Virtual Open Systems

VOSYS IoT

Enabling mixed-criticality IoT Edge

VOSYSIoT is an end-to-end IoT software stack product which allows to execute isolated real-time, security and safety related applications on a single hardware platform, enabling consolidation and lowering infrastructure costs.

Features

▶ Strong isolation of safety critical applications

▶ Resilient software architecture

▶ Compatible with all *Arm Cortex-A* processors

▶ Secured shared memory between the two worlds

▶ Secured shared network communication between the two worlds

▶ Critical software components are functional safety certified

▶ Modular system design

▶ Protected against *Spectre* and *Meltdown* vulnerabilities

Benefits

▶ System cost reduction, consolidation of two (or more) OS

▶ System extension by optional open-source virtualization layer

▶ Bare-metal performance, no overhead

▶ Fully customizable (additionnal software components, peripheral sharing, etc.)

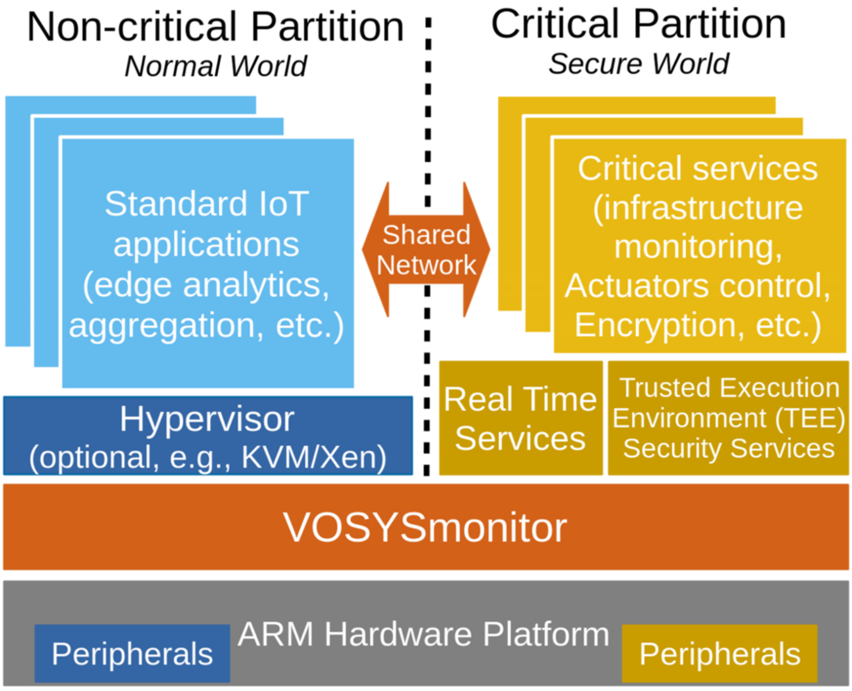
▶ Compatible with your legacy OS

The Challenge

Modern IoT systems need to treat critical and sensitive data in secure and safety critical environments. Today the processing of critical and non-critical data requires to duplicate resources to properly isolate them and guarantee security and safety. In this context, consolidation is becoming crucial to keep cost under control.

The Solution

VOSYSIoT software stack enables the co-execution, on a single hardware platform, of applications and operating systems with different levels of criticality. Moreover, VOSYSIoT guarantees the best isolation thanks to its certifiable secure software VOSYSmonitor, which leverages on the Arm TrustZone hardware security extensions.



Non-critical Partition

Normal World

Critical Partition

Secure World

Standard IoT applications (edge analytics, aggregation, etc.)

Shared Network

Critical services (infrastructure monitoring, Actuators control, Encryption, etc.)

Hypervisor (optional, e.g., KVM/Xen)

Real Time Services

Trusted Execution Environment (TEE) Security Services

VOSYSmonitor

Peripherals

ARM Hardware Platform

Peripherals

Use case examples

Industry 4.0, Smart Energy

Real-time monitoring, actuator control, automation, etc.

Medical

Health monitoring, smart hospital/trolley, data encryption, etc.

Smart City/Building

Energy and infrastructure monitoring, edge computing, neutral host, etc.

Intelligent Transport Systems

Vehicle-to-everything, drones, public transportation gateway, etc.

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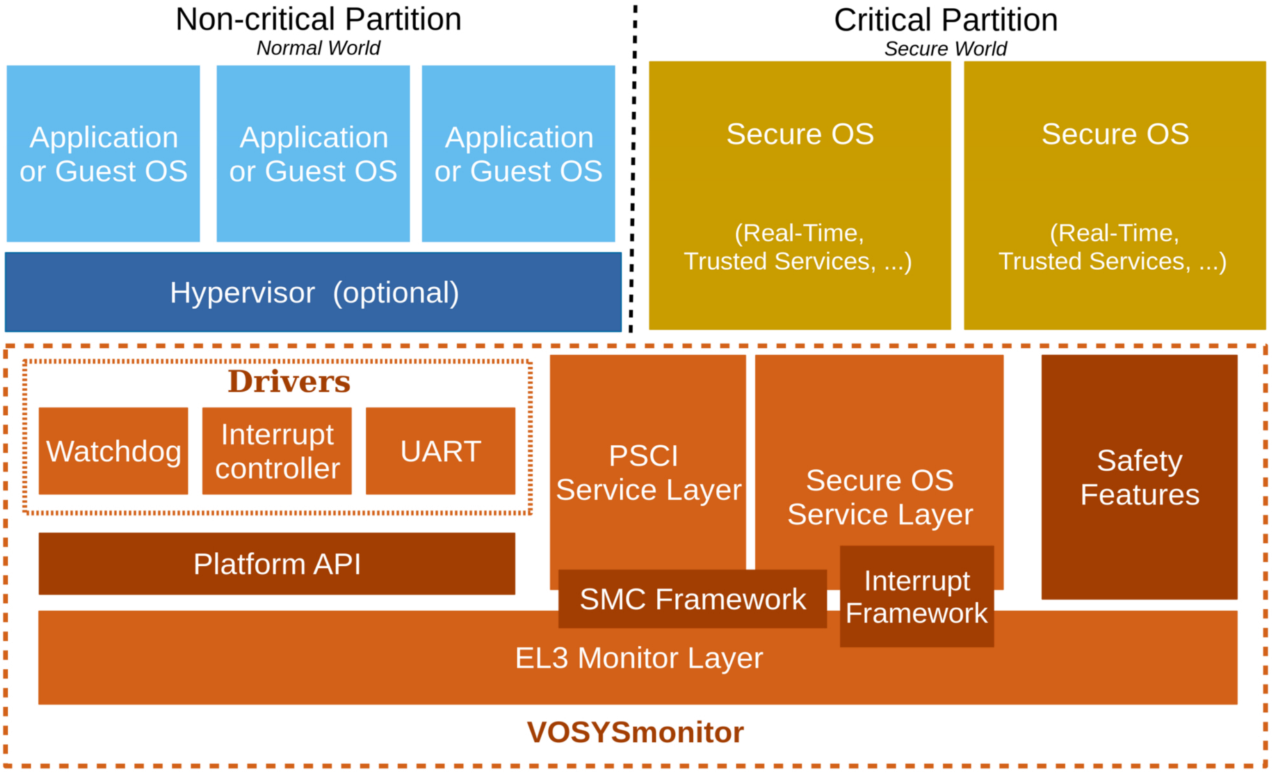
Virtual Open Systems

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

VOSYSmonitor software product

Low latency certified system partitioner for mixed criticality systems

VOSYSmonitor is a software system partitioner which enables consolidation of multiple applications with different levels of criticality on a single multi-core hardware platform. VOSYSmonitor product is proposed as a software binary allowing the co-execution of critical and non-critical operating systems. To support more complex use-cases, VOSYSmonitor can execute multiple virtual machines in the Non-critical Partition by the addition of an optional open-source hypervisor.



The isolation provided by VOSYSmonitor, which is executed in the highest exception level of the ARM processors, is stronger than any traditional virtualization solution. Indeed, other hypervisors can suffer from security issues and performance penalties. By contrast, leveraging ARM TrustZone, VOSYSmonitor provides a system-wide security approach which isolates processor cores, bus, memory and peripherals in two separated compartments, ensuring the highest protection and native performance.

VOSYSmonitor hardware target

- ARMv8-A and ARMv7 processors with ARM TrustZone (e.g., Cortex-A57/A53/A72, etc.)
- Access to secure monitor mode (EL3)
- TrustZone enabled Interrupt controller and security IP

VOSYSmonitor is an ISO 26262 functional safety certified software system partitioner with boot time smaller than 60µs and with average RTOS interrupt latency below 1µs.

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