Integrating the driver experience

VIRTIO devices status

Today's Agenda

Topic 1
- Summarize Last EG
- Jerry, 2min

Topic 2
- Future Roadmap discussion on VirtIO activities in AGL
- Jerry, 3min

Topic 3
- Current Status of VirtIO implementation by OpenSynergy & Panasonic
- Mikhail, 15min
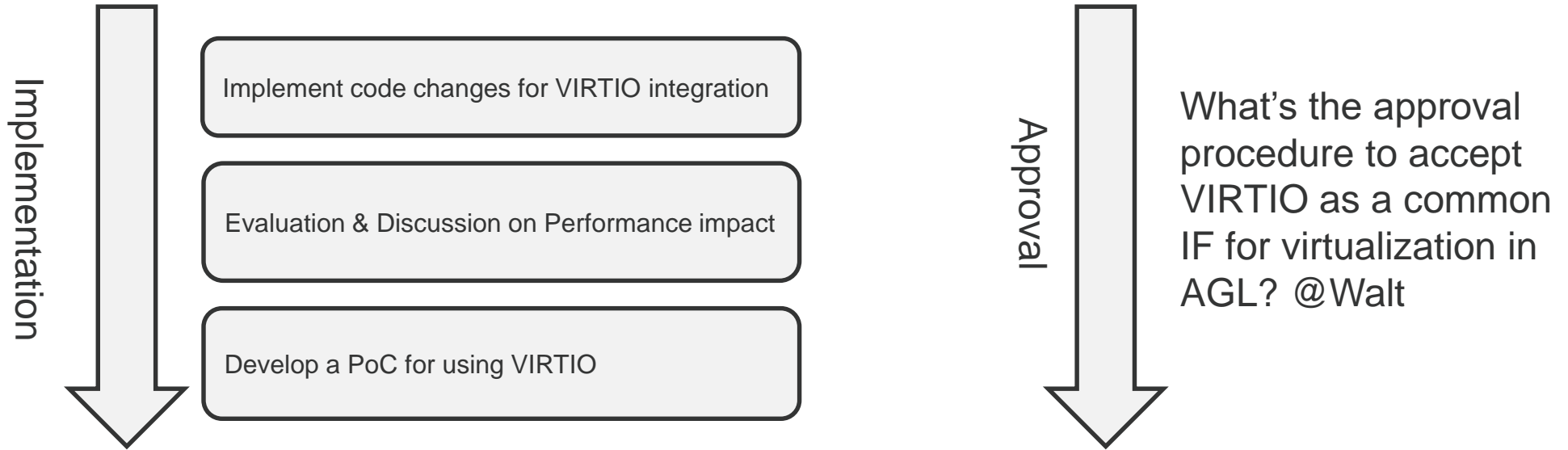
Summary of Last EG

- 21 members from 12 companies/organizations joined Apr 22 EG

- A presentation was given by Panasonic about a proposal of adopting VIRTIO as standard virtualization IF in AGL.

- VIRTIO as a standard got a good response in the EG
  - ✓ Several members showed great interest or support for the VIRTIO, but mentioned further work might be needed (such as extending current VIRTIO devices, identifying specifications for different automotive use cases and making a performance criteria for VIRTIO).
  - ✓ No members attending the EG raised objections for the VIRTIO adoption.

- Some members raised concern that discussion on VIRTIO may overlap the AVPS of GENIVI. To differentiate the activity, below opinions were raised.
  - ✓ AVPS is more focusing on specification, while AGL is more focusing on implementation (coding, evaluation and etc)
  - ✓ AVPS specification can be a good start & input for VIRTIO discussion in AGL.
  - ✓ Missing points in AVPS and OASIS found in AGL EG should be given feedback to GENIVI and OASIS. They are open to get outside opinions.

Road Map to Achieve VIRTIO Adoption in AGL

OPEN**SYNERGY**

First Step: Forming a consensus on VIRTIO adoption to AGL in Virtualization EG

-> What need to be known/discussed to achieve the consensus in EG on VIRITO adoption into AGL?
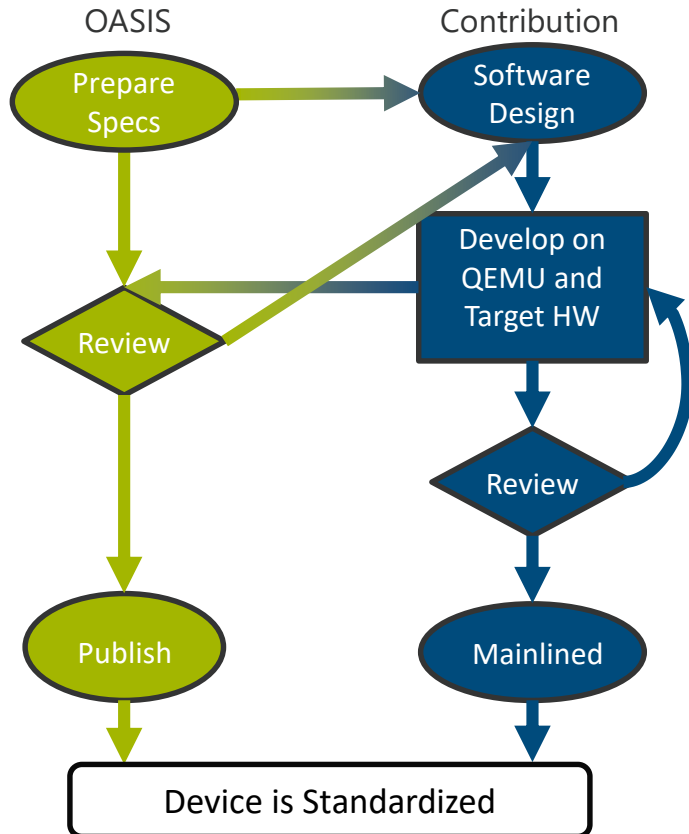
Second Step: How to achieve the adoption?

Implementation

Implement code changes for VIRTIO integration

Evaluation & Discussion on Performance impact

Develop a PoC for using VIRTIO

Approval

What's the approval procedure to accept VIRTIO as a common IF for virtualization in AGL? @Walt

Goal: Adopting VIRTIO as a standard API for virtualized devices in AGL

Progress of Automotive Ready VIRTIO and Our Contribution

OPEN**SYNERGY**

Still needing a lot of work though, progress of implementation is steadily being made.

OASIS   Contribution

Prepare Specs → Software Design

Develop on QEMU and Target HW

Review

Review

Publish → Mainlined

Device is Standardized

virtio-blk	**virtio-net**	**virtio-console**	**virtio-crypt**
VIRTIO: 1.1	VIRTIO: 1.1	VIRTIO: 1.1	VIRTIO: 1.1
LX DRV: upstream	LX DRV: upstream	LX DRV: upstream	LX DRV: upstream

virtio-input	**virtio-vsock**	**virtio-entropy**	**virtio-GPU(2D)**
VIRTIO: 1.1	VIRTIO: 1.1	VIRTIO: 1.1	VIRTIO: 1.1
LX DRV: upstream	LX DRV: upstream	LX DRV: upstream	LX DRV: upstream

Our Main Contribution Area

virtio-audio	**virtio-video**	**virtio-scmi**	**virtio-GPU(3D)**
VIRTIO: review	VIRTIO: review	VIRTIO: review	VIRTIO: 1.2
LX DRV: review	LX DRV: review	LX DRV: prepare	LX DRV: upstream

virtio-…
USB, CAN, Camera, RPMB …

Virtio-snd, -video and -SCMI outline

- **virtio-video**
  - Spec: https://markmail.org/message/dmw3pr4fuajvarth
  - Linux driver: https://www.spinics.net/lists/spice-devel/msg42373.html
 - QEmu: TBD
  - POC: COOQS HV on Linux Renesas RCar H3
- **virtio-snd**
  - Spec: https://markmail.org/message/jvgtjfwpuxhw72f6 (will be in virtio 1.2 release)
  - Linux driver: https://github.com/OpenSynergy/linux/tree/virtio-snd-draft
  - QEmu: TBD (old: https://github.com/OpenSynergy/qemu/tree/virtio-snd-draft)
  - POC: COOQS HV on Linux Renesas RCar H3
- **virtio-scmi**
  - Spec: https://markmail.org/message/e4qlrpogt62oqcq3
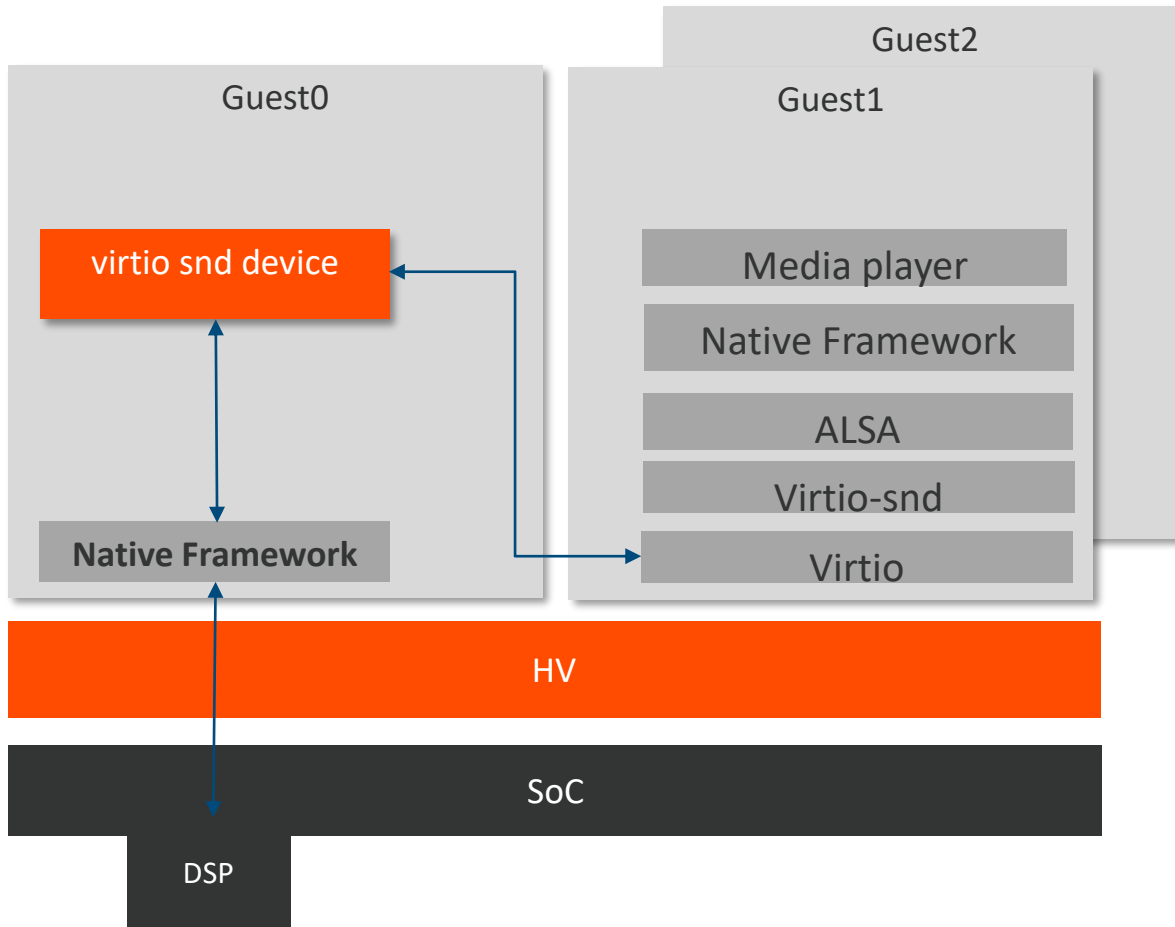 - Linux driver: TBD
  - QEmu: TBD
    - POC: COOQS HV on Linux Renesas RCar H3
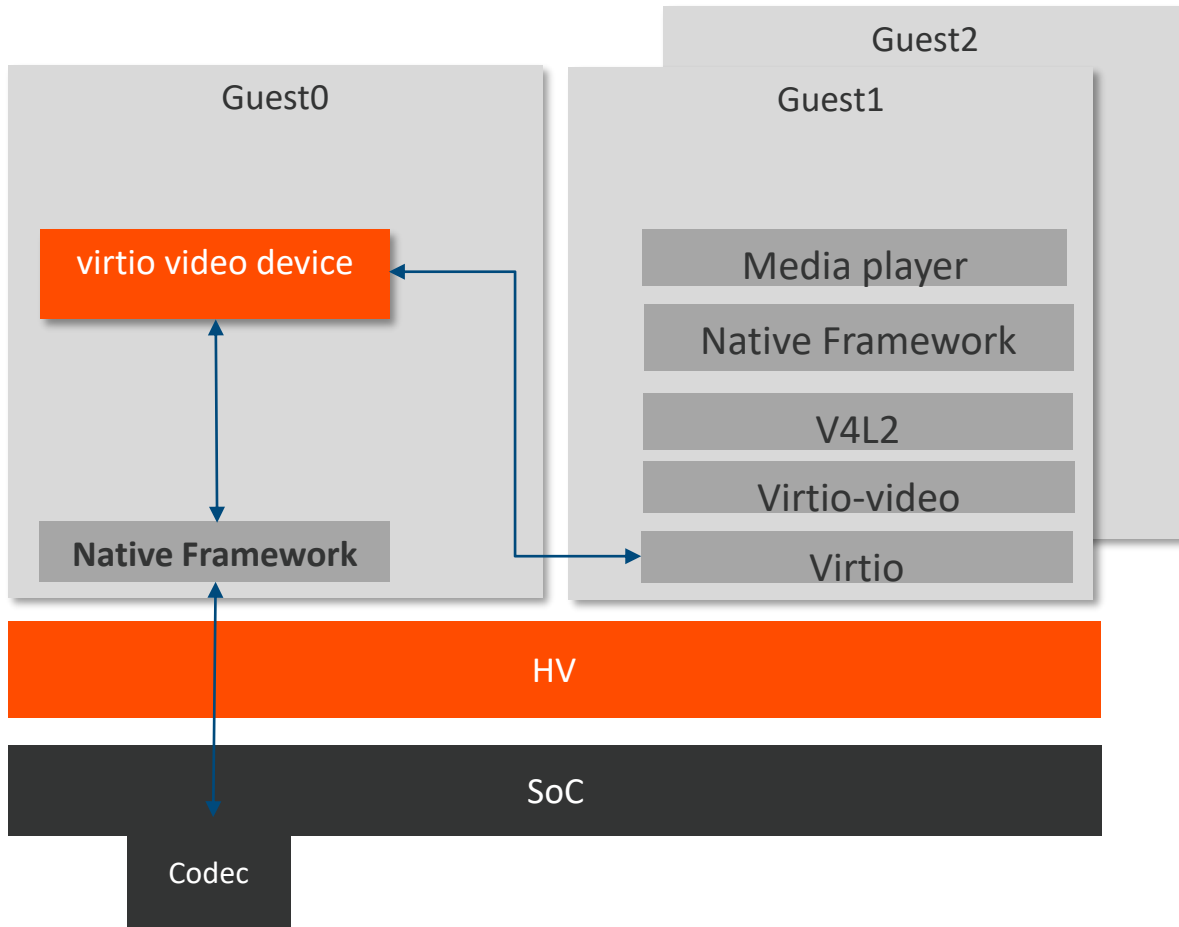
virtio-video

- V4l2 based driver
- Supports
  - Hardware video codec virtualization
  - ~~Camera input~~ Will be a separate virtio-camera device
- Memory to Memory or device to device by use of dma-buffers
- Memory model same as virtio-gpu
- Virtio-gpu and video can share buffers (in development)
- Stateful decoder/encoder

Legend: Open Source/ Vendor BSP   Hardware

virtio-snd

Guest2

Guest1

Guest0

virtio snd device

Media player

Native Framework

ALSA

Virtio-snd

Native Framework

Virtio

HV

SoC

DSP

- Virtual sound driver in ALSA
- Only PCM data leaves Guests
- Message- and shared-memory (polling) based
- Multiple inputs and outputs
  - Multi-stream support
  - Channel maps
  - Jack support
- Asynchronous notification from device

Legend: Open Source/ Vendor BSP   Hardware

virtio-scmi
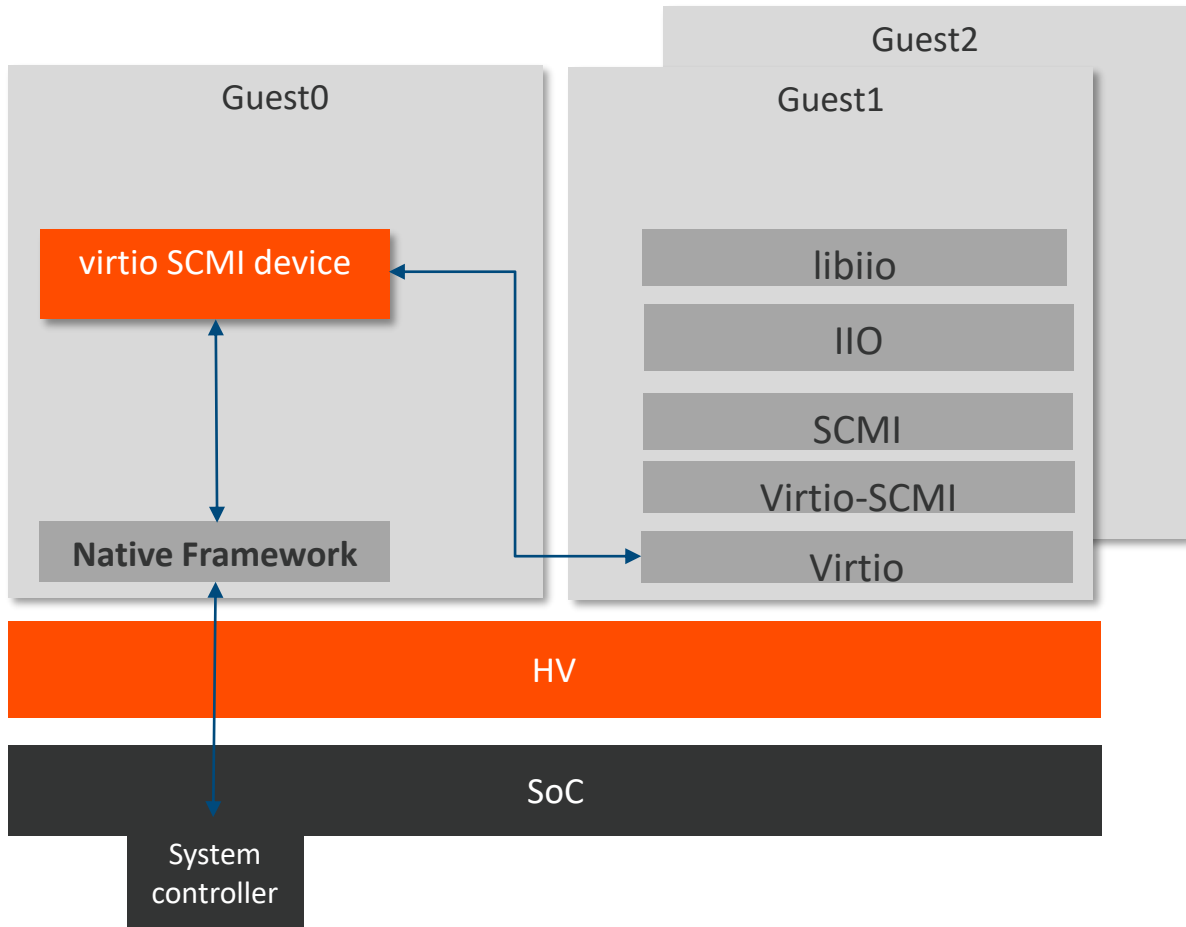
- Device and driver are SCMI agent and platform
- Message-based communication
  - Shared memory (polling) mode is optional
- Asynchronous events support
- SCMI messages:
  - Power domain
  - System power
  - Performance
  - Clocks
  - Sensors
  - Reset

Legend: Open Source/ Vendor BSP   Hardware

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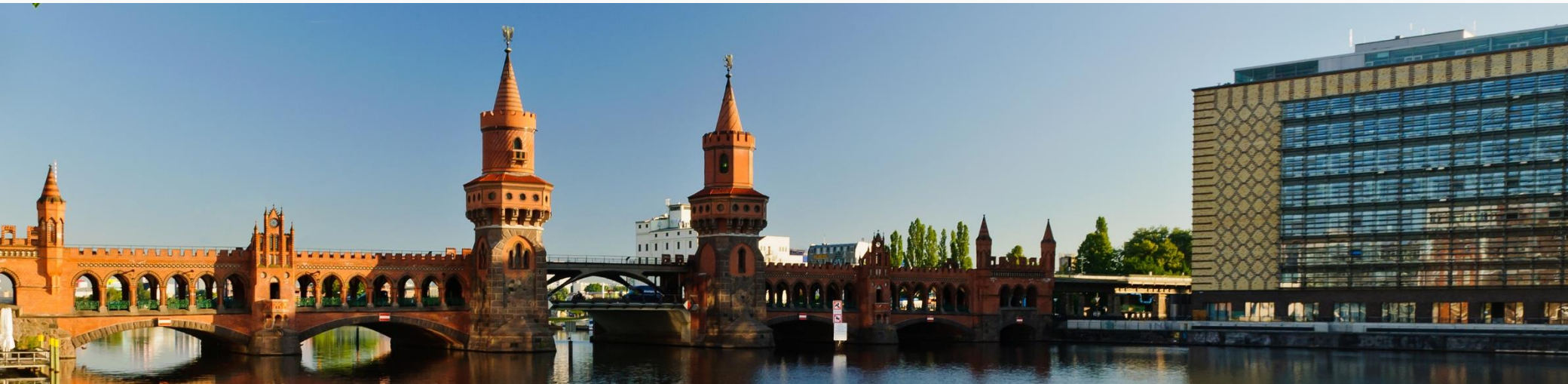
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