



Virtual I/O (VIRTIO) based virtualization in AGL

Mikhail Golubev, 19.10.2022

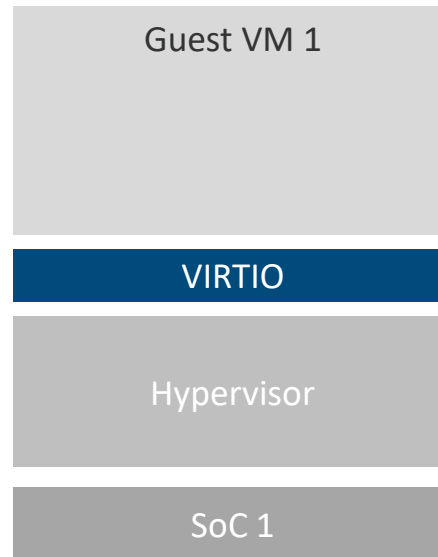
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Agenda

- **Enter VIRTIO**
- **How VirtIO works**
- **VirtIO devices in AGL**
- **Demo architecture outline**
- **Swap on the Fly Demo**

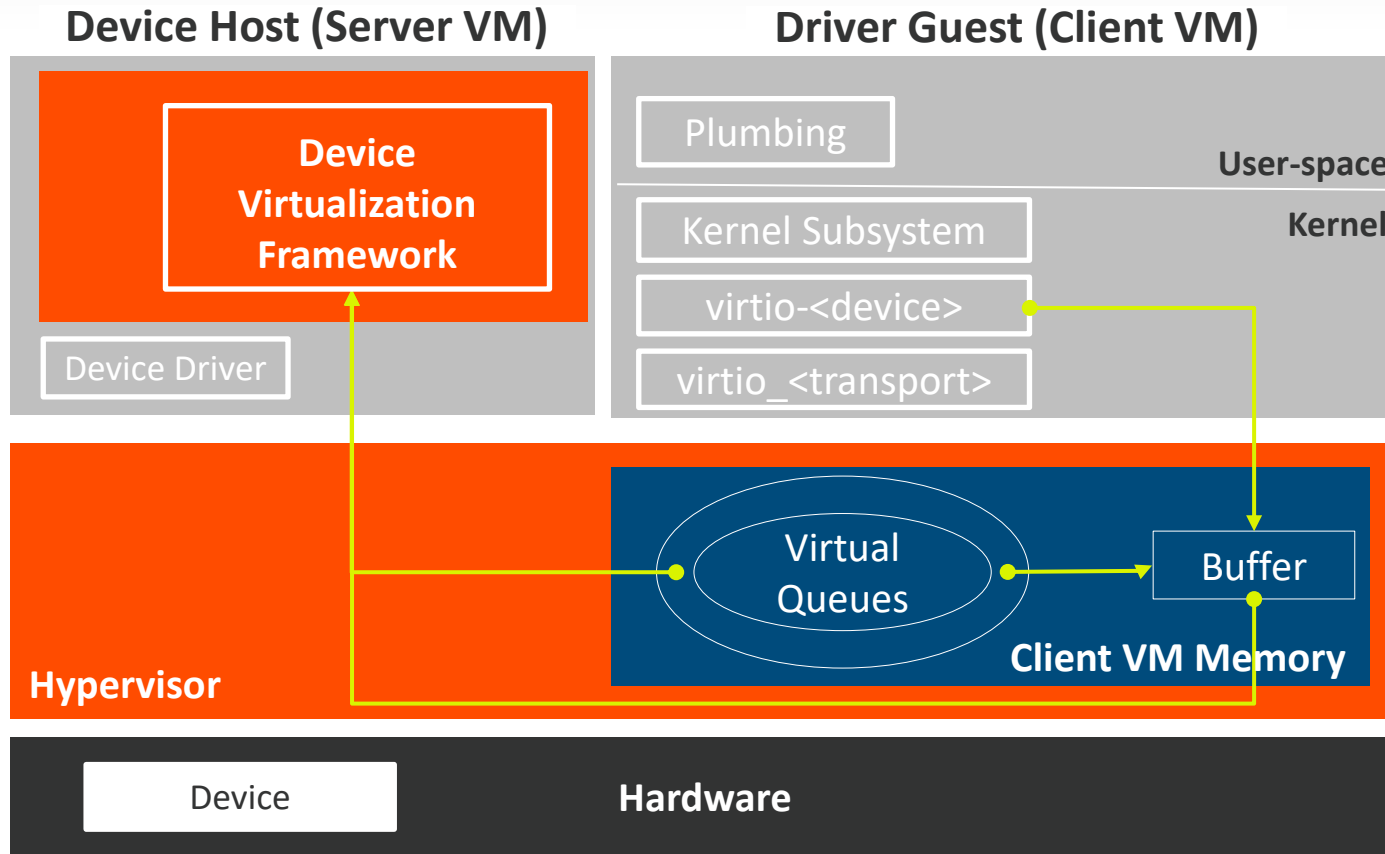
Enter VIRTIO

- Developed in 2008 as a hypervisor neutral way of accessing devices
- Provide virtual machines access to Input/Output
- A standardized interface for I/O between virtual machines and hypervisors
- Abstract device functionality instead of hardware
- Drivers are widely available in all major operating systems
 - Linux, Android, BSD, Windows, etc.
- Supported by all clouds and enterprise hypervisors



- **Reliable and proven technology**
- **Versatile abstraction model**
- **Scalable and high performance**
- **Multiple interoperable implementations**
- **Broad ecosystem across multiple industries**

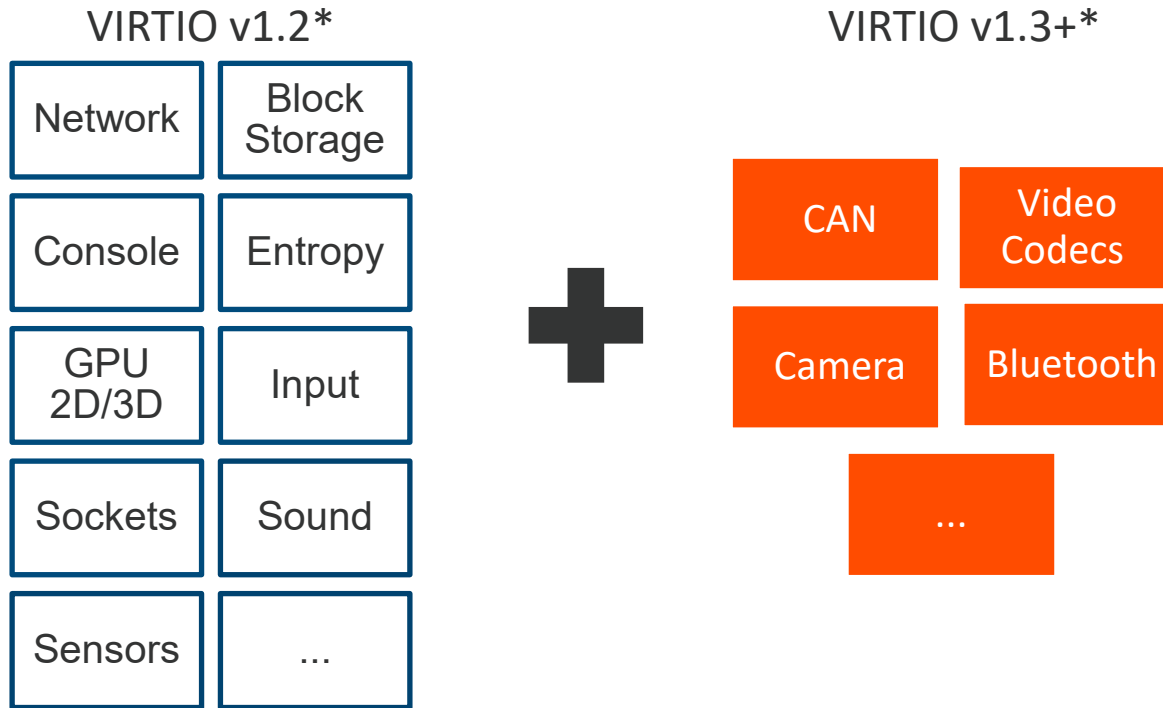
How VirtIO works



Legend: Open Source/
Vendor BSP VIRTIO support Hypervisor Vendor Hardware

- Bulk data transport via DMA-like memory model
- Buffer allocations handled by "Driver" part (client)
- Direct Read/Write access to allocated buffers in the "Device" part (server)
- Metadata transport via Virtual Queues (ring buffers, asynchronous pipeline)
- Virtio Transport is independent from Hypervisor and/or Hardware

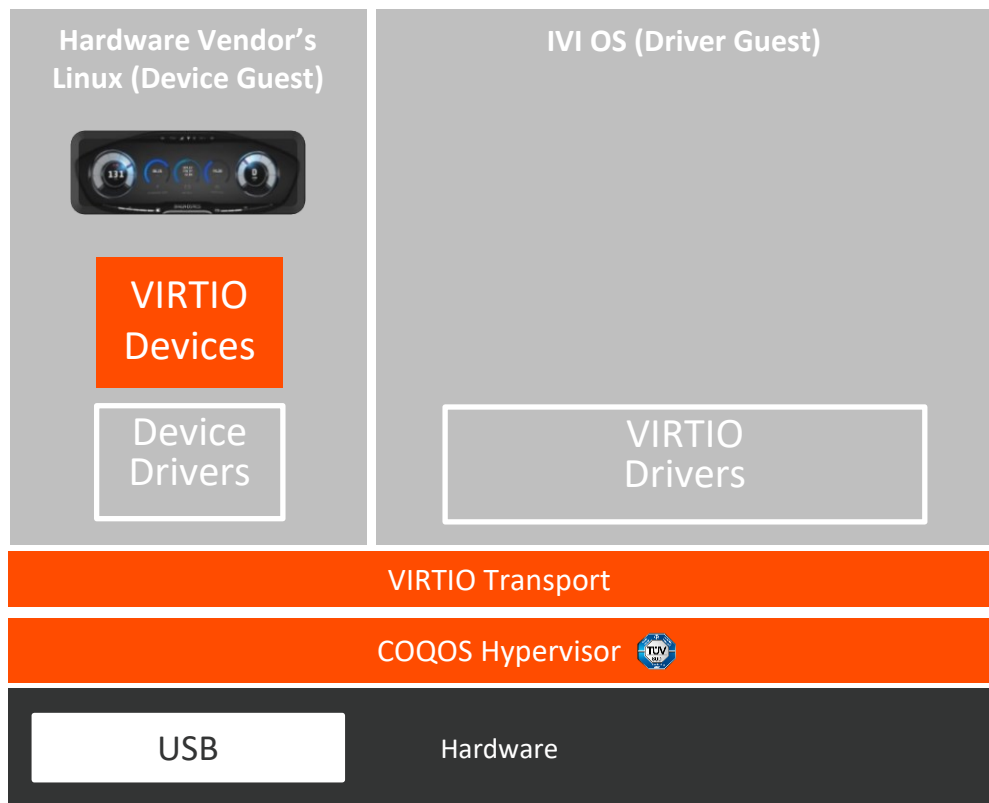
VirtIO devices in AGL



* OASIS Consortium standardizes the VIRTIO interface

- Add automotive specific device interfaces to standard
- Provide high quality drivers in upstream Linux kernel
- Prepare virtual machine ecosystem that guarantees guest readiness
 - AGL
 - Android
 - RTOS
 - ...

Demo system architecture overview



Legend: Open Source/ Vendor BSP OpenSynergy Hardware



- Swap / Upgrade IVI OS independently of hardware vendor
- Migrate existing system to a new hardware

Swap on the Fly Demo



<https://vimeo.com/713301344>

Thank you!

Questions?

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