

GStreamer & QTQMMFSrc Element Overview

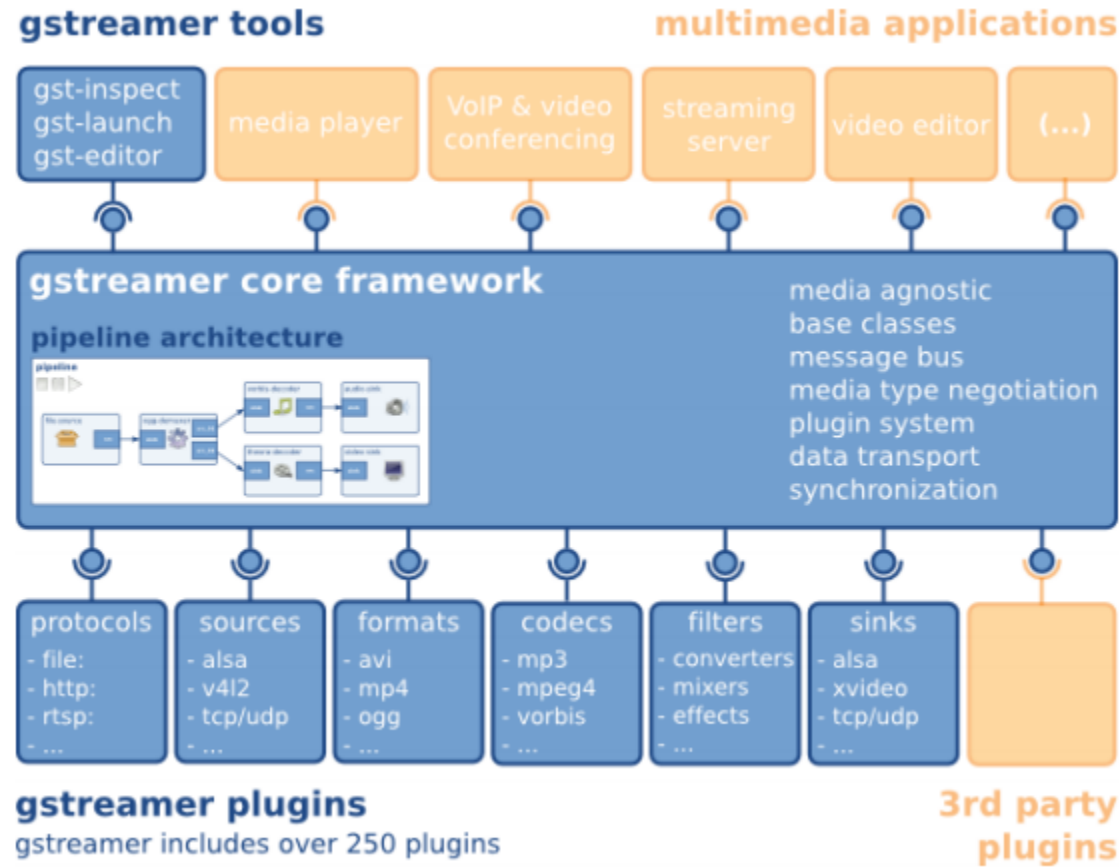
GStreamer란?

- Multimedia application을 위한 framework
- Linux, Windows, OS X, Android 등 지원...
- 20년 이상된 opensource project

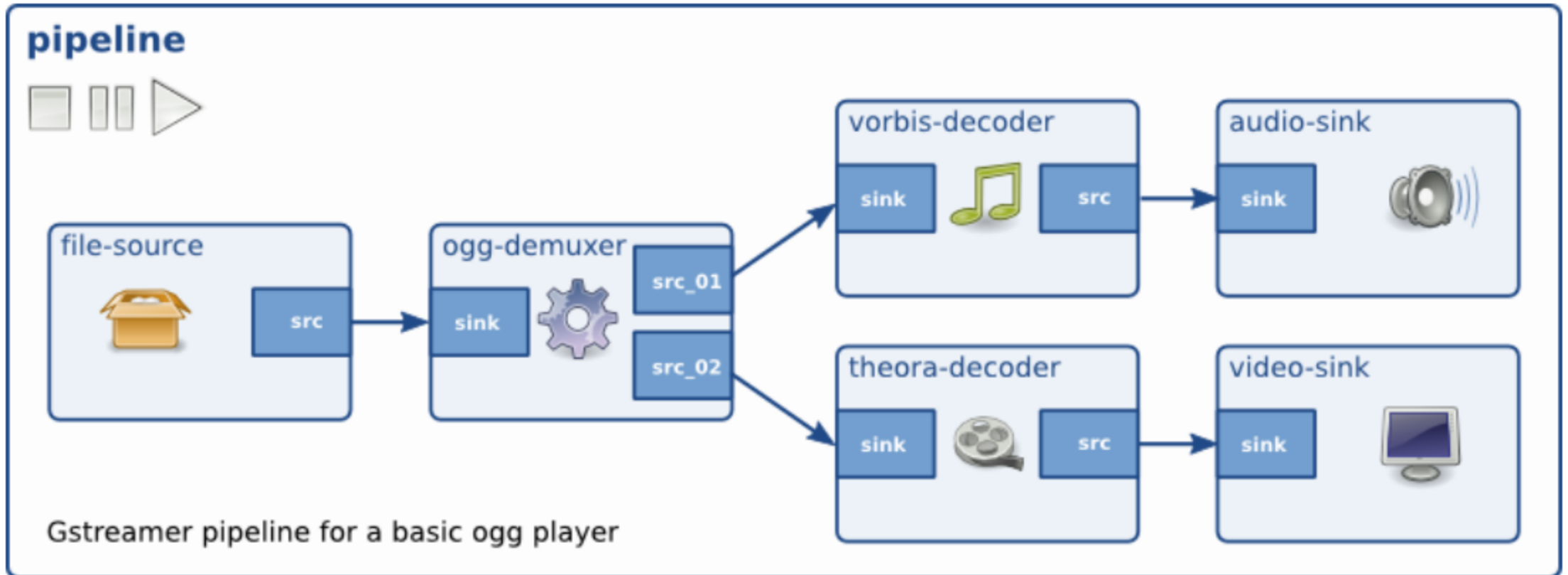
Feature

- Plugin으로 확장 가능, 유연함
- Often wraps other libraries (decoders, encoders, filters, etc.)
- Pipeline-based
- Bindings to multiple languages (C/C++, Python, Java, Ruby, Pearl, etc.)

GStreamer Overall Architecture



GStreamer Pipeline Example



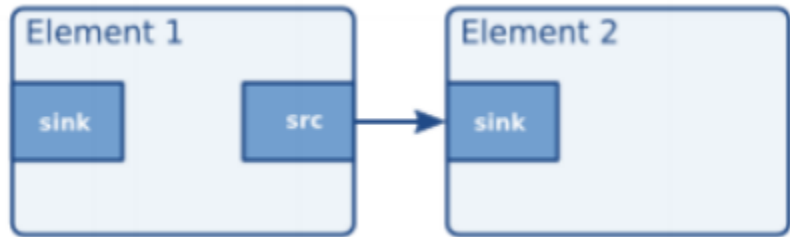
Element

- GStreamer에서 가장 중요한 class object
- Element들은 자신만의 명시된 기능을 지원
- Element들은 서로 연결되고 data가 전달됨
- GStreamer는 많은 elements들을 제공
- Element 종류 : Source, sink, filter, converters, demuxers, muxers, codecs



Pads

- Element들 간의 연결지점(connection points)

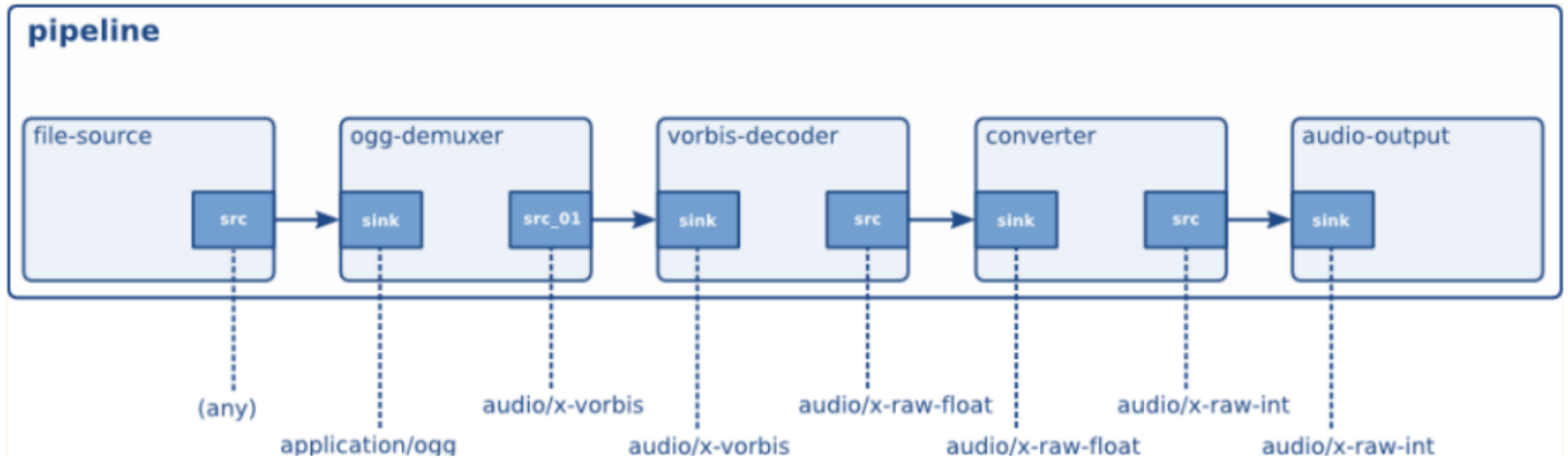


- Src(source) pads는 data를 생성.
- Sink pads는 data를 소비 (수신함).
- Data는 !항상! src pads에서 sink pads로 흐름.
- pull or push mode로 동작.

Pads (Cont)

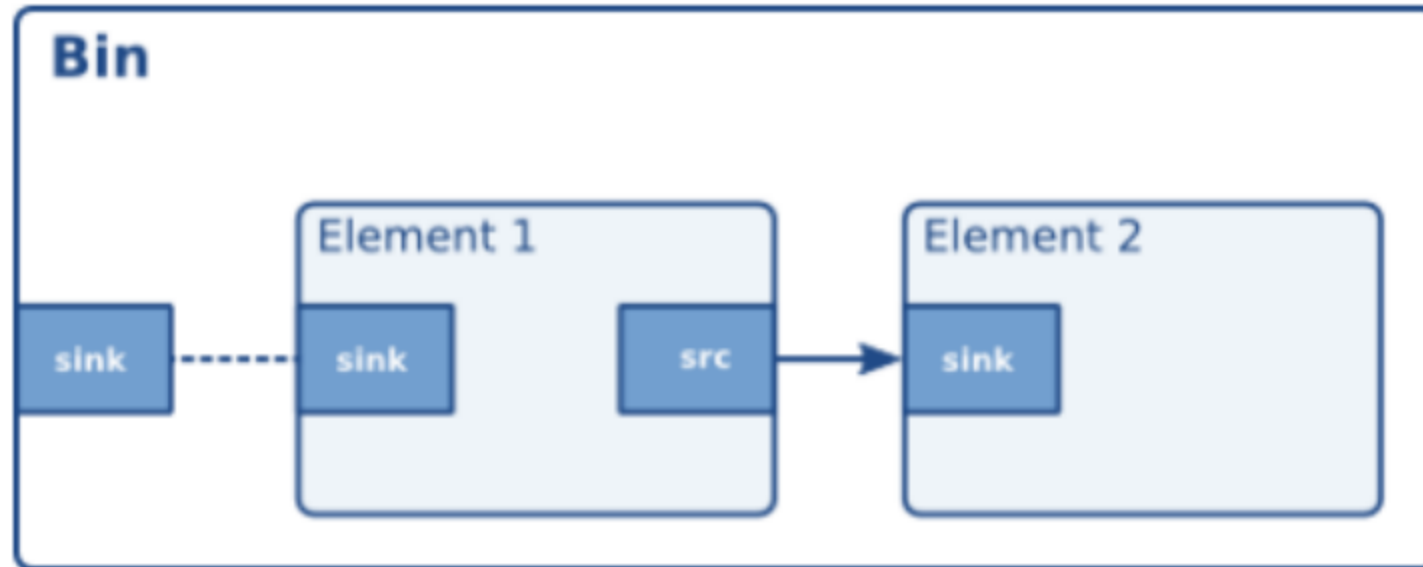
- Pad는 Capabilities or Caps라는 속성(property)을 가짐
- Caps는 element들 간의 연결을 검증하는데 사용됨 (data의 type을 제한함)
- Src pad와 sink pad는 각 pad들이 허용하는 data type이 호환되는 경우에 연결
 - 예를 들어, video stream을 생성하는 src pad는 audio stream을 수신하는 sink pad와 연결될 수 없음
- Elements는 사용할 형식에 대해 서로 협상할 수 있음 (caps negotiation)

Pads (Cont)



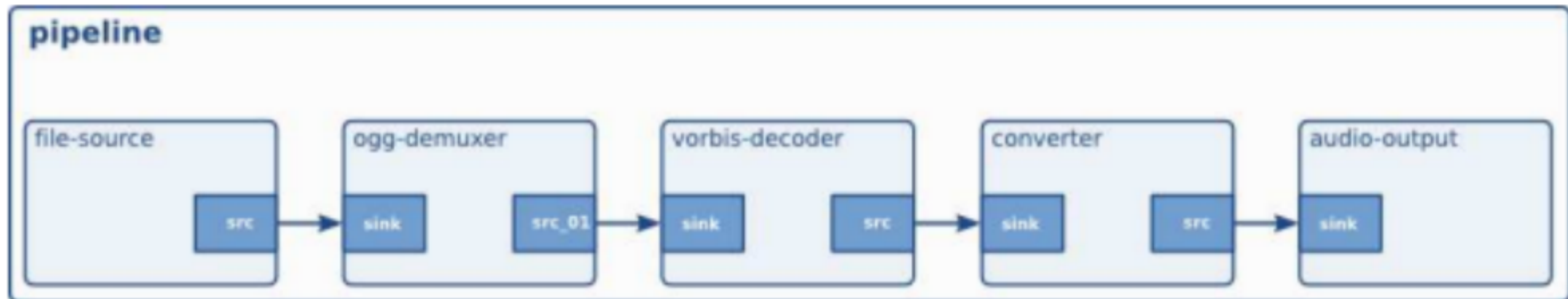
Bin

- Element들은 bin이라는 컨테이너로 그룹화 될 수 있음

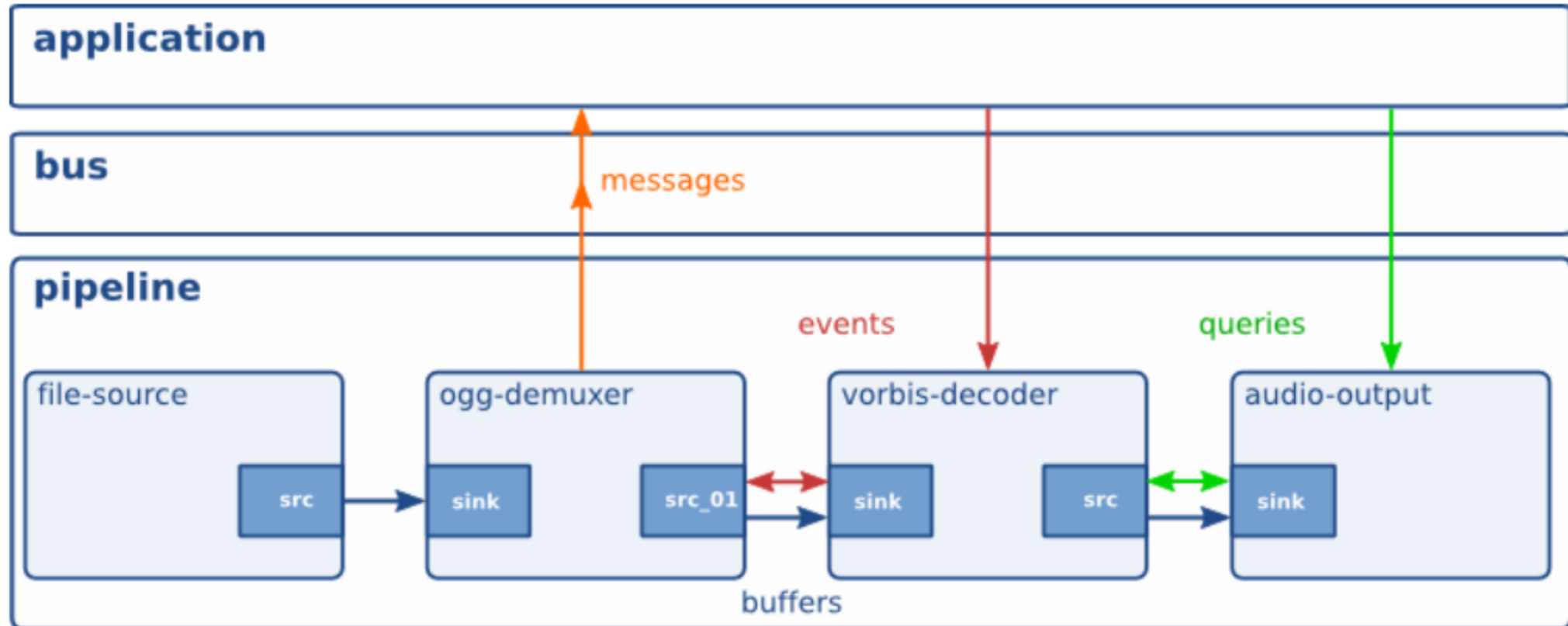


Pipeline

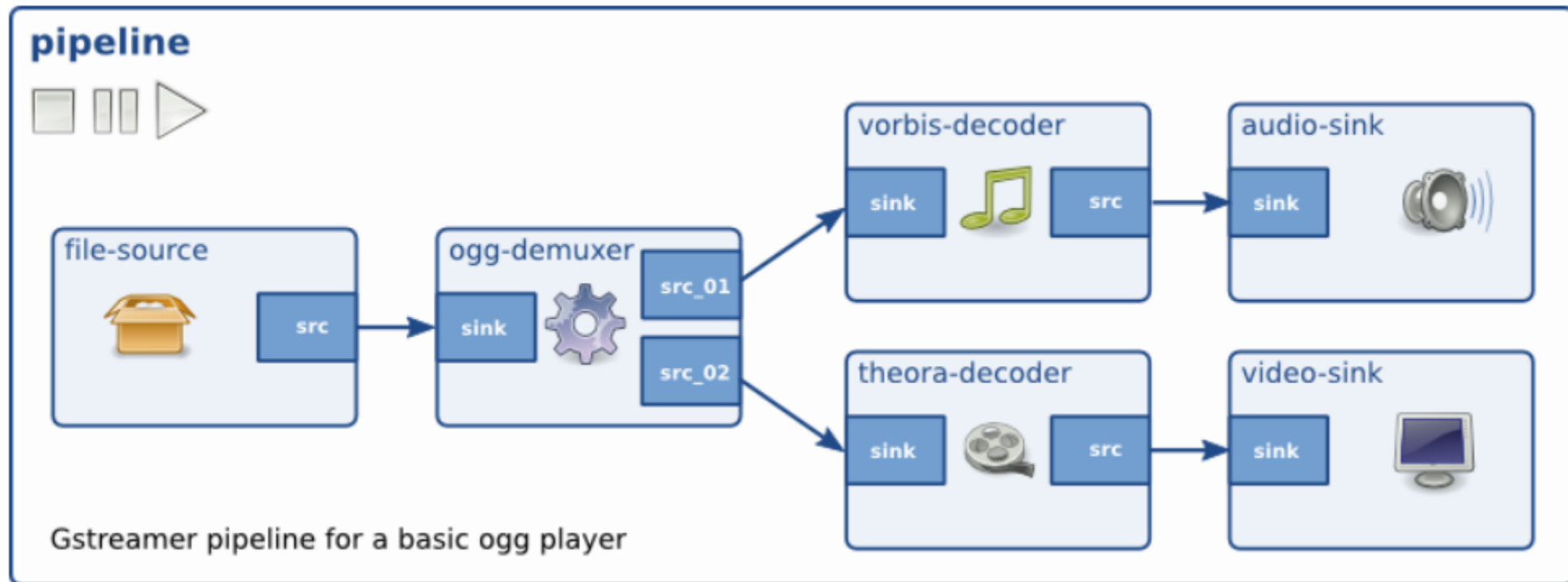
- A top-level bin
- Communication을 위해 bus를 제공
- 재생 동기화를 관리함.
- 분리된 thread에서 실행됨.



Bus for communication

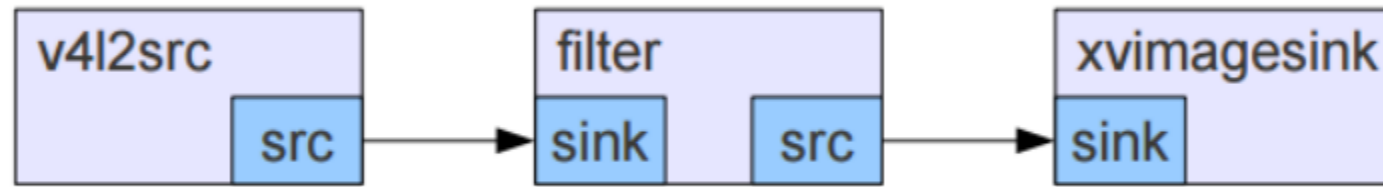


Pipeline Example 1



Pipeline Example 2

WebCam

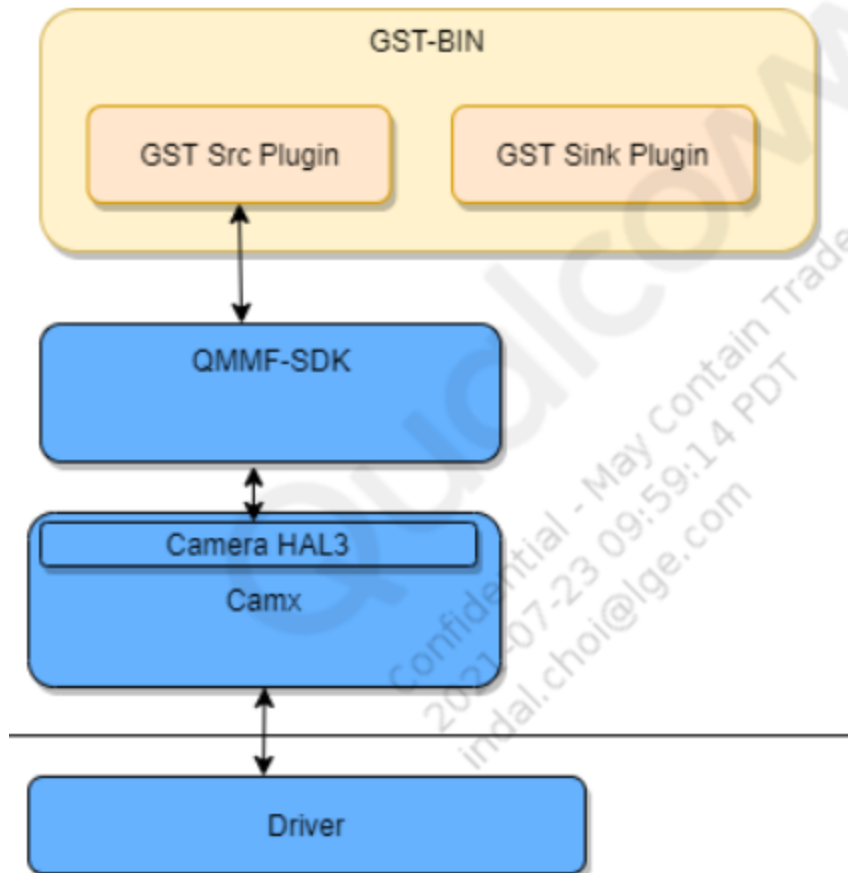


```
gst-launch v4l2src ! 'video/x-raw-yuv,width=320,height=240' ! xvimagesink
```

QTIQMMFSrc Element

QTIQMMFSrc 란?

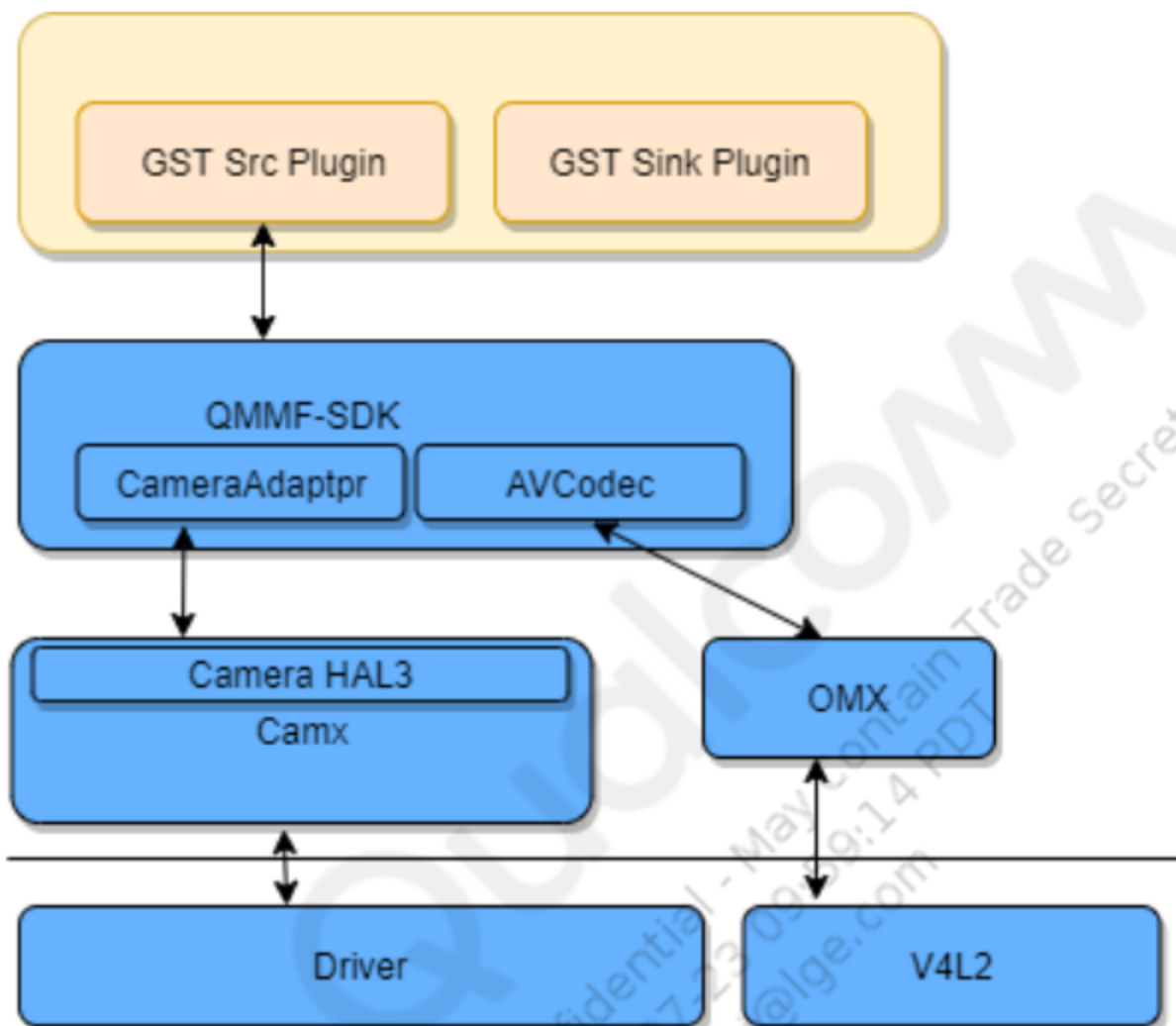
- GST SRC plugin (qtiqmmfsrc)



Feature

- qtiqmmfsrc는 AVC/HEVC bitstreams 및 YUV streams을 제공
- qtiqmmfsrc는 QMMF server의 client, QMMF server는 deamon
- QMMF server는 binder RPC 기반의 camera/recorder use cases를 구현한 deamon
- QMMF-SDK interacts with HAL3 and further HAL3 interacts with camera backend (Camx)

Video encoder usecase



qtiqmmfsrc

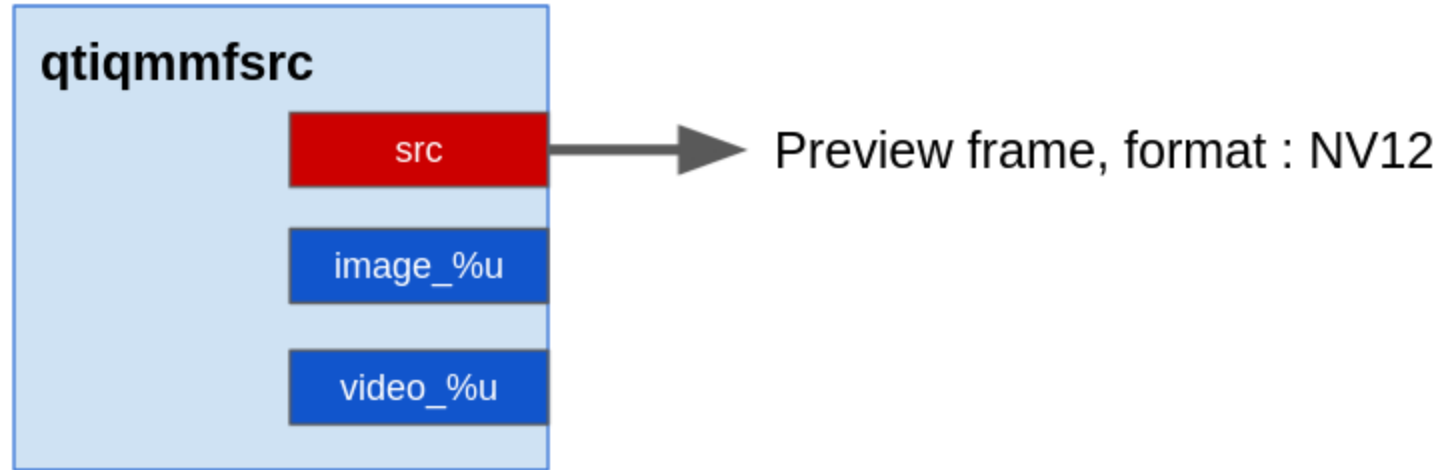


- To capture video frame via the QMMF service
- A wrapper on top of the QMMF Recorder Client
- 2 pads for video and image streams.
- Pads will push the buffer to its linked sink pad from the next plugin.

Problem

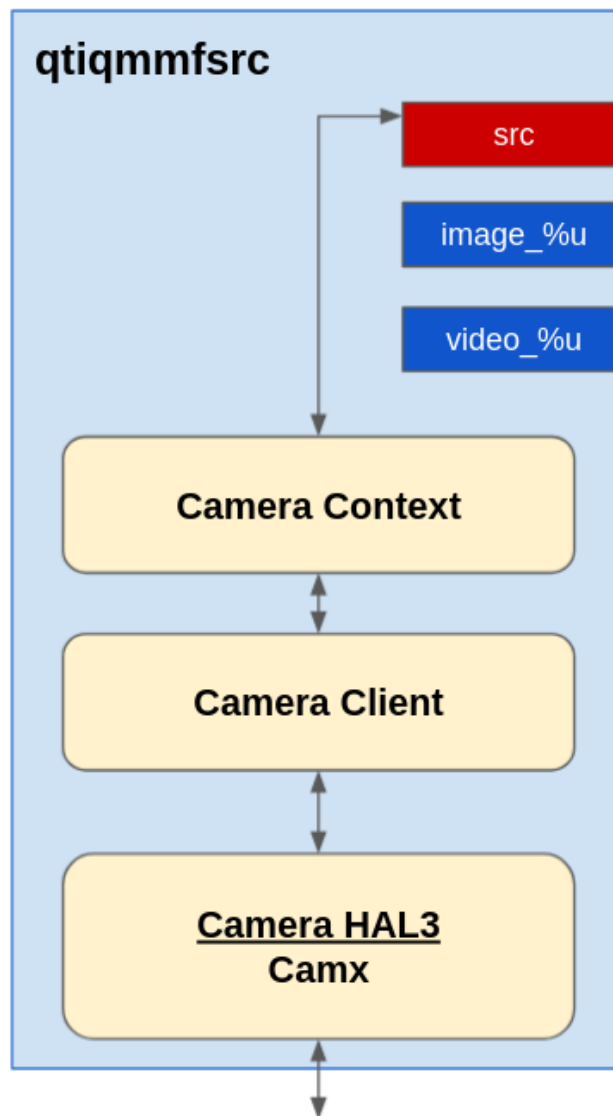
- qtiqmmfsrc는 QMMF *Recorder* client
- QCS605 QMMF와 qtiqmmfsrc (based QCS610) 의 호환성 문제
- qtiqmmfsrc는 Preview를 위해 GBM을 사용.
- 현재 webos 버전에 QCT LE porting이 완전하지 않음.

Modified qtiqmmfsrc (Cont)



- Add src pad for preview data
- **image_%u** : for capture a single image buffer
- **video_%u** : for streaming video data

Modified qtiqmmfsrc



Reference

1. GStreamer Tutorials :

<https://gstreamer.freedesktop.org/documentation/tutorials/basic/index.html?gi-language=c>

2. GStreamer Writer's Guide :

<https://gstreamer.freedesktop.org/documentation/plugin-development/index.html?gi-language=c>

3. QCS610/QCS410 Linux Platform Development Kit : 80-pl631-100_m_qcs610_qcs410_linux_platform_development_kit_software_reference_manual.pdf