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COQOS Micro SDK is a hypervisor-based platform for real-time safety-critical applications running on the next generation of microcontroller with hardware assisted virtualization. It allows running multiple virtual machines (VMs) with different ASIL levels on a single Microcontroller/µC with MPU (Memory Protection Unit) and provides freedom from interference between virtual machines.

Main Features

- Hardware assisted virtualization

- RTOS agnostic (e.g. AUTOSAR stack of different vendors)

- Freedom from interference for virtual machines

- Static configuration

- Symmetric multi-processing for virtual machines

- Support for multi-core architectures

- VM update

- VM supervision and restart

- Support for error detection and notification

- Inter-VM communication

- Logging and tracing

- Integration with AUTOSAR methodology

- ISO 26262 ASIL-D compliant development

Target ECU/Application

- ADAS

- Power Train

- Motor & Chassis Control

- Braking system

- Gateway

- Body Control

- Energy Management

- Domain Control

Benefits

- Supports consolidation of ECU running legacy single or multi-core applications

- Allows running applications of different ASIL levels in different VMs

- Allows integration of VMs from different vendors

- Lowers ASIL-D certification and recertification costs

- Supports design of secure system architectures by
  - isolation of faults
  - adding an additional layer of privilege above the OS

- Facilitates modular software updates
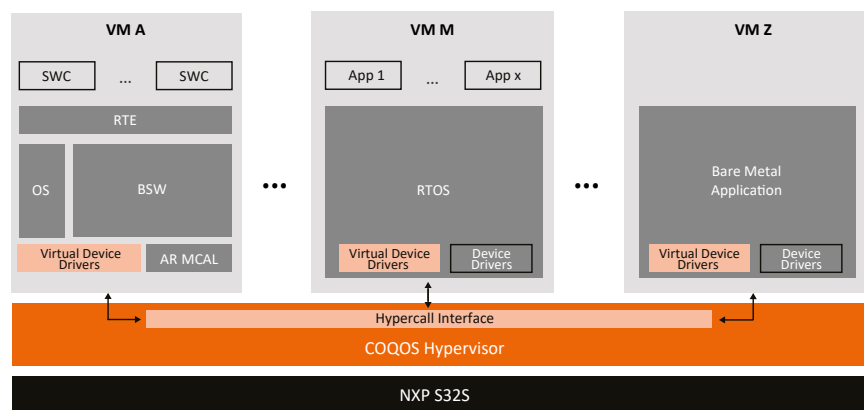
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Supported Architectures

- Arm Cortex®-R52

Supported SoC

- **NXP S32 family** (OpenSynergy reference platform)

Capable of more HW support

- STMicroelectronics Stellar family

- Infineon TriCore ™

- Renesas RH850/U2x

Hypervisor

- Takes advantage of hardware assisted virtualization

- Especially tailored to the needs of automotive applications (e.g. AUTOSAR)

- Lean kernel, high efficiency and functional reliability

- Real-time scheduling with support of low latency interrupt

- Partitioning of processor resources (execution time and memory)

- Dedicated and controlled access to peripherals from the VMs

- Statically configured for high predictability

Inter-VM Communication

- Point-to-Point communication between VMs over channels

- Shared-memory as a medium for high-performance communication

- Static allocation of channels for controlled communication

Virtual Machines

- COQOS Micro SDK allows multiple virtual machines to run on a single physical core

- COQOS Micro SDK allows a single virtual machine to run on one or more physical cores

- Each virtual machine has dedicated memory regions configured and managed by the hypervisor

Guest Operating Systems

Any RTOS that runs natively on the Microcontroller can run on the hypervisor.

COQOS Micro SDK supports:

- AUTOSAR (Classic Platform) systems

- non-AUTOSAR real-time operating systems

- bare-metal applications

Shared devices

- COQOS micro hypervisor sets the foundation for sharing devices between multiple VMs

- State-of-the-art, high-performance sharing techniques in both VM and hypervisor spaces

- Compatible with VIRTIO and AUTOSAR (MCAL) standards

AUTOSAR Integration

COQOS Micro SDK is compatible with the AUTOSAR methodology for seamless integration of AUTOSAR software.

Safety

COQOS Micro SDK is developed according to the ISO 26262 standard and can be used up to ASIL-D based applications.

Support

COQOS Micro SDK comes with standard support and access to updates of the product. In addition, OpenSynergy's Engineering Services are available to port COQOS Micro SDK to your hardware or to help in configuration or integration tasks.

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