Virtual Open Systems

VOSySmcs - Automotive mixed-criticality virtualization product software stack

In the era of connected electric/hybrid vehicles, the automotive industry is facing a revolution, accelerated by an un-avoidable integration of Autonomous Driving and AI. Its electronic components, based on increasingly complex, heterogeneous hardware platforms and an exponentially growing software represent a key strategic challenge. To cope with this revolution while limiting the number and costs of Electronic Components Units (ECU), car-makers are pushing for ECU consolidation with mixed-criticality requirements.

Features

► VOSYSmonitor - ISO 26262 ASIL-C certified system partitioner for consolidation of mixed-critical automotive systems
► VOSYSVirtualNet - Safe, portable and efficient communication link based on IP stack (virtual Ethernet)
► FreeRTOS - ISO 26262 certifiable open source RTOS extended version
► Safe Peripheral Sharing - Solution to share peripherals between both domains, while ensuring the critical output is not impacted by non-critical system
► GPU virtualization - Enhance non-critical Virtual Machines (VMs) with 3D acceleration capacity for advanced graphic rendering close to native performance

Virtual Open Systems' Solution

In this disruptive context, VOSySmcs, an innovative, scalable and open software stack solution, enables Tier-1 vendors to answer the requirements set by the car-makers with a secure, modular and high performance solution. VOSySmcs innovation resides into open source components (including certified RTOS) modular integration upon a slim proprietary certified virtualization layer called VOSYSmonitor.

VOSySmcs opens to a completely new generation of software driven vehicles, where autonomous driving with virtualized access to hardware accelerators can be orchestrated and executed in isolated virtual machines, with stringent ISO-26262 certification requirements. Indeed, VOSySmcs provides as key certified components, VOSYSmonitor (the system partitioner) and an open source RTOS (FreeRTOS) extended to address safety critical applications.

Benefits

► Strongest security isolation for safety critical partitions
► Modular and scalable solution (additional software components, peripheral sharing, etc.)
► ISO 26262 certified software stack for Automotive system
► System cost reduction based on an open software stack
► High performance, no overhead
► Compatible with legacy OSes

VOSYSmonitor

Arm multi-core platform

Normal World
Non-critical applications

Secure World
Critical applications

Inotainment OS
Rich OS
Android, etc.

RTOS
Digital cluster, etc.
Secure Services
OP-TEE
AUTOSAR
OS

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Virtual Open Systems is a software company providing open virtualization solutions and custom services in complex mixed-criticality systems for Automotive, connected vehicles, IoT edge, and more in general for embedded systems.

VOSySmcs automotive
Safety-aware virtual cockpit for modern vehicles

VOSySmcs provides a full fledged software stack to support a modern generation of car virtual cockpit where the In-Vehicle Infotainment (IVI) system and the Instrument Digital Cluster are consolidated and interact on a single platform. Indeed, traditional gauges and lamps are replaced by digital screens offering opportunities for new functions and interactivity. Vehicle information, entertainment, navigation, camera/video and device connectivity are being combined into displays but these different applications does not have the same level of criticality.

VOSySmcs enables the integration of safety-critical and non-critical information on a single display, while providing rendering guarantees for the safety-critical output thanks to a key ISO 26262 certified component called VOSYSmonitor.

More information about VOSYSmonitor

**Description**

VOSYSmonitor is a software system partitioner that enables consolidation of mixed-critical applications on a single multi-core platform by leveraging on ARM Trustzone.

VOSYSmonitor is proposed as a software binary allowing the co-execution of critical and non-critical operating systems.

**Supported SoC's**

- Renesas R-Car H3/M3 (ARMv8)
- Xilinx Zynq US+ (ARMv8)
- Renesas RZ/N1D (ARMv7)
- NVIDIA Jetson TX1 (ARMv8)
- ARM JUNO r0/r1/r2 (ARMv8)

**Key Characteristics**

- Portable on ARMv7-A/ARMv8-A platforms with TrustZone
- High performance: RTOS interrupt latency < 1us
- Certified for safety systems (e.g. IEC61508, ISO26262, etc)
- System monitoring to recover failures and preserve critical OS

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