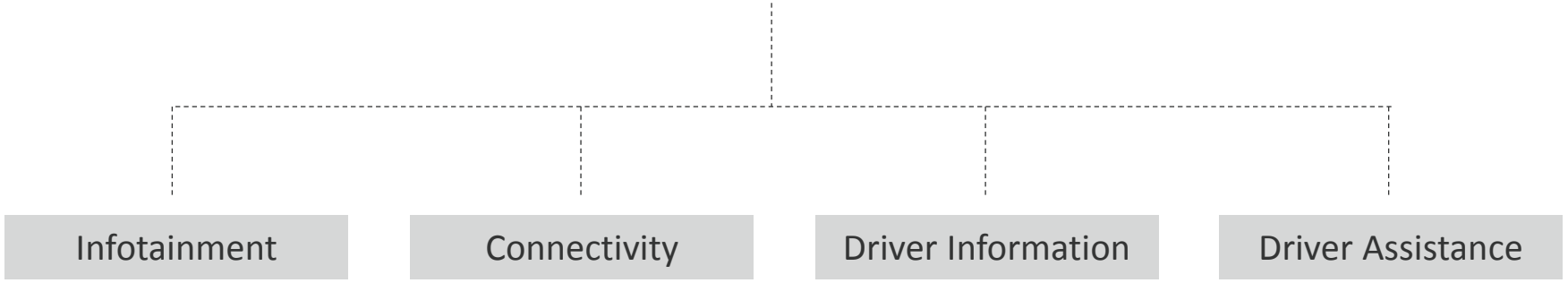
OPENSYNERGY

Safe and Seamless Integration of Tegra into the In-Vehicle Network

Stefaan Sonck Thiebaut, OpenSynergy

OpenSynergy is a global provider of software solutions for embedded automotive systems.

OpenSynergy's core product portfolio consists of the key software components necessary to create efficient automotive solutions in the areas of:



OpenSynergy Product Portfolio

Products

COQOS SDK

- The standards-based COQOS software platform is the basic technology underpinning all OpenSynergy solutions

Blue SDK

- Leading independent Bluetooth stack

Voice SDK

- Voice band audio processing

Update SDK

- Versatile software update mechanism for embedded devices

Engineering

Car2Infrastructure

- Model-based telematics stack
- Backend system simulation
- End-to-end security solutions

Development and Integration

- AUTOSAR software systems
- Architecture and software design
- Implementation and integration
- Board support packages

Support

- Standard support for OpenSynergy's products
- Access to product updates

Agenda

OPENSYNERGY

- **Background on automotive trends & challenges**
- **Background on AUTOSAR**
- **Targets of the project**
- **Architecture**
- **Process & tools**
- **Demonstration**
- **Summary**

Automotive Trends & Challenges

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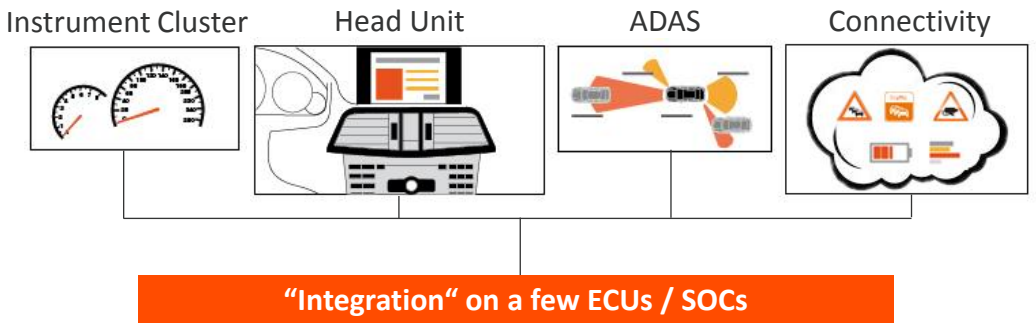
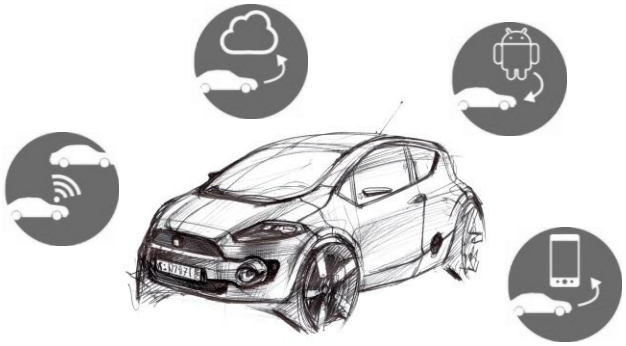
Convergence



Connected Car



Safety & Security

Standardization

AUTOSAR

Bluetooth® SPECIAL INTEREST GROUP

THE LINUX FOUNDATION

GENIVI®

Towards autonomous driving

Possible Software Architecture of Future Automotive ECUs

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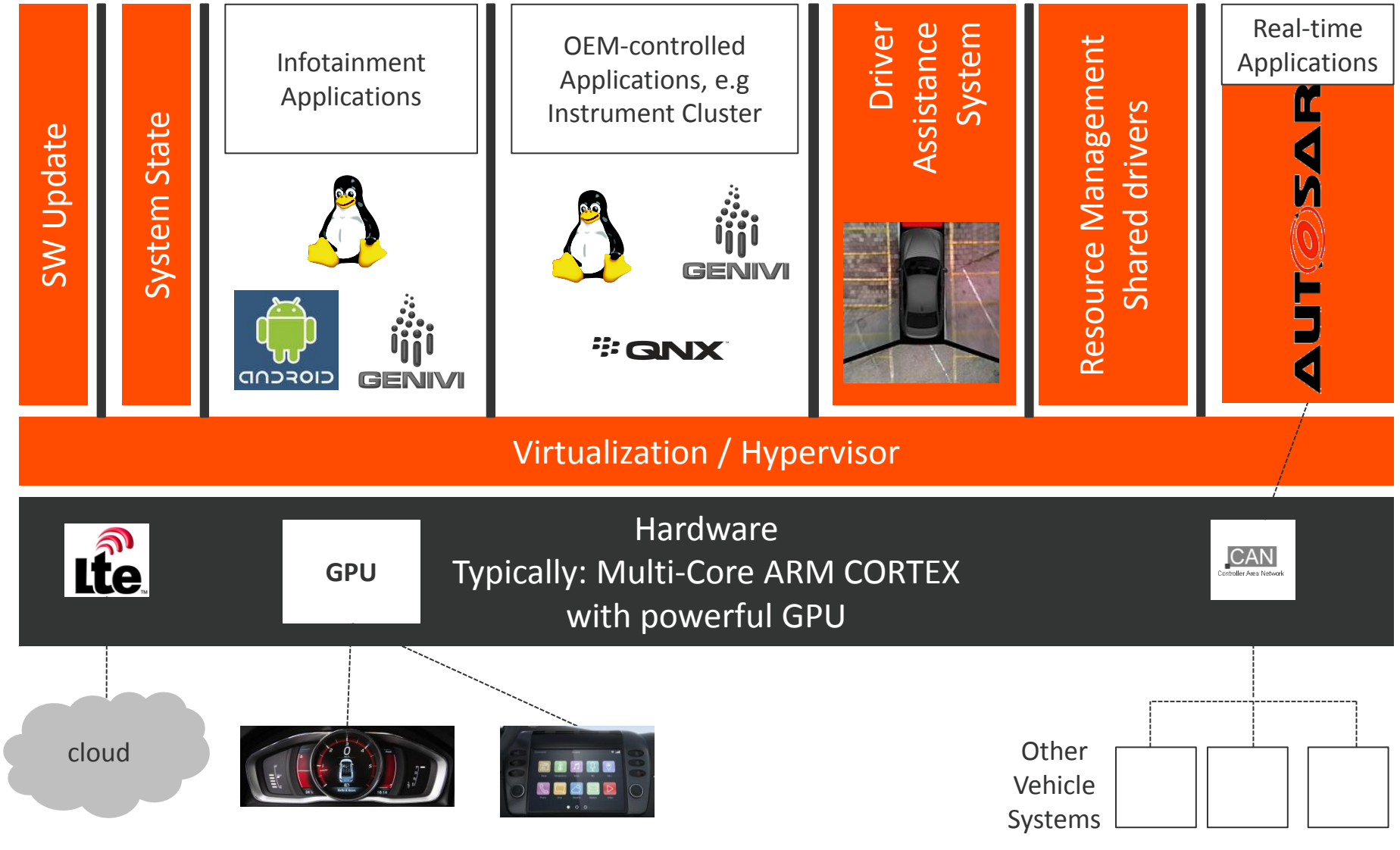

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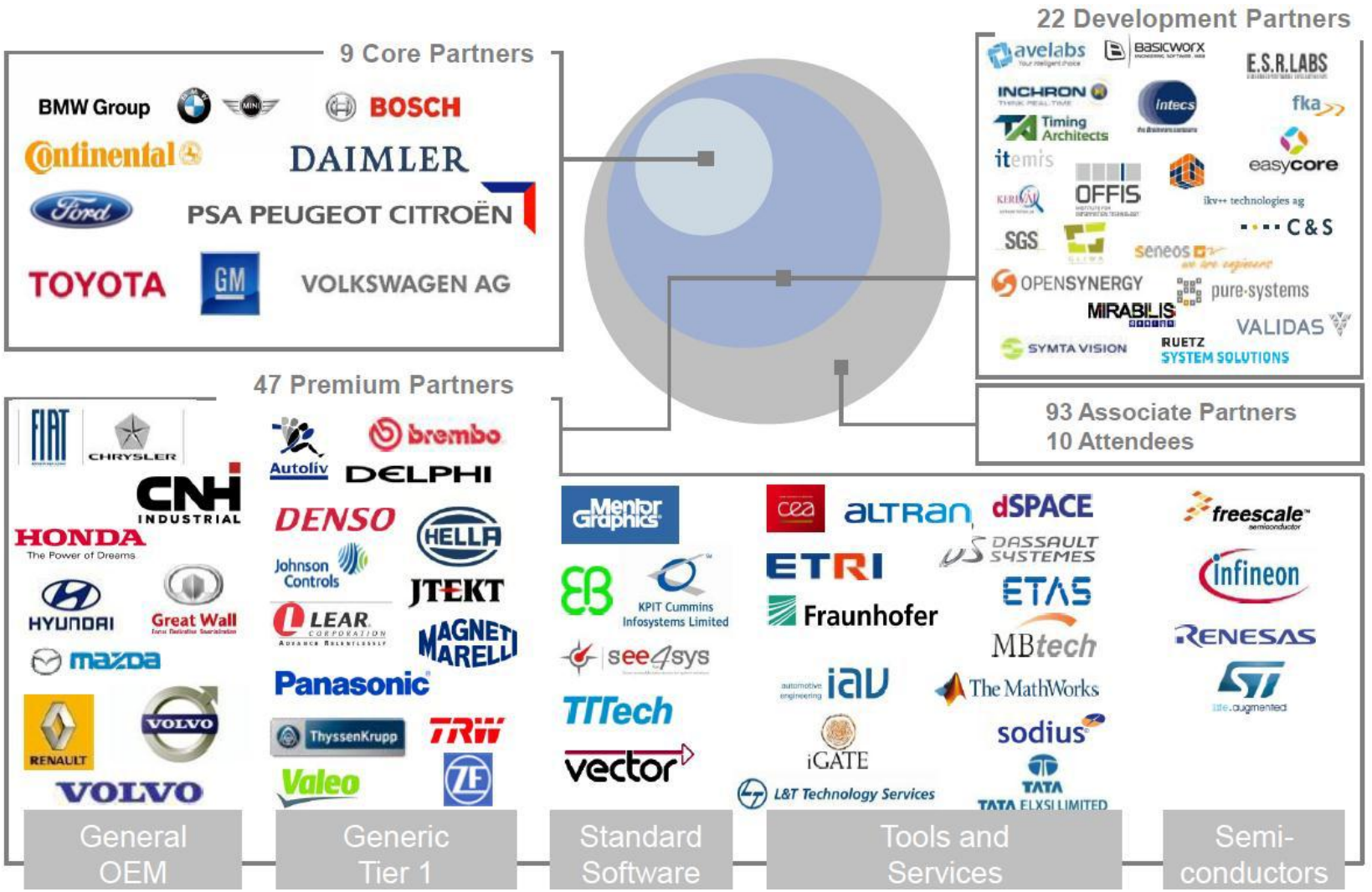
Development Partnership „AUTOSAR“

(www.autosar.org)

Defines the software architecture and development methodology for automotive ECUs.



from „Global Automotive E/E Standard“, Rick Flores, General Motors, presented at Open Architecture Summit, Nov 4, 2014

AUTOSAR Defines

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1. **software architecture of automotive devices**
2. **methodology to configure automotive devices**
3. **application interfaces.**

AUTOSAR Software Architecture

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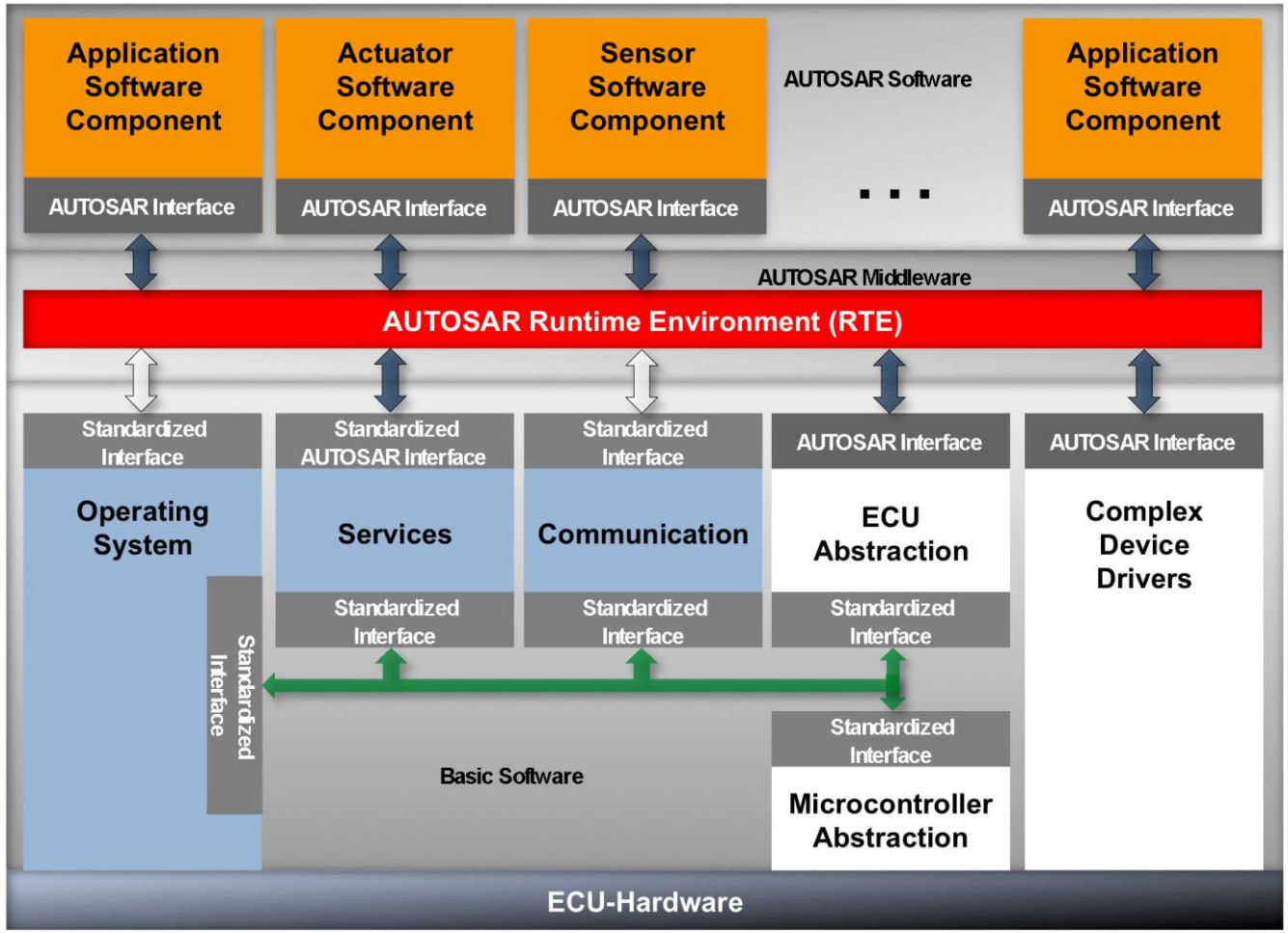
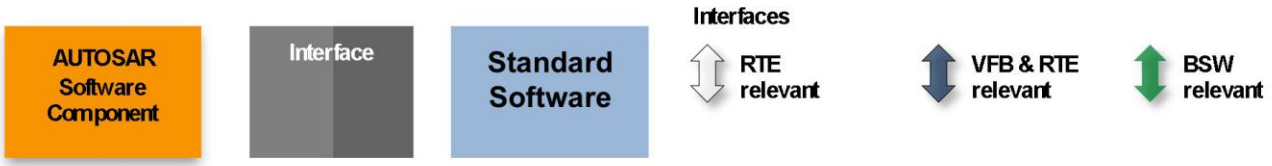
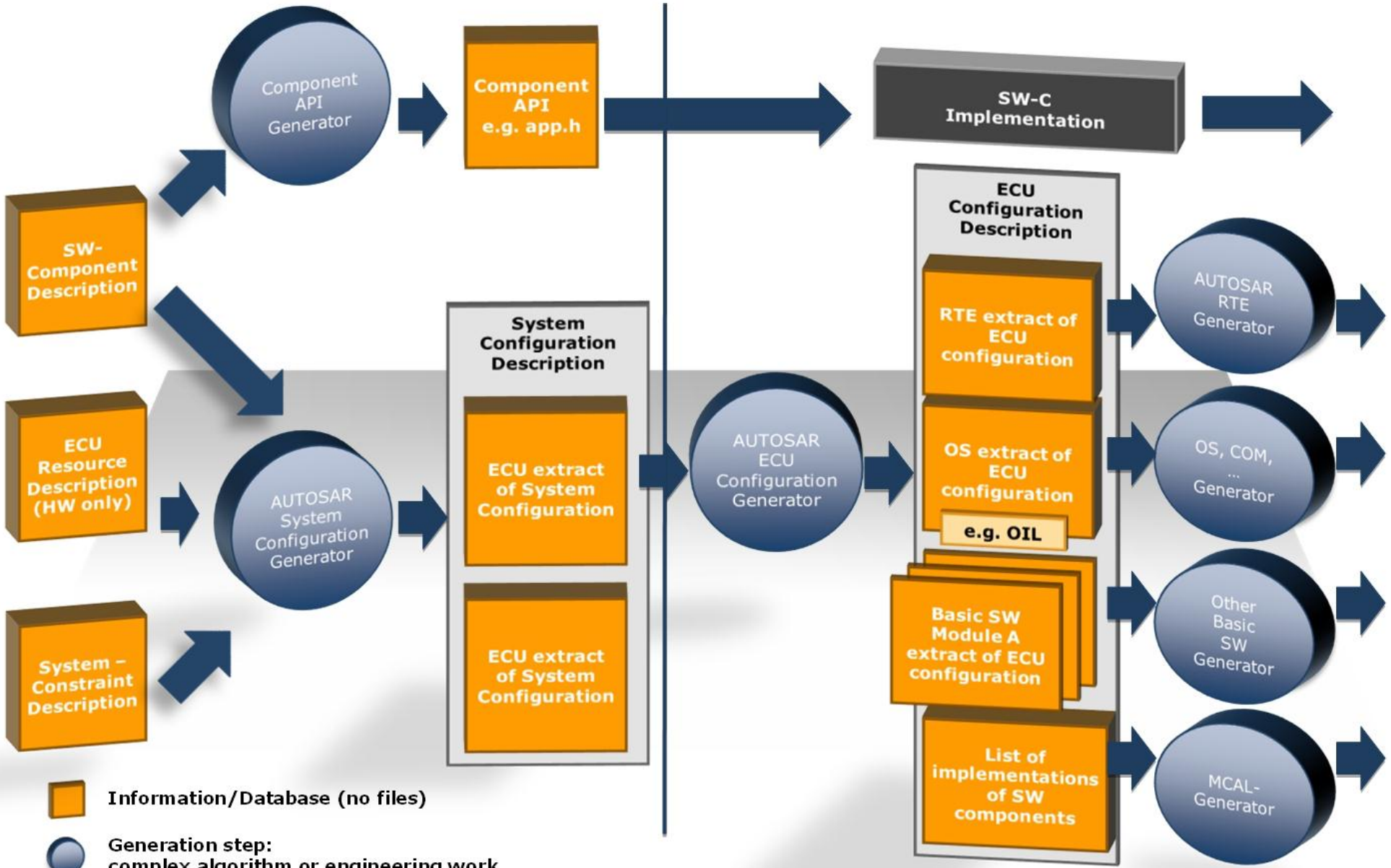




http://www.autosar.org/fileadmin/images/media_pictures/AUTOSAR-components-and-inte.jpg

System per ECU



http://www.autosar.org/fileadmin/images/media_pictures/AUTOSAR-Methodology.jpg

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Targets of the project

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- Facilitate integration of Tegra into the in-vehicle CAN network (through MCU)
- Allow use of AUTOSAR methodology to configure the integration in the vehicle bus
- Control information flow between non-AUTOSAR and AUTOSAR partitions
- Integrate the configuration & build process into the Vibrante SDK
- Make it possible to run AUTOSAR Software-Components (applications) on Tegra
- Allow the integration of OEM-specific AUTOSAR variants on Tegra
- Take advantage of virtualization/hypervisor technology

AUTOSAR

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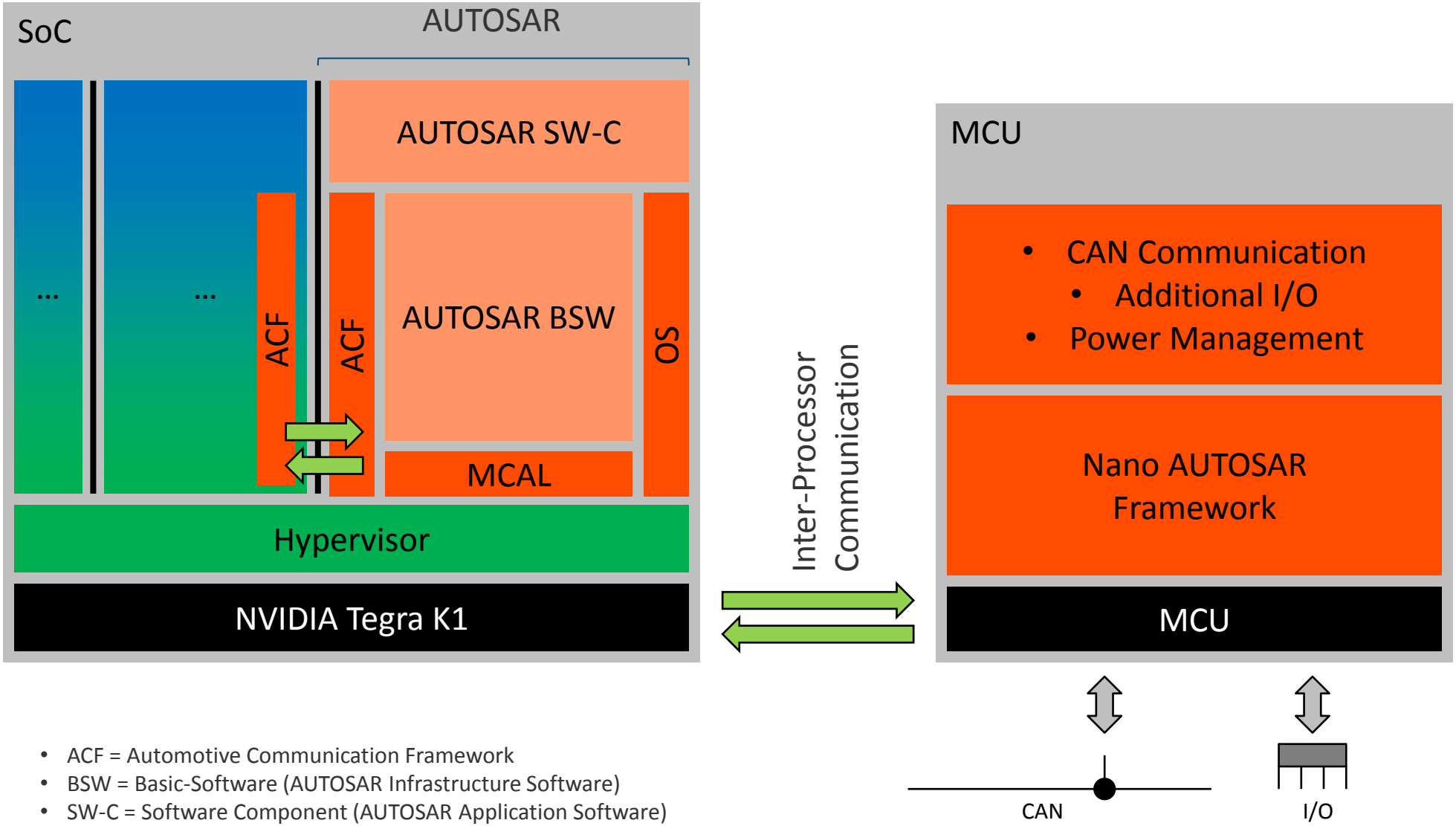
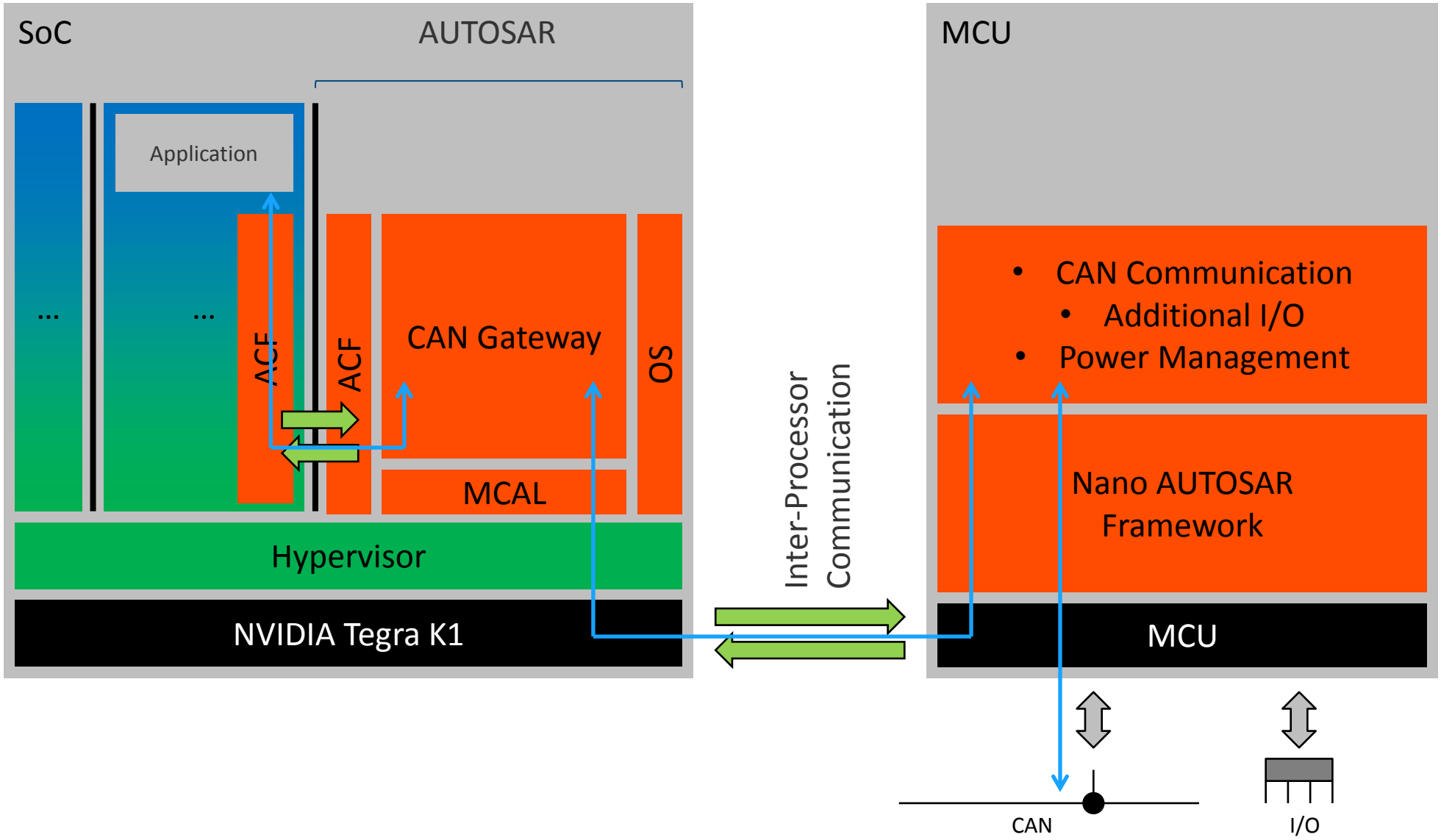
High-Level Concept

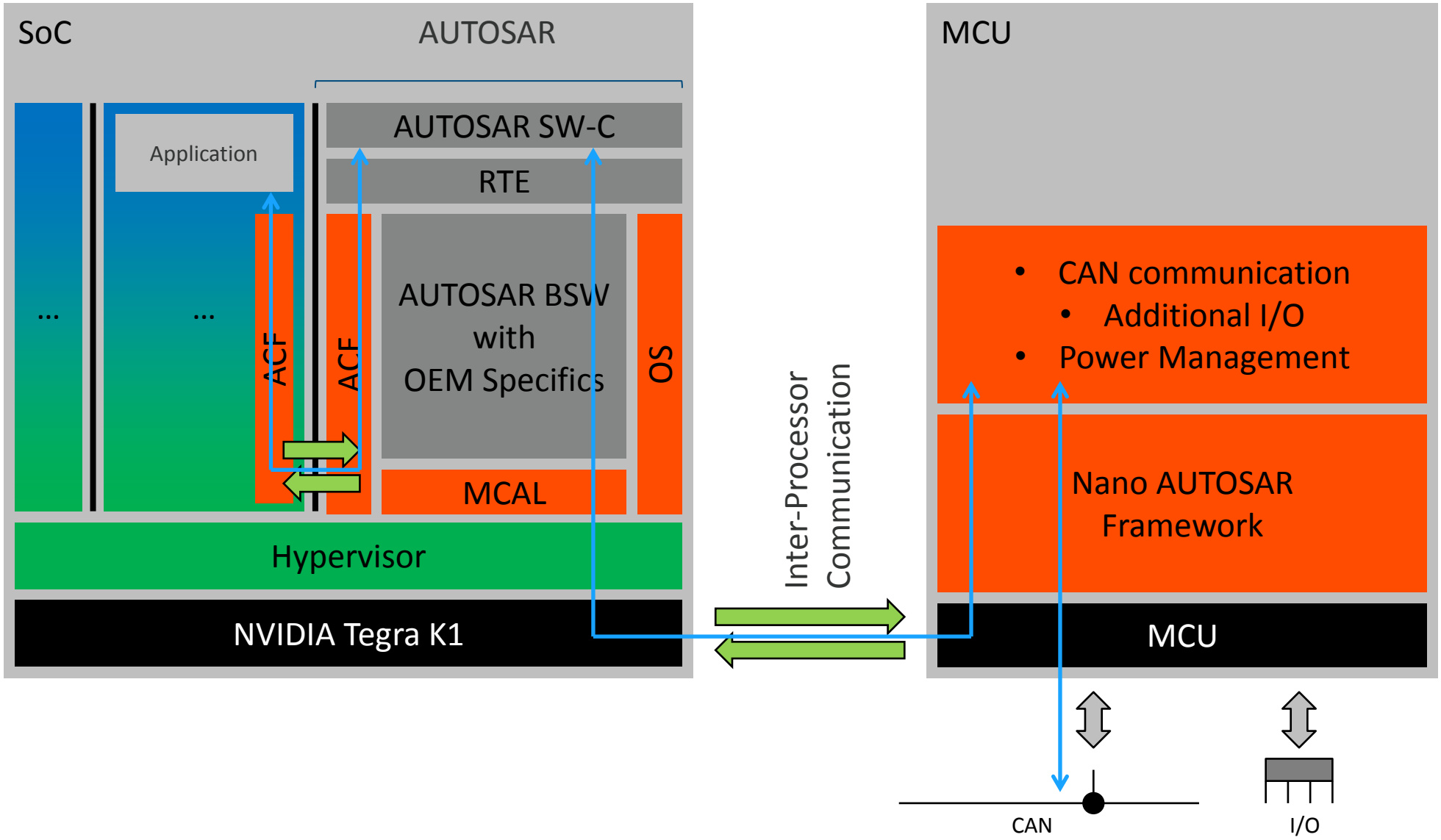


- ACF = Automotive Communication Framework
- BSW = Basic-Software (AUTOSAR Infrastructure Software)
- SW-C = Software Component (AUTOSAR Application Software)
- MCAL = Microcontroller Abstraction Layer (Drivers)
- OS = Operating System

Use Case 1: Communication to Vehicle Bus



Use Case 2: Integration of OEM Applications



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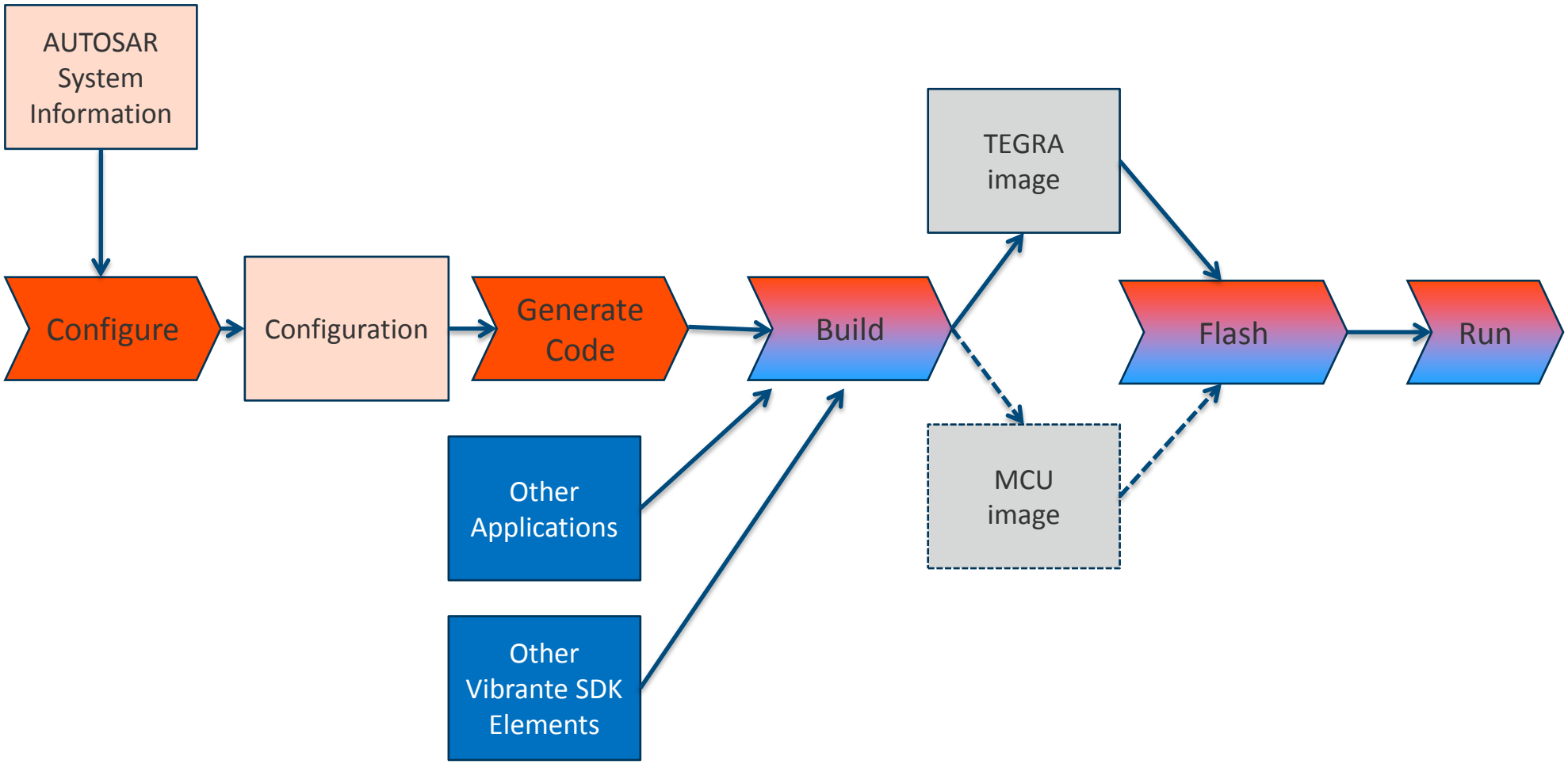
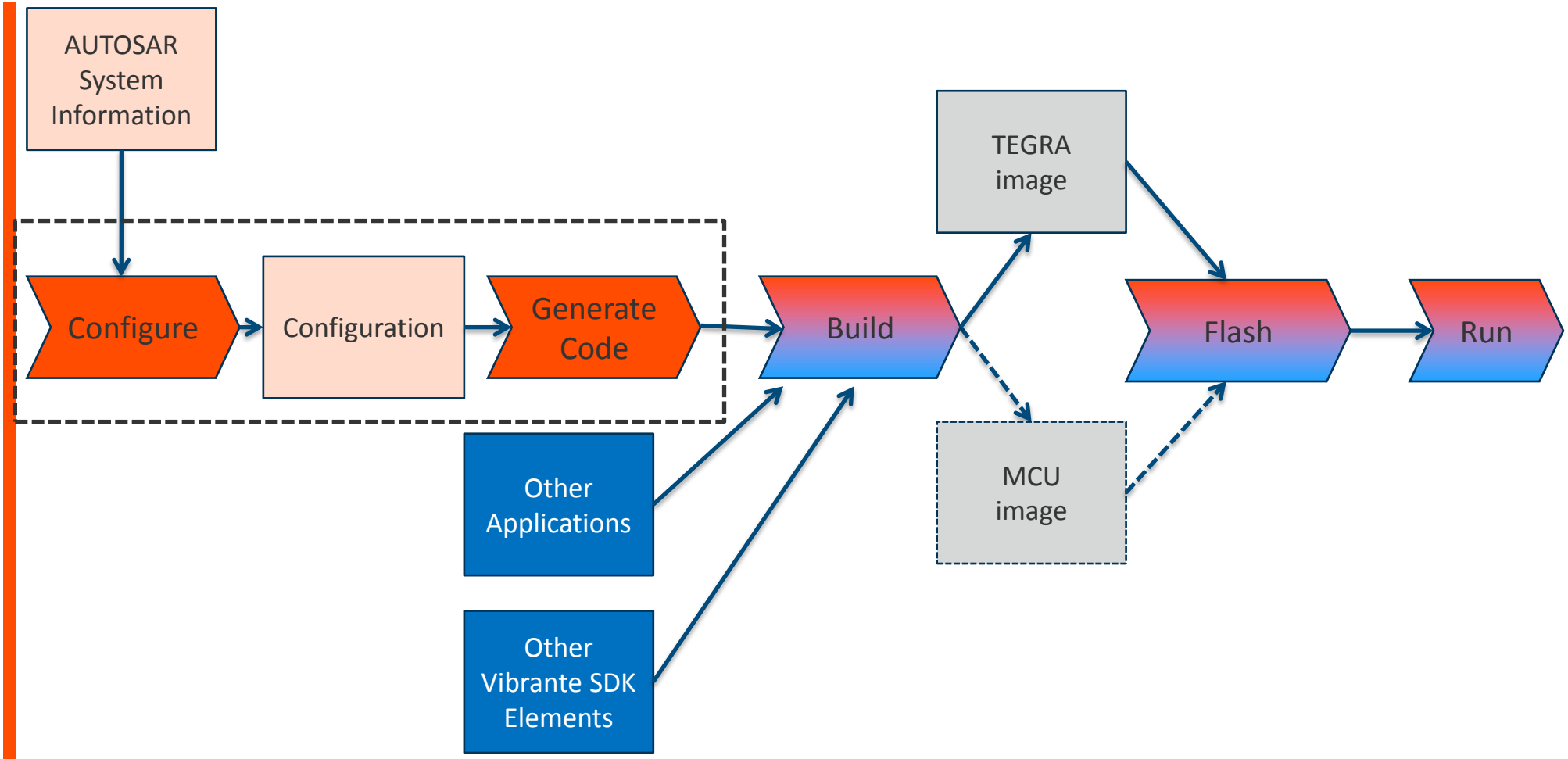
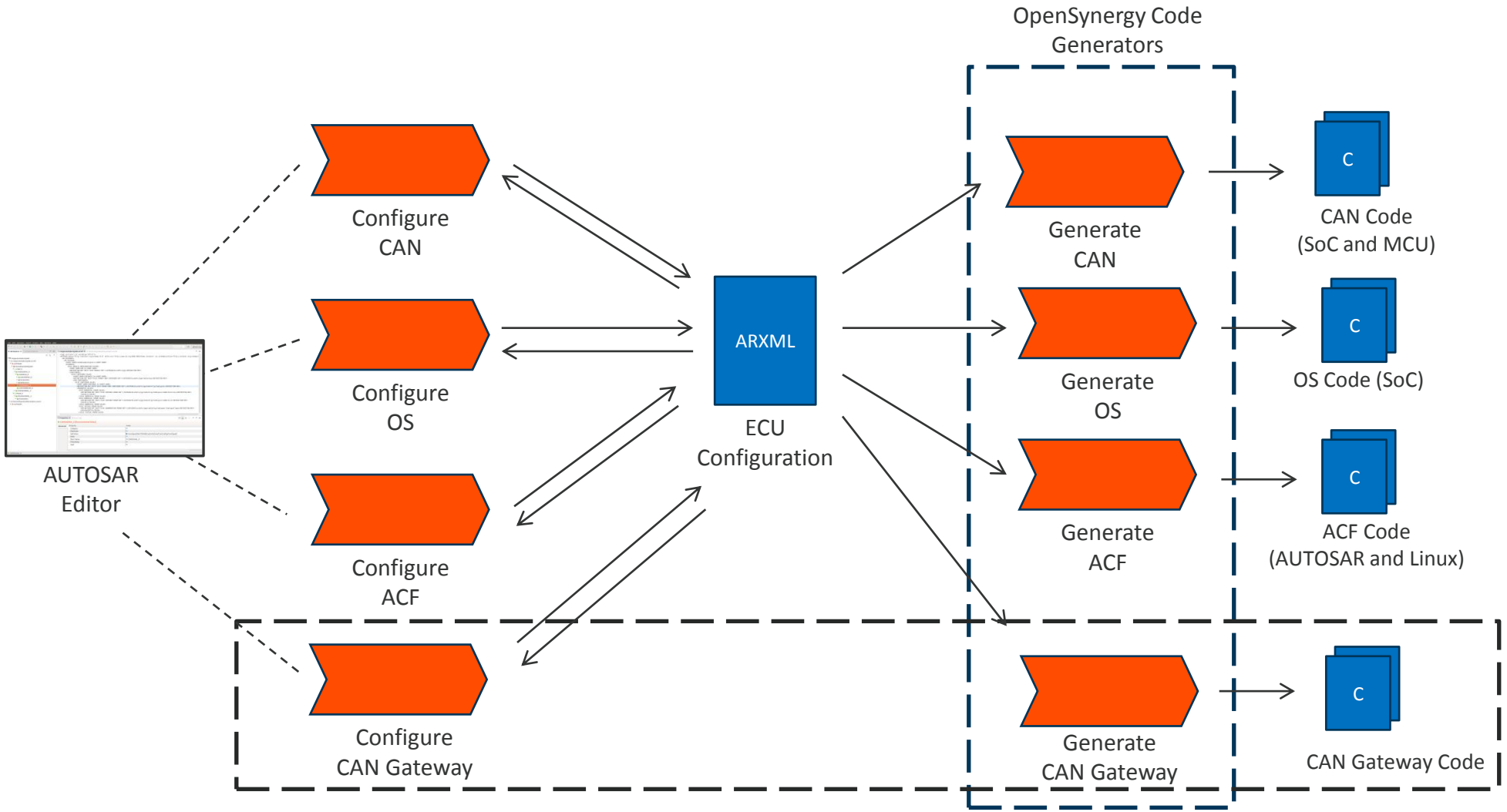
Overall Process



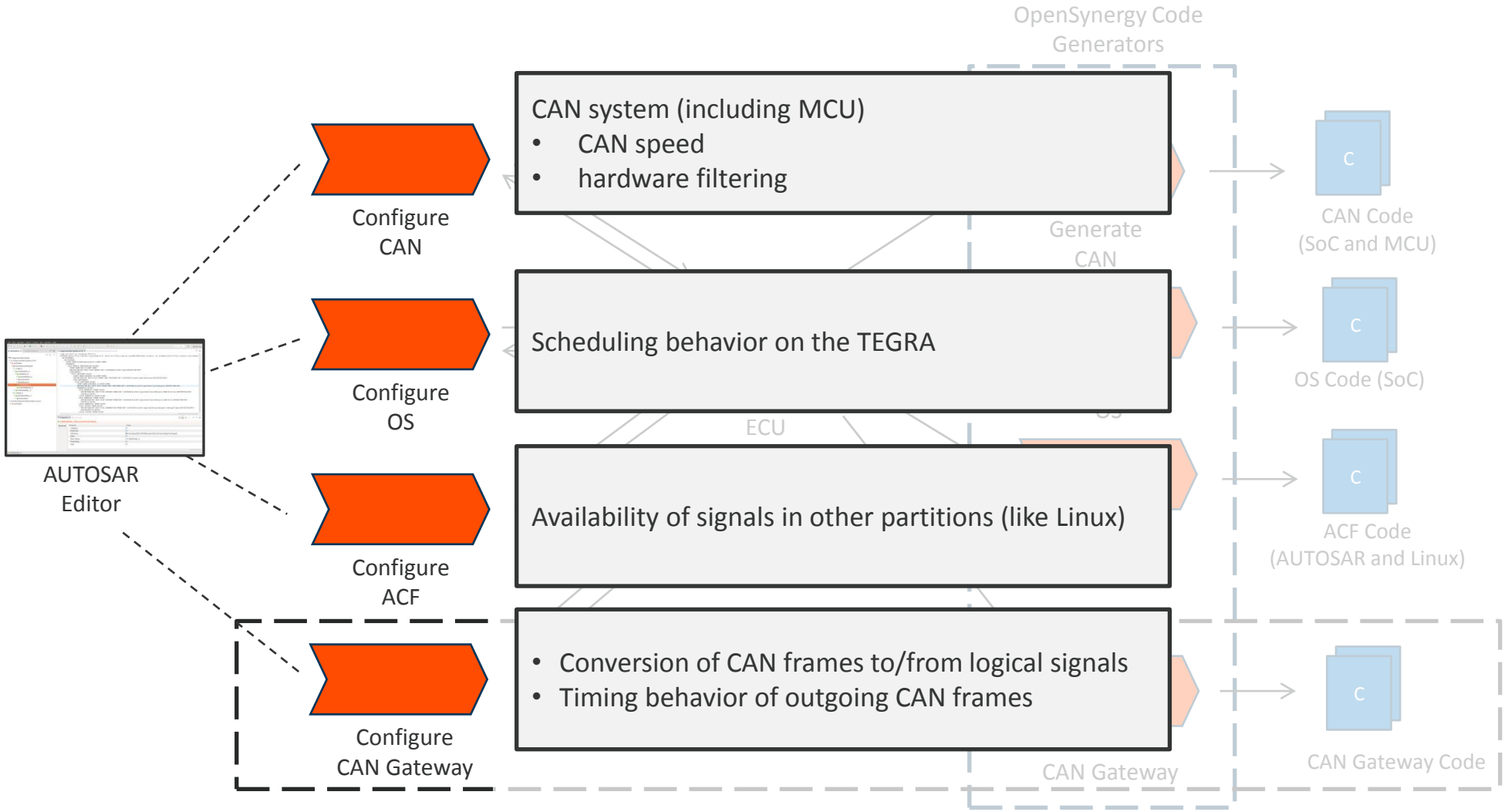
Overall Process



Configuration and Code Generation



Examples of configuration items



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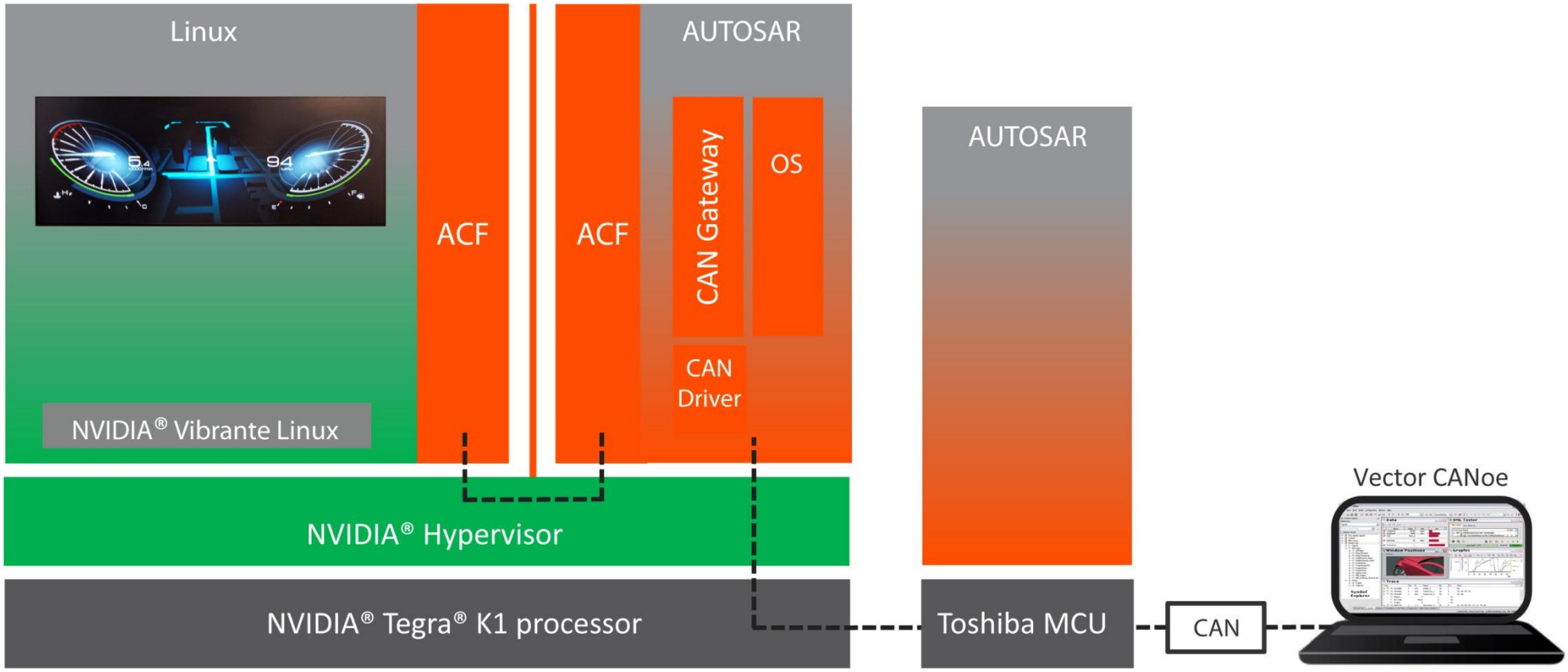
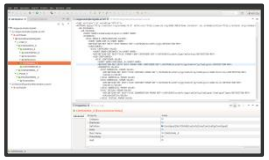
Demonstration



Development Scenario



Example AR ARXML

arxml

Add new CAN MSG and Signal

Updated Configurations

arxml

Generate (command Line)

C/H Files

C/H

Build

Image

Flash

MOVIE

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- **Future versions of Vibrante SDK will include support for AUTOSAR and CAN-integration.**

- **Solution consists of:**
  - MCU running nano-AUTOSAR handling CAN, IO, power management
  - AUTOSAR partition on Tegra handling CAN processing, AUTOSAR basic-software functionality and applications
  - Automotive Communication Framework for communication to non-AUTOSAR operating systems
  - Tooling integrated in Vibrante.

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