



Industry Solution

Automotive

MEET FUTURE MOBILITY DEMANDS WHILE MAINTAINING SAFETY – Car manufacturers have to integrate a flood of electronic components, reduce development and production costs, and respond quickly to new demands while ensuring functional Safety. The ISO 26262 certification increases the needs for intelligently extensible system architectures.

PIKEOS HYPERVISOR TO MANAGE COMPLEXITY

The PikeOS Hypervisor provides a modular system architecture that integrates multiple applications on a single hardware. PikeOS is a full RTOS, virtualization and partitioning system designed to support highest requirements of automotive applications. It consists of a small, certifiable microkernel, upon which the hypervisor provides separated partitions for broad resource and function needs in safe individual partitions.

Common Automotive applications range from non-critical infotainment systems to highly critical control functions. That is why PikeOS provides a broad variety of GuestOSs: From POSIX and Linux to Android and AUTOSAR. Thanks to strict separation technology, applications of different Security levels, different criticality levels, real-time or non-real-time can run concurrently in a mixed-critical environment on a single standard hardware.

CERTIFICATION SUCCESS INCLUDED

When ISO 26262 certification is required in Automotive applications, PikeOS is the best choice for three reasons: Small size, criticality partitioning, and unparalleled company support for the certification process.

Purpose-built to meet highest certification requirements, PikeOS is implemented with a partitioning concept which enables the certification of applications of various levels of criticality to their individual Safety levels while running securely separated on one hardware platform.

Equally important for certification is a competent and reliable partner when it comes to planning, documentation, verification, validation and quality assurance processes. For over 25 years, SYSGO supports its customers with certification expertise, training workshops as well as full process artifacts and source code kits for system certification activities.

“We have developed a virtualization technology for our V850 architecture to control multiple systems on a single CPU core with no mutual interference, allowing high speed and composite control for industrial machinery and automotive, where real-time is essential. SYSGO enables us to achieve a scalable CPU architecture with virtualization technology that supports our customers in building flexible development systems.”

Michiya Nakamura
General Mngr., 1st MCU Business Division at Renesas

WHY PIKEOS FOR AUTOMOTIVE

Today, Automotive applications go beyond the actual vehicle. In particular, reliable communication is needed to ensure smooth mobility. The use of PikeOS resolves a wide array of challenges at the same time:

1. Reduced complexity saves weight, space and cabling: PikeOS enables integration of a large number of electronic devices onto a single hardware platform.
2. Secure communication protects subsystems: Strict separation of applications into secure partitions allows authorized access only and avoids mutual interference.
3. Integrated Safety reduces certification costs: Applications of various levels of criticality and Security are safely separated from each other in distinct partitions and certified separately.
4. Extreme flexibility provides independence from suppliers in the choice of hardware and software: PikeOS supports a broad range of hardware architectures and provides interfaces for a wide array of GuestOSs. Adding other architectures and interfaces (incl. legacy code) is easy.
4. Multiple Independent Levels of Security (MILS) architecture: The PikeOS separation kernel controls communications and provides protection against malicious attacks. The PikeOS hypervisor is certified according to Common Criteria EAL3+. Read more → www.sysgo.com/common-criteria
5. Expandability saves costs in downstream incremental development: Partitions are simple to configure in the development phase and can even be supplemented and expanded with new applications after entry into service.

INDUSTRY ECOSYSTEM AND COLLABORATIONS

Automotive projects use a wide range of software and hardware products. Flawless interaction between the components used is vital to the success of complex projects. For this reason, we have been working in close collaboration with the leading global automotive suppliers for many years. We support a wide selection of hardware platforms with

PIKEOS GUEST OS

Partitions can host different GuestOSs, run-time environments (RTE) and APIs, which run in non-privileged mode, on top of the PikeOS Hypervisor.

Automotive GuestOSs include:

- Android · AUTOSAR
- GENIVI · Linux · PikeOS Native · OSEK · POSIX

AUTOMOTIVE ARCHITECTURES (SINGLE & MULTI-CORE)

- ARM · V850 · PowerPC
- x86

THE ECOSYSTEM

- AbsInt · Aicas · Atego
- Esterel · Freescale
- Infineon · Kontron
- Lauterbach · MEN
- NEC · OpenSynergy
- PrismTech · Rapita
- Renesas · Symtavision
- Systemel · TTTech
- Vector Software · Xilinx

MORE CUSTOMERS AND PARTNERS

- Audi · BMW · Bosch
- Continental · Daimler
- Delphi · Denso
- EB Automotive · ESG
- Funkwerk Dabendorf
- PSA · SAIC · TÜV SÜD Automotive · VDO Dayton

our software products and have developed interfaces for code generators and analysis tools that are constantly being expanded.

PIKEOS IN ACTION: ACTROS TRAFFIC CONTROL SYSTEM

Swarco (formerly Signalbau Huber) selected PikeOS for its traffic control system ACTROS to control highly complex traffic situations in centralized networks. Developers used PikeOS partitioning to consolidate several boards onto a single hardware platform while successfully separating applications of varying criticality. PikeOS virtualization allowed reuse of legacy applications, minimize porting and migration efforts. All future development will be based on PikeOS-supported standards like POSIX, Linux and Java.

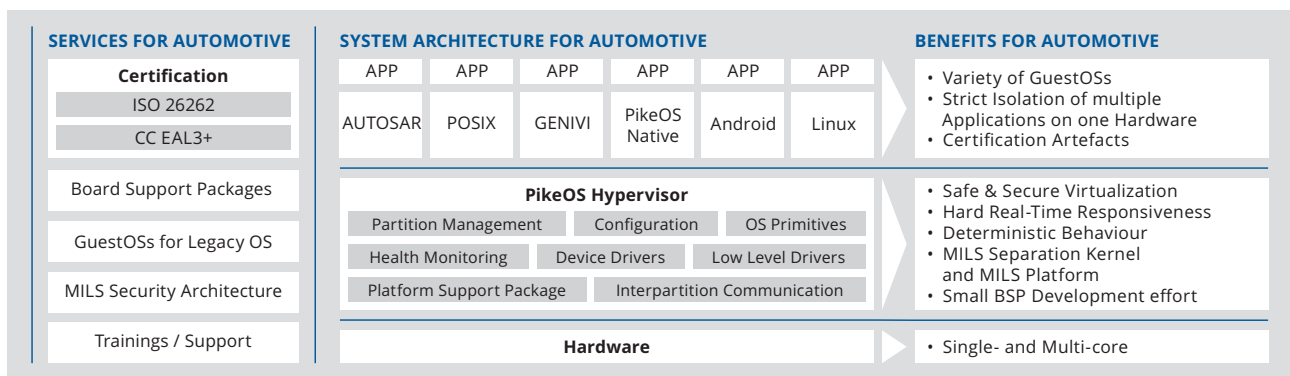


Figure 1: Scheme of an Automotive System with PikeOS Architecture

Founded in 1991, SYSGO became a trusted advisor for Embedded Operating Systems and is the European leader in hypervisor-based OS technology offering worldwide product life cycle support. We are well positioned to meet customer needs in all industries and offer tailor-made solutions with highest expectations in Safety & Security. More information at www.sysgo.com/automotive