

Taking Automotive Central Computers to the Next Level

OpenSynergy's hypervisors complement the Renesas R-Car S4

Berlin, December 8, 2022. OpenSynergy announces its latest cooperation with Renesas to run its VIRTIO-based virtualization platform on the new, powerful Renesas R-Car S4 system-on-chip (SoC). The integration of OpenSynergy's automotive platforms onto the Renesas R-Car S4 allows customers to accelerate the convergence of a wide range of functions within the vehicle and invent new use cases for high-end central car computers.

The automotive industry is moving away from an E/E architecture consisting of many ECUs to an architecture with a central, High-Performance Computer (HPC) that is connected to local zonal computers. This architecture provides a significant reduction of in-vehicle cabling and allows manufacturers to add features easily as software functions, even to vehicles in the field. The usage of heterogeneous, i.e. application and real-time, processors characterizes both HPCs and zonal computers. While the zonal computers are used to consolidate the traditional real-time microcontroller-based ECUs, the HPCs are used to consolidate several domain controllers.

The new Renesas R-Car S4 combines both types of processors, application and real-time processors in order to support different kinds of workloads. Both the application processors as well as the real-time processors support hardware virtualization. This way the new chip allows customers to reduce costs by consolidating functionalities and integrating mixed-criticality applications up to ASIL D. Moreover, it increases the security against malicious attacks from outside by controlling the access to the system's devices.

OpenSynergy provides virtual technologies for both types of processors to run the hypervisor on the application as well as the real-time processors. Its COQOS Hypervisor SDK is an open-standards-driven virtualization platform. When deployed on a powerful SoC such as the Renesas R-Car S4, the hypervisor isolates software functions from each other as well as the underlying hardware, ensuring freedom of interference between the individual functions and hardware.

"We have already realized several series projects with Renesas in which COQOS Hypervisor SDK runs on the Renesas R-Car H3. In total, there are hundreds of thousands of vehicles on the road with our joint technology," emphasized Isaac Trefz, Product Manager, COQOS Hypervisor SDK at OpenSynergy. "We are now extending this success story to the SoC R-Car S4. OpenSynergy's COQOS solution is particularly well suited to support automotive functions realized in software on top of such powerful HPC hardware. Our hypervisor variants fully leverage the tremendous performance of this new chip."

Only one of the countless configurations could be gateway, telematics, and ADAS functions running side by side on the application cores. The diversity of processor cores allows additionally deploying several real-time applications with very different safety requirements on the same SoC, such as body controller and power train functionalities. The freedom from interference between the functionalities ensured by the hypervisor enables development, integration, update, and upgrade of each function separately. Therefore OEMs have more flexibility to choose operating systems as well for real-time processors. For example, they could combine different AUTOSAR stacks. They can use

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open source solutions like free RTOS for non-safety critical parts or they can use bare metal virtual machines for optimal performance.

“The combination of OpenSynergy’s COQOS Hypervisors with Renesas R-Car S4 enables customers to implement new use cases around centrally connected gateways, high-performance computers for cars, and high-end zonal controllers,” said Yusuke Kawasaki, Director of Automotive Digital Products Marketing Division at Renesas Electronics Corporation. “This enriches the comprehensive solutions offered by our partners in the R-Car Consortium and allows faster time to market for our customers.”

About OpenSynergy

OpenSynergy provides embedded software products for the next generation of vehicles. Its hypervisor and communication products pave the way for an integrated driving experience.

The automotive virtual platform COQOS Hypervisor SDK integrates a mix of real-time applications and open-source solutions on powerful domain controllers. It supports a large bundle of features corresponding to the virtualization standard VIRTIO, creating maximum flexibility: guest operating systems can be used and reused on different Systems on Chips.

The automotive leading Bluetooth® stack Blue SDK is one of OpenSynergy’s communications platforms. It is the reference Bluetooth® implementation for many OEMs around the world.

OpenSynergy further provides complimentary Automotive-Grade software components tailored for the Android™ Open Source Project (AOSP) to boost Android’s adoption in the automotive domain. OpenSynergy also provides engineering services to support the customization of its products. Read more on www.opensynergy.com

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