

GlobalLogic Vehicle Cockpit Accelerator

A virtual platform whose hybrid architecture enables automotive businesses to develop customizable IVI+ instrument cluster systems up to 20% faster



Develop innovative cockpit solutions without compromising on functionality, security, or reliability

GlobalLogic's Vehicle Cockpit Accelerator leverages our deep expertise in telecommunication units (TCUs), instrumental clusters, and in-vehicle infotainment (IVI) systems to help automotive businesses quickly and cost-effectively develop powerful, ISO 26262 compliant cockpit solutions.

The accelerator's hypervisor-based platform enables multiple operating systems to run on a single system on a chip (SoC) with resources sharing (e.g., CPUs, GPUs, and block/net devices). It uses an Android-based IVI system, a Linux-based instrumental cluster, and a safety island hosted by a dedicated Cortex-R7 MCU (driven by FreeRTOS) to manage safety critical tasks. It also includes innovative UX features to help businesses design driving experiences that are just as engaging as they are functional.

In-Vehicle Infotainment

Heads-Up Display

Instrumental Cluster

The Vehicle Cockpit Accelerator includes a demonstration kit that helps businesses visualize how their solution will work across various automotive use-cases, from the core functionality to the user experience.



Emulator Unit

GlobalLogic Vehicle Cockpit Accelerator



Technology Details

Technology Stack

- Hypervisor: Xen 4.9 Hypervisor
- Guest OS #1: Android 8.1 (IVI)
- Guest OS #2: Yocto-based, fully customized Linux distribution (instrumental cluster)
- Dedicated safety island: Coretex-R7 (ASIL-B compliant RTOS)
- TCU with HUD functionality
- WiFi 2.4 and 5 GHz
- Bluetooth and BLE

Additional Features

- Navigation application
- Ultra-fast rear view camera (RVC) (<1s from power-on)
- Completely switch off instrument cluster in emergency with RVC-enabled functionality
- Parktronic & ultrasonic parking assist functionality
- Digital cluster and safety critical clusters
- Dedicated communication unit

Renesas Gen3 Platform

The Vehicle Cockpit Accelerator is based on the Renesas Gen3 platform and uses the R-Car Starter Kit Premier as the target board. Although GlobalLogic is hardware agnostic and can easily leverage hardware from other vendors (e.g., Qualcomm, N-Vidia, TI, Mediatek, etc.), we selected the R-Car platform because its extraordinary computation power allows seamless resource sharing between different operating systems. Furthermore, since all parts of the platform's R-Car SoC are ready for virtualization, the accelerator's hypervisor can work in a native environment and ensure maximum stability.

Xen Hypervisor

By leveraging an open source Xen hypervisor (versus independent digital clusters and IVIs), the accelerator enables businesses to decrease their final bill of materials (BOM), as well as reduce dependencies and limitations on guest operating systems and drivers. The accelerator interacts with hypervisor-based domains via a Virtio interface and hardware mailboxes.

Dedicated Connectivity Chip

Bluetooth and WiFi (2.4 and 5GHz) hardware modules that are located on separate boards can be shared with and managed by the Android IVI. Driver information can also be passed from the Android IVI, Linux cluster, and CR7 to the HUD display behind a driver's eyes.

Custom Drivers

GlobalLogic developed multiple drivers to share peripheral devices across the system, such as:

- Shared GPU that enables rendering for 2D/3D scenes in each guest
- Paravirtualized audio functionality that enables each domain to play sounds or use voice assistance
- CAN-Pipe-to-Guest-Domain that provides bidirectional interaction between CAN bus and guest domains
- CAN-to-HID functionality that forwards CAN bus events to the Android IVI with regular HID event representation (enables integration of events like volume level changes without modifying the Android OS.)