



**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 SoC/μC with MPU (Memory Protection Unit) and provides Freedom from Interference between virtual machines.**

**Main Features**

- Hardware assisted virtualization
- Freedom from Interference using memory and timing separation/protection
- Multicore support
- Inter-VM communication
- VM restart and update
- Error reporting & recovery
- A configuration generator following AUTOSAR methodology
- Developed as an ISO26262 ASIL-D SEooC (Safety Element out of Context)

**Supported Architectures**

- ARM Cortex-R52

**First supported SoCs**

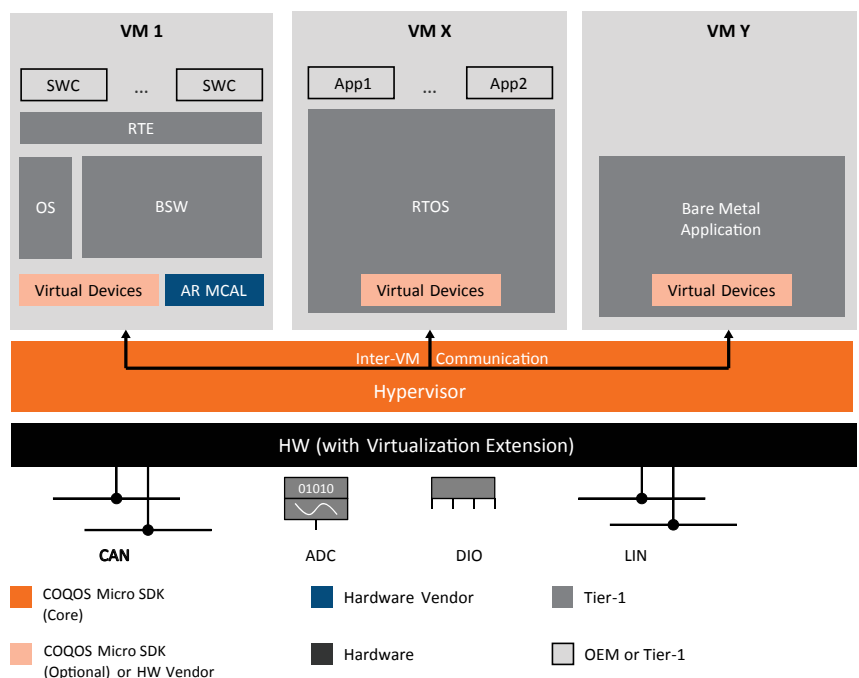
- NXP S32S/S32D/S32P

**Target ECU/Application:**

- Safety application:
  - ADAS
  - Power Train
  - Motor & Chassis Control
  - Braking system
- Real time:
  - Gateway
  - Body Control
  - Energy Management
  - Domain Control

**Benefits**

- Consolidates functionality: reduce HW in the car, thus cost, space and weight
- Benefits from the optimal usage of the newest powerful μC
- Increases safety and security
- Allows modular software updates
- Allows implementation of multiple vendor-independent OS/stack



### 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
- Scheduling enables to run several virtual machines on a single physical core
- Partitioning of processor resources (execution time and memory)
- Dedicated and controlled access to peripherals from the VMs

### Inter-VM Communication

- Allows communication channels between different virtual machines
- Uses shared memory mechanisms (for faster communication)
- Is fully integrated with the Hypervisor (for access rights)

### 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 SoC can run on COQOS Micro SDK. For example:

- AUTOSAR (Classic Platform) systems
- Other real-time operating systems
- Or bare-metal applications

### Shared devices

- Software Drivers run in the Virtual Machines (e.g. AUTOSAR MCAL)
- For sharing devices, there are the following options:
  - Sharing using features of the Hardware, when supported
  - Client/Server mechanism with one VM (server) having direct access to physical devices.

### Tools

- COQOS Micro Hypervisor and Inter-VM communication comes with a configuration tool which follows the AUTOSAR configuration methodology
- The tools can be easily integrated in the AUTOSAR tool chain

### Safety

COQOS Micro Hypervisor and Inter-VM communication are developed according to the ISO26262 standard as a SEooC (safety element out of context), which can be used in an ASIL-D based application

### Support

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

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