



**COQOS Hypervisor for real-time processors 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**

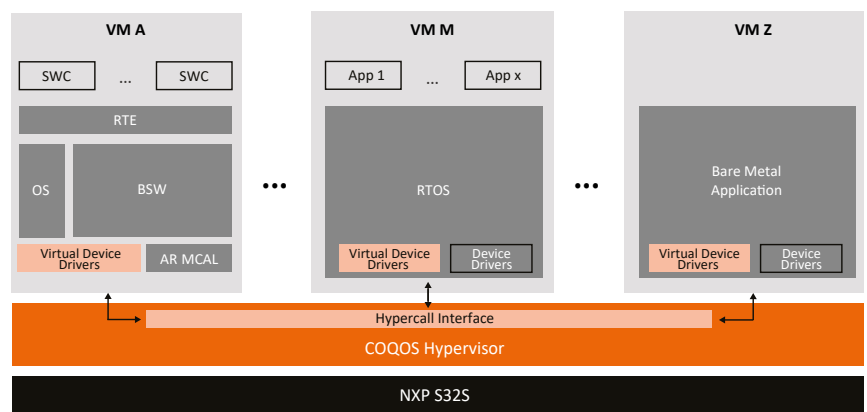
- Hardware assisted virtualization
- RTOS agnostic (e.g. AUTOSAR stacks from different vendors)
- Freedom from interference for virtual machines
- Static configuration
- Symmetric multi-processing for virtual machines
- Support for multi-core architectures
- VM update
- VM supervision and restart
- Support 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 Controller

**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



■ OpenSynergy (Core)   
 ■ OpenSynergy (Optional)   
 ■ Hardware Supplier   
 ■ SW Supplier (Tier-1, OEM)

## Supported Architectures

- Arm Cortex®-R52

## Supported SoC

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

## Supported Hardware upon Request

- 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 Hypervisor for real-time processors allows multiple virtual machines to run on a single physical core

- COQOS Hypervisor for real-time processors 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 Hypervisor for real-time processors supports:

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

## Shared devices

- COQOS Hypervisor for real-time processors 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 Hypervisor for real-time processors is compatible with the AUTOSAR methodology for seamless integration of AUTOSAR software.

## Safety

COQOS Hypervisor for real-time processors is developed according to the ISO 26262 standard and can be used up to ASIL-D based applications.

## Support

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

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