

TÜV SÜD confirms: Linux-based Instrument Cluster concept is suitable for safe developments

OpenSynergy presents new Safety Mechanism

Berlin, December 3, 2018. OpenSynergy has developed a safety concept that makes a Linux-based Instrument Cluster safe. Although Linux by itself is not a safe operating system yet, OpenSynergy has developed a guard mechanism that ensures that the safety relevant telltales on digital instrument clusters are correctly displayed. TÜV SÜD has now confirmed that this safety concept satisfies the safety requirements related to correct rendering telltales up to ISO 26262 ASIL-B.

An instrument cluster displays and runs applications that read information from the vehicle busses and translate it into digitally rendered dials and icons. Important parts on the instrument cluster are the telltales, that alert the driver of a malfunction in the car (e.g. a problem detected in the braking) or a dangerous driving situation (e.g. coming from a driver assistance system). Most OEMs will give this function an ASIL level of QM, A or B.

Safety relevant telltales have to be displayed in a certain period of time, when the instrument cluster receives the data from the in-vehicle network to do so. If the telltales are not shown although they should be, the driver will not know that his instrument cluster is not functioning correctly. This is an unsafe situation. Therefore, the instrument cluster must satisfy the safety requirement related to rendering telltales up to ISO 26262 ASIL-B.

OpenSynergy proposes to use Linux to render the digital instrument cluster. This takes maximal advantage of the open source eco-system and the operating system that the SoC vendors support best. Thousands of experts are working on improving Linux constantly to enable the automotive industry to rapidly develop, with low costs even more dependable products.

Although Linux is an ideal operating system to render the instrument cluster, it cannot provide the required safety (ASIL) level by itself. For this reason, OpenSynergy has developed a safety concept for digital instrument clusters to address the ASIL-B safety requirements. This safeguard mechanism called IC-Guard is based on OpenSynergy's COQOS Hypervisor SDK. The core technology of COQOS Hypervisor SDK is the hypervisor. This Type-1 hypervisor has been developed according to ISO 26262 requirements. It creates virtual machines (VMs) that provide freedom from interference between systems integrated in the VMs, so that functions with different requirements regarding real-time behavior and functional safety can run simultaneously on a single SoC.

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The IC-Guard operates in such a VM. It verifies that the telltales rendered in the Linux VM are displayed correctly on the instrument cluster. The in-vehicle busses supply the necessary information. In the exceptional case that telltales are not displayed as expected, indicating that there might be a problem inside the Linux-based VM, the IC-guard will immediately put the cockpit controller in a safe state. The system then initiates OEM-specific measures such as restarting the VM or turning off the display backlight.

TÜV SÜD has now validated that this safety concept is appropriate to reach the stated safety requirements up to ASIL-B. This confirmation is documented in Technical Report of Functional Safety by TÜV SÜD Rail GmbH, Automotive department.

OpenSynergy has developed the proposed architecture based on many years of experience using hypervisors in automotive and bringing cockpit controllers into mass production.

About OpenSynergy

OpenSynergy provides embedded software products for the next generation of vehicles. Our hypervisor and communication products pave the way for an integrated driving experience.

The virtualization platform COQOS Hypervisor SDK supports the convergence of software-based vehicle functions with different requirements on safety and security. It is designed for multi-display cockpit controllers, smart antennae or powerful domain controllers using a mix of AUTOSAR technology and open solutions, such as Linux and Android.

OpenSynergy's communication stacks allow the wireless connection between the car and the cloud or between the car and mobile devices. OpenSynergy's Blue SDK is the reference bluetooth implementation for many OEMs around the world.

Our engineering services complement the products.

Read more on www.opensynergy.com

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