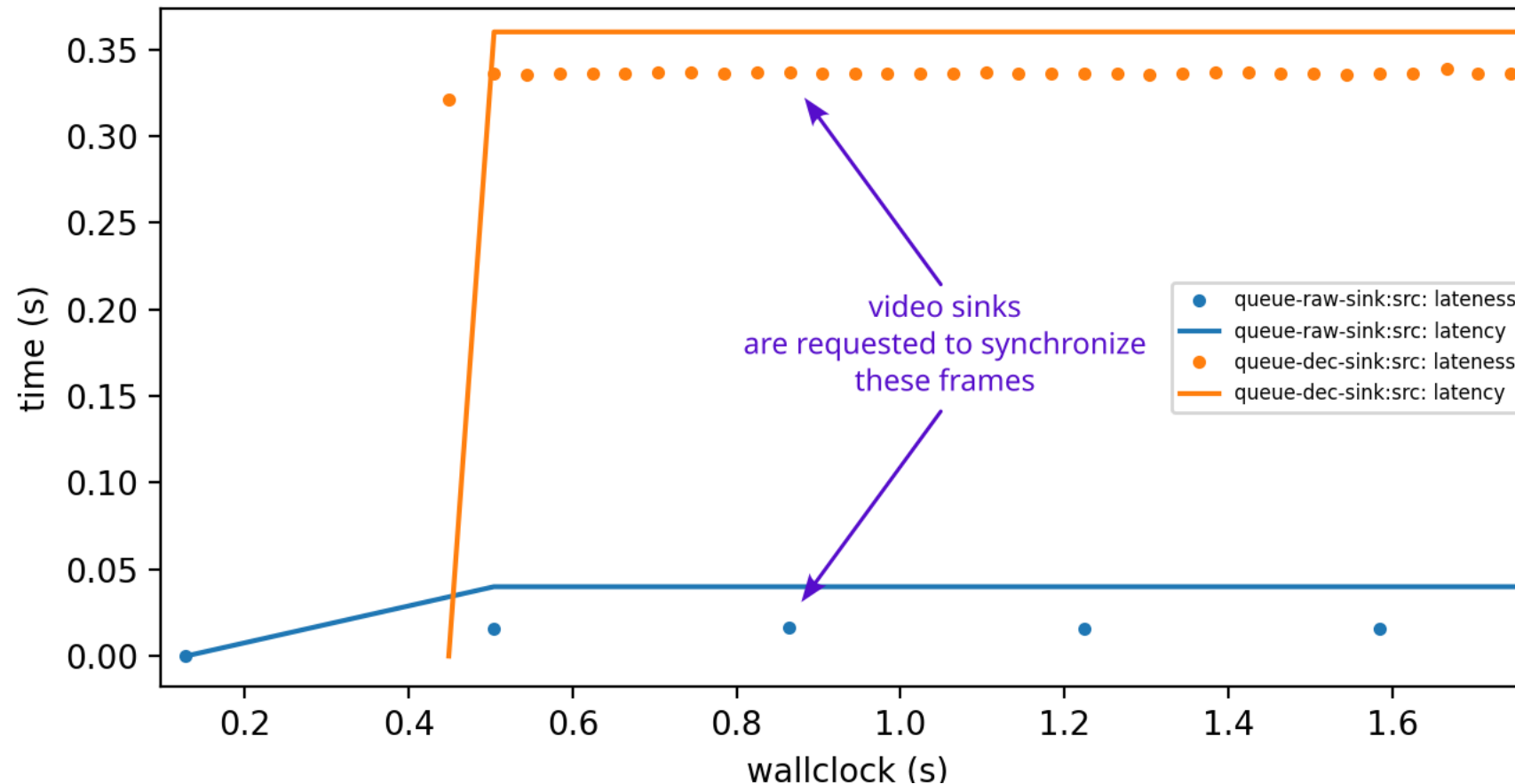
Lateness tracer - encode + decode branch: 9 frames latency

```
gst-plugins-rs/utils/tracers/scripts/buffer_lateness.py \  
  --include-filter="tee.src_1|x264enc|vah264dec|queue-dec-sink" \  
  buffer_lateness.log
```



Lateness tracer - raw + decode $\Rightarrow$ the split

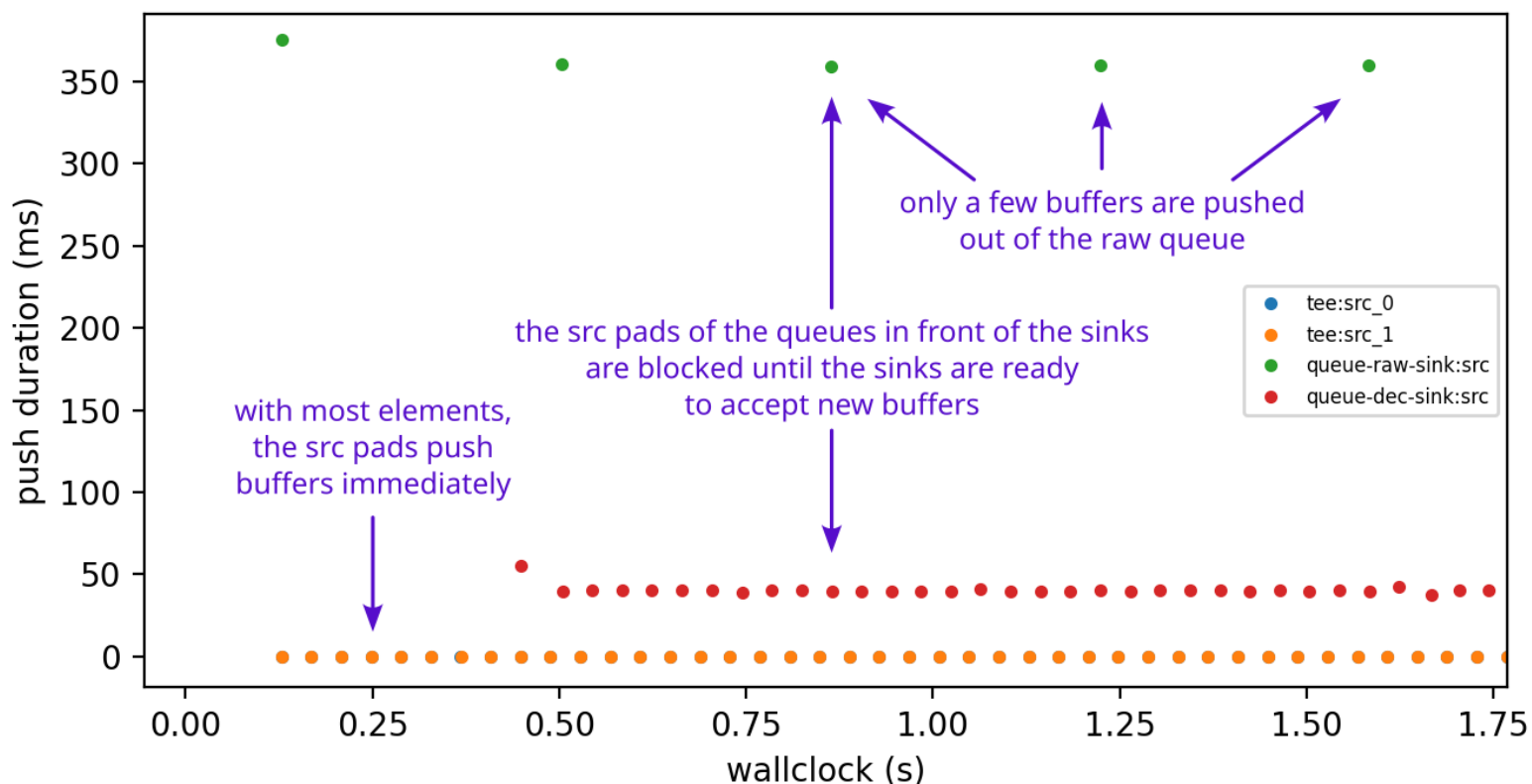
```
gst-plugins-rs/utils/tracers/scripts/buffer_lateness.py \  
  --include-filter="queue-raw-sink|queue-dec-sink" \  
  buffer_lateness.log
```



Pad Push Timings tracer

```
GST_TRACERS='pad-push-timings(file="pad_push_timings.log")' gst-launch-1.0 ...
```

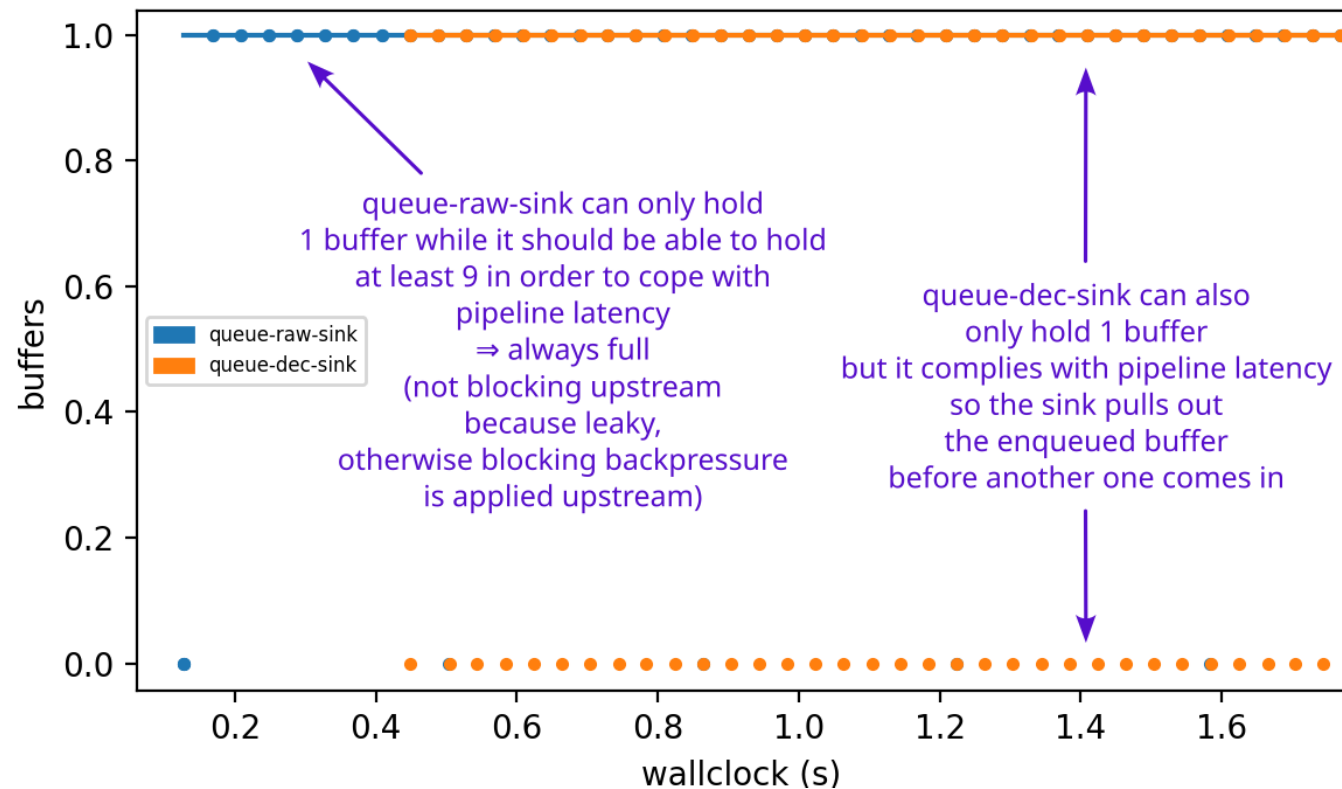
```
gst-plugins-rs/utils/tracers/scripts/pad_push_timings.py \  
  --include-filter="tee|queue-raw-sink|queue-dec-sink" \  
  pad_push_timings.log
```



Queue Levels Tracer - queues at sinks

```
GST_TRACERS='queue-levels(file="queue_levels.log")' gst-launch-1.0 ...
```

```
gst-plugins-rs/utils/tracers/scripts/queue_levels.py \  
  --buffers \  
  --include-filter="queue-raw-sink|queue-dec-sink" \  
  queue_levels.log
```



Tips

- Call `deinit()`
- Alt. call the `write-log` signal
- Name elements
- Apply filters in `GST_TRACERS` with large pipelines