

How to Introduce Virtualization in AGL?

Objectives, Plans and Targets for AGL EG-VIRT

Michele Paolino
m.paolino@virtualopensystems.com

Automotive Grade Linux Summit 2017
2017-06-01, Tokyo, Japan



TAPPS

<http://www.tapps-project.eu/>



The connected car challenges

Automotive electronics industry is today facing several challenges which include:

- Software time to market/updates (Infotainment, SoTA, ADAS, control units, etc.)
- Cyber security (remote threats, CAN attacks, etc.)
- Connectivity (5G, connected vehicles, etc.)

How to correctly address them with a unified ECU architecture?



Virtualization: the connected car enabler

Virtualization helps addressing all of them with a unified ECU architecture:

- Software time to market/updates
 - *Flexibility, co-execution of IVI and RT tasks, ease of deployment/maintenance, migration, portability*
- Cyber security
 - *Isolation*
- Connectivity
 - *Software Defined Networking, limited overhead*



Open virtualization: the perfect solution for connected cars

Open source virtualization does more than that, by adding:

- Software time to market/updates
 - *Open standards and existing code speed up applications development*
- Cyber security
 - *More eyes on the code means reduced vulnerabilities life*
- Connectivity
 - *Networking virtualization community very active can bring important benefits (tools, knowledge, etc.)*



Virtualization Expert Group (EG-VIRT)

The purpose of the AGL Virtualization Expert Group is to add virtualization support to AGL targeting at an open infrastructure able to support different potential solutions:

- No specific hypervisor is targeted
- Multiple solutions can be supported together (Container + hypervisor, partitioning system + hypervisor)
- Intel and ARMv8 support



EG-VIRT activity

In its first 6 months, the EG-VIRT group activities focused on:

- Kicked off on January 2017
- Bi-weekly telephonic meetings held on a regular basis
- 1 JIRA spec (Virtualization, SPEC-148) with 1 task (KVM porting to AGL, SPEC-496)
- 1 Gerrit change under review (Change 9317) with 3 patchsets
 - [RFC] Enable KVM hypervisor execution in AGL

How far did we go?

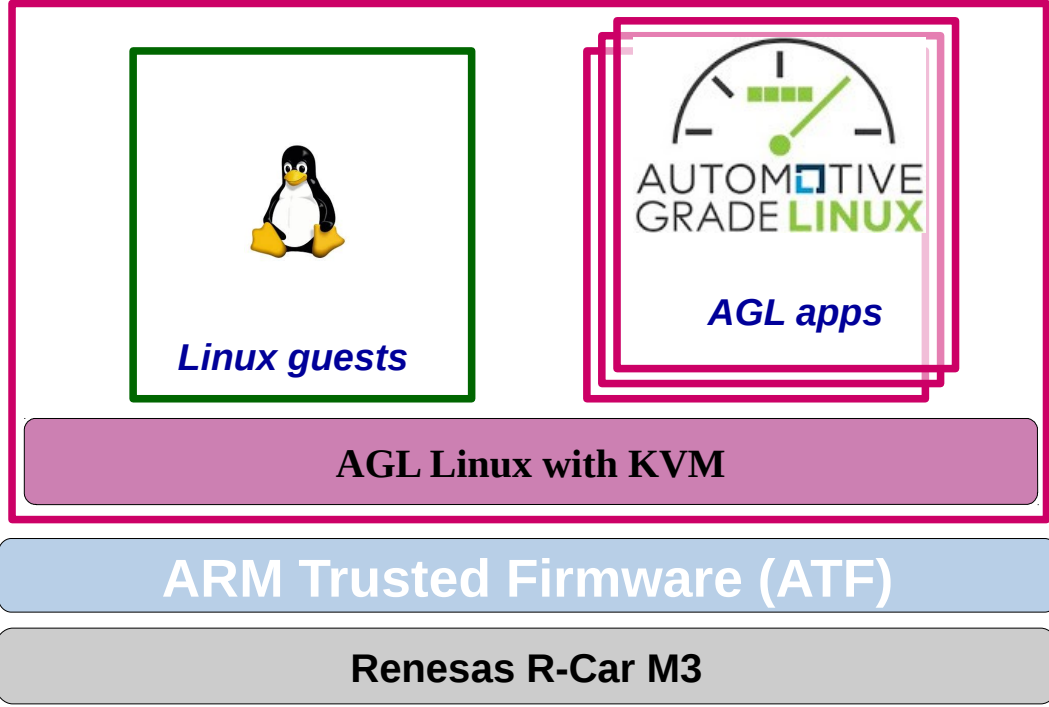


Demo

```
root@linux:~
```



Demo





EG-VIRT: open issues

A first step has been achieved with a PoC of KVM running in the AGL distribution. However, there is still a lot of work to do:

- RT requirements
 - We need fast predictable responses from security critical operating systems
- Certification
 - Open source solution needs to ease this process, which need to be performed for each specific target HW
- GPU virtualization, connectivity (Quality of experience)
 - Users are more and more demanding 3D/connected applications

How to address them?



EG-VIRT: call for participants

Virtualization is of utmost importance to enable smart connected vehicles. Adding virtualization in AGL means:

- Set the ground for open source connected autonomous vehicles
- Provide a reference infrastructure for future automotive systems and fast-prototyping, fast-innovating, connected applications
- Present an alternative solution to closed source hypervisors

Virtual Open Systems is currently showing the way, however more participants are needed!



EG-VIRT: What's next

The Virtual Open Systems EG-VIRT activity will continue, aiming at:

- Upstream the current RFC patches in the mainstream AGL distribution for the Renesas R-Car platform
- Investigate real time capabilities and certification solutions for Linux/KVM
- *[Community support needed!]* Develop a community AGL PoC including virtualization
- *[Community support needed!]* Integrate virtualization in the reference AGL architecture



EG-VIRT: join the discussion

- AGL wiki:
 - <https://wiki.automotivelinux.org/eg-virt>
 - <https://wiki.automotivelinux.org/eg-virt-meetings>
- JIRA:
 - <https://jira.automotivelinux.org/browse/SPEC-148>
- IRC (Freenode)
 - #automotive
- mailing list
 - automotive-discussions@lists.linuxfoundation.org



Thank you!

To contact me:

m.paolino AT virtualopensystems. com

OR

Virtual Open Systems' booth at the Tokyo ALS2017



Virtual Open Systems