AUTOSAR™

# AUTOSAR Introduction

## Part 2 – Current Features in a Nutshell

BMW BOSCH Continental Mercedes Ford gm PSA GROUPE TOYOTA VOLKSWAGEN AKTIENGESELLSCHAFT

# Agenda

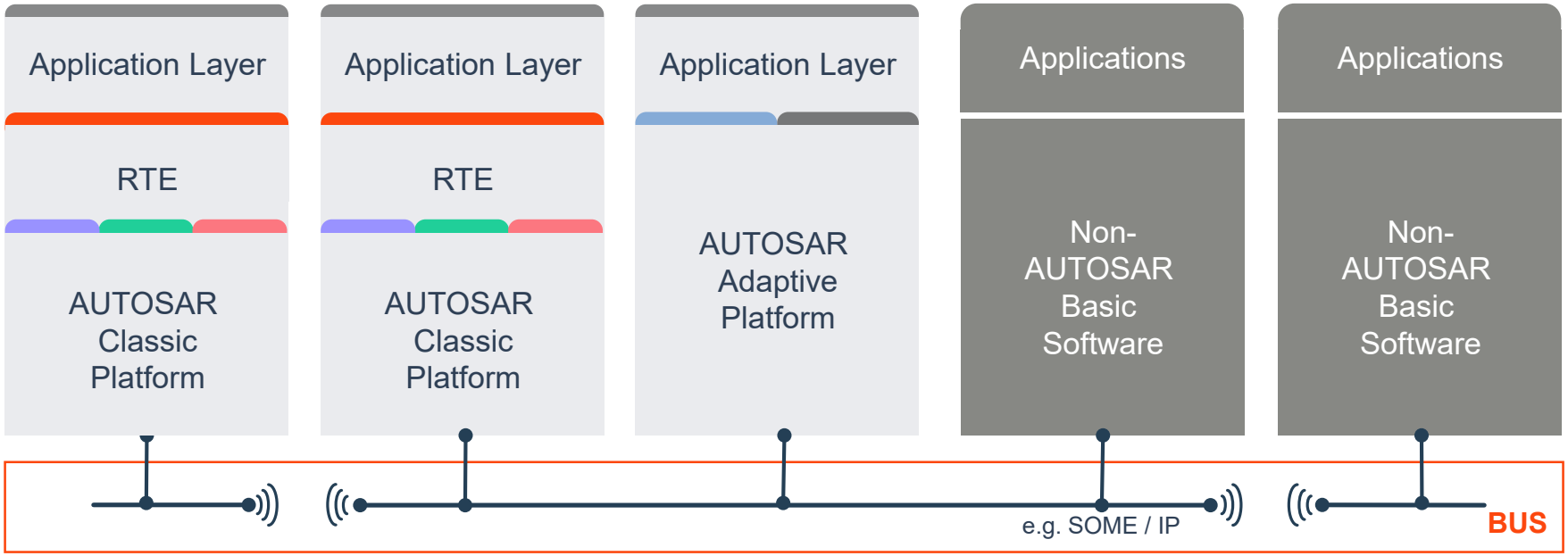
Part 1

- The AUTOSAR Partnership
- The AUTOSAR Standardization

Part 2

- Architecture and Features
  - AUTOSAR in Vehicle Network
  - AUTOSAR Foundation
  - AUTOSAR Classic Platform
  - AUTOSAR Adaptive Platform
- Smart Solutions Based on AUTOSAR
- Processes and Quality

# AUTOSAR in a Vehicle Network



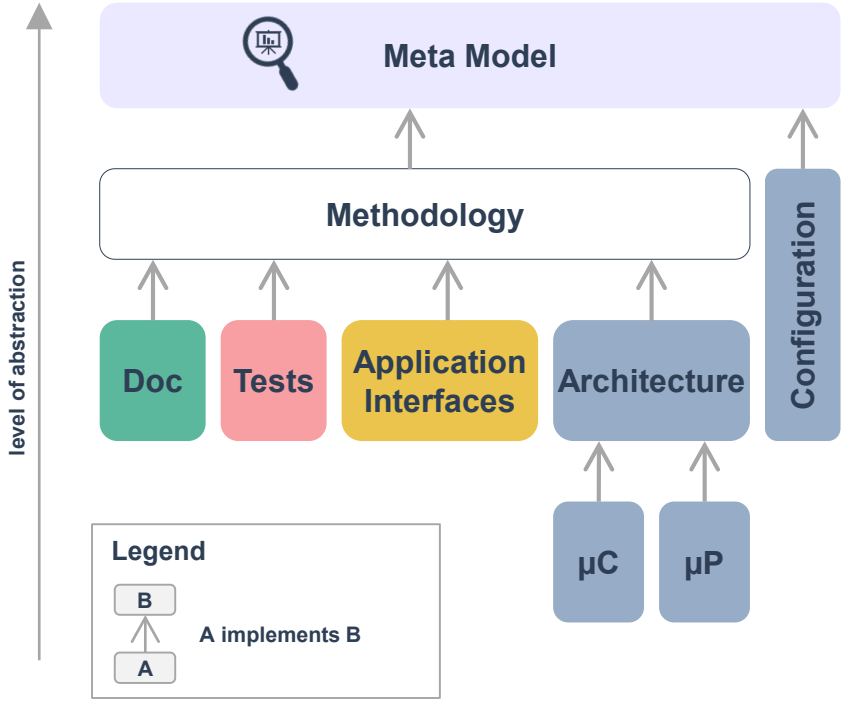

Common Bus Interface Specification

# AUTOSAR Foundation
## Common Features

The Foundation **assures compatibility** of the different AUTOSAR standards and therefore **contains** all **common artifacts** such as …

# AUTOSAR Foundation

## The Methodology, derived out of the Meta Model, …




… provides means to describe the AUTOSAR **architecture** with all its **interfaces**

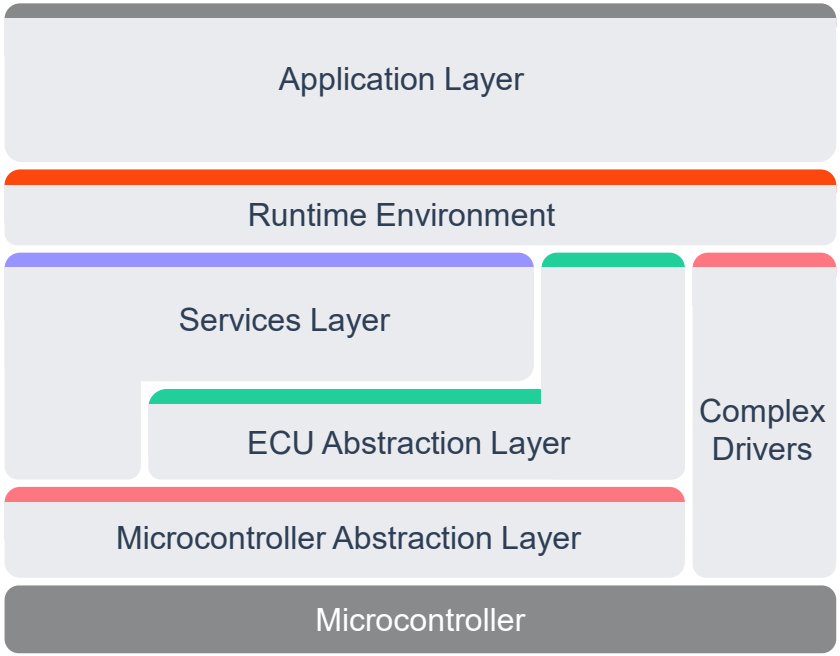
… defines **exchange formats** and description **templates** (e.g. manifest) to enable

- a seamless integration of the complete vehicle E/E architecture,
- the automatized configuration of the µC- and µP-software stacks and
- the seamless integration of application software

… supports means to **ensure safety** and **security** of the system

… provides templates to **document the standard**

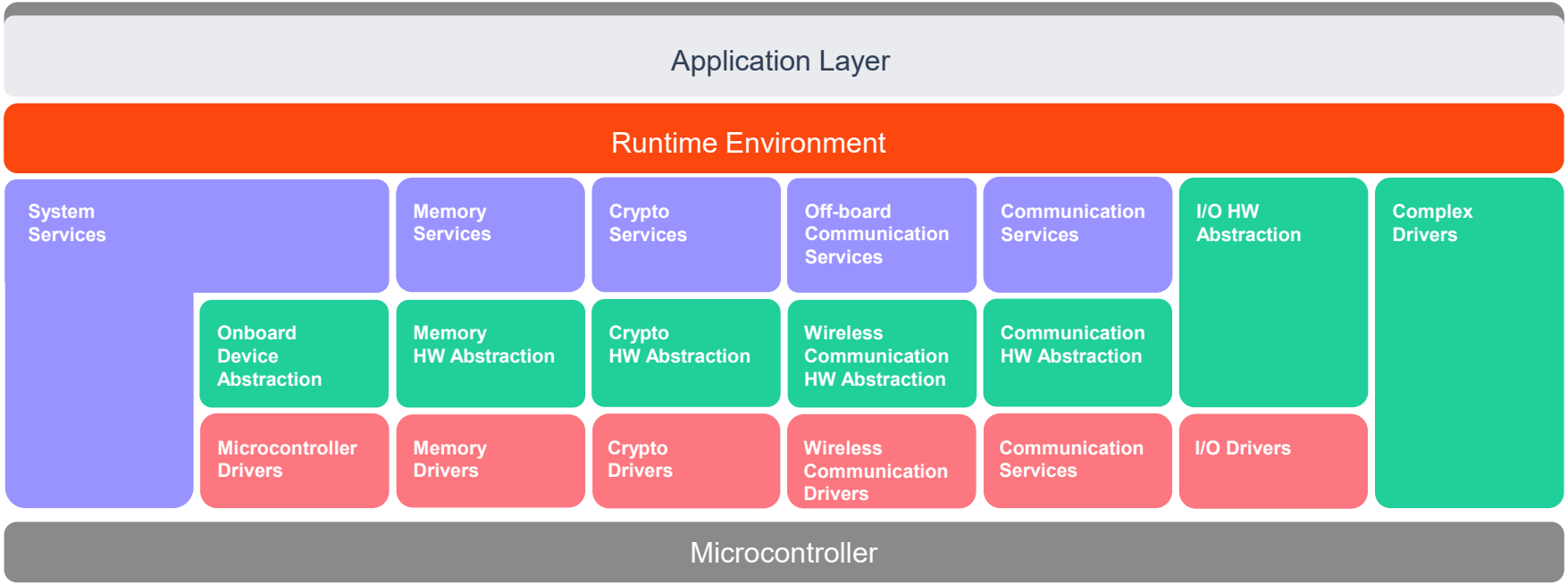
# AUTOSAR Classic Platform
## Layered Software Architecture (1/2)




The layered architecture of the classic platform basically supports

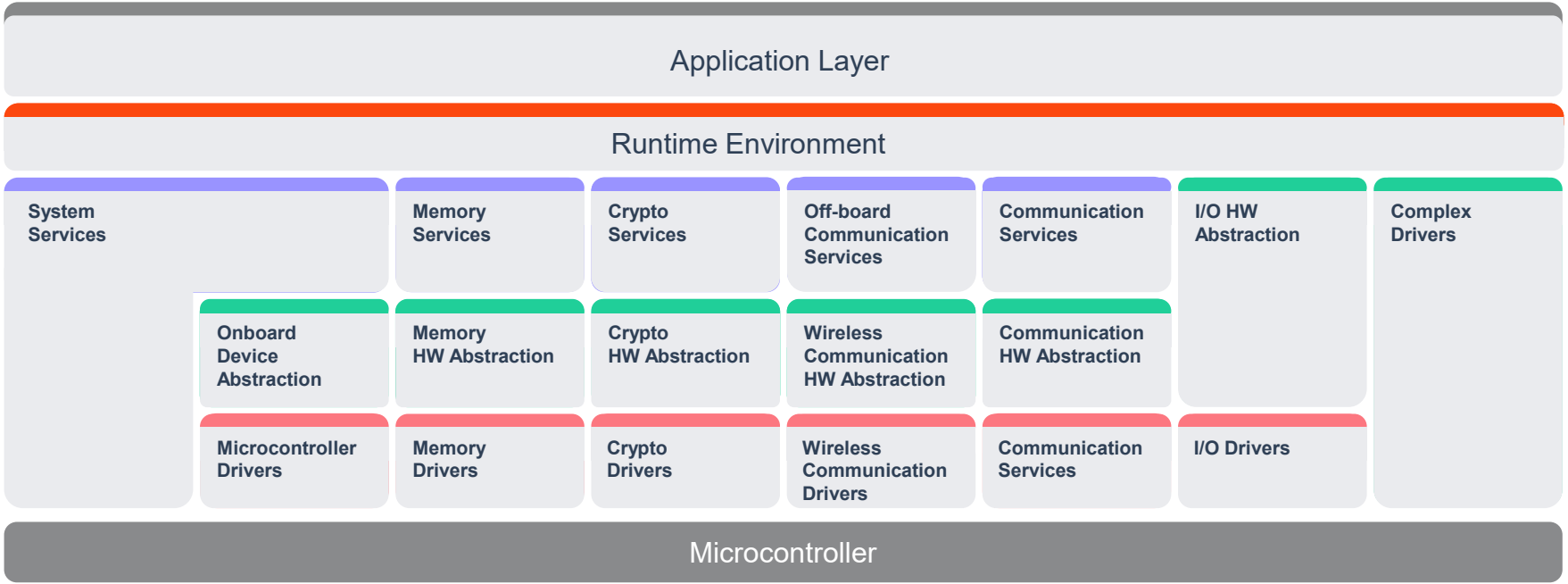
- Hardware abstraction
- Scheduling of runnables and tasks (OS)
- Communication between applications on the same hardware and over the network
- Diagnosis and diagnostic services
- Safety- and
- Security Services

# AUTOSAR Classic Platform
## Layered Software Architecture (2/2)



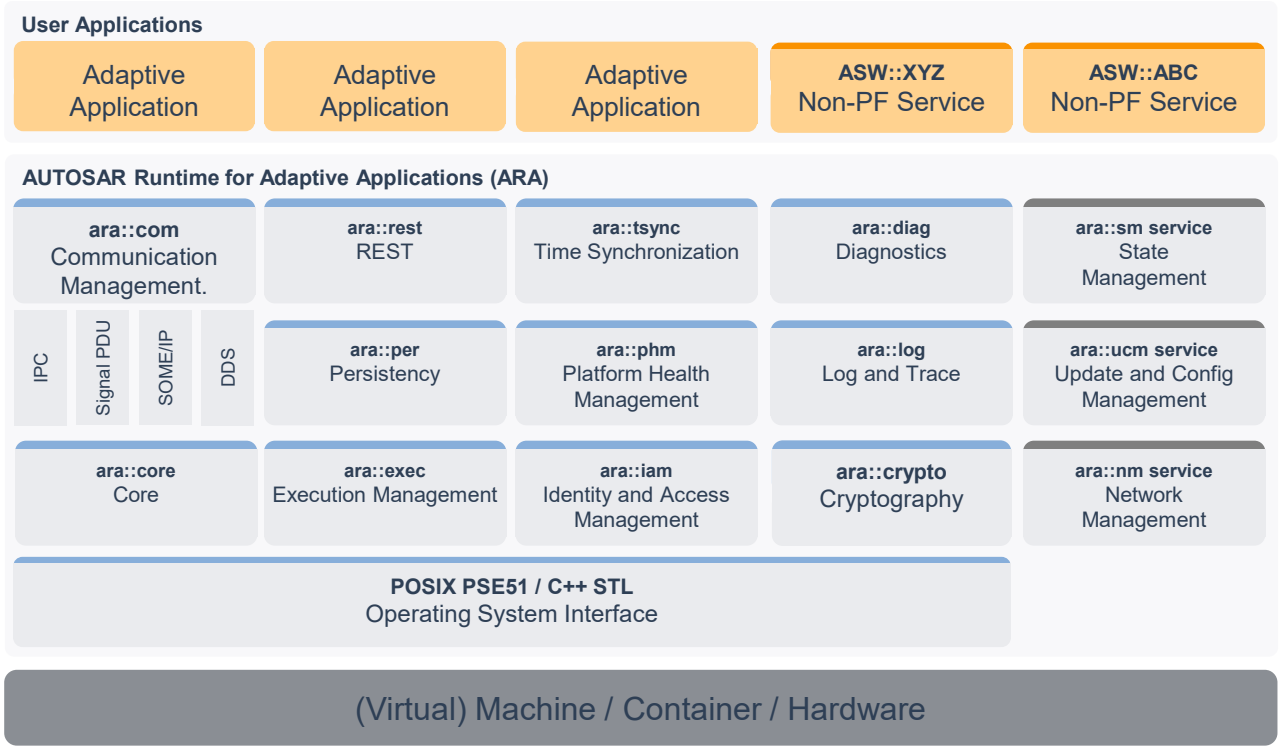
# AUTOSAR Classic Platform

## Layered Software Architecture (2/2)

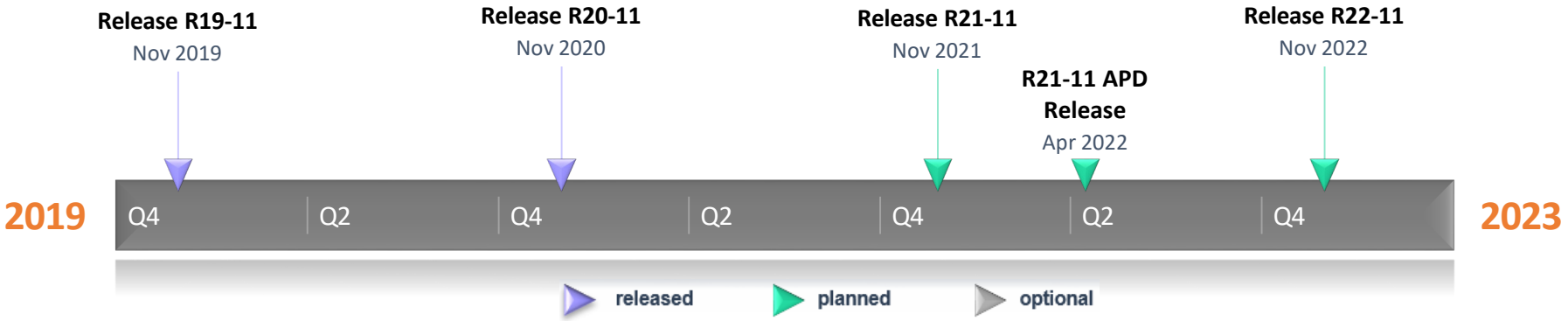


# AUTOSAR Adaptive Platform

## Architecture - Logical view



# AUTOSAR Standards
## Roadmap



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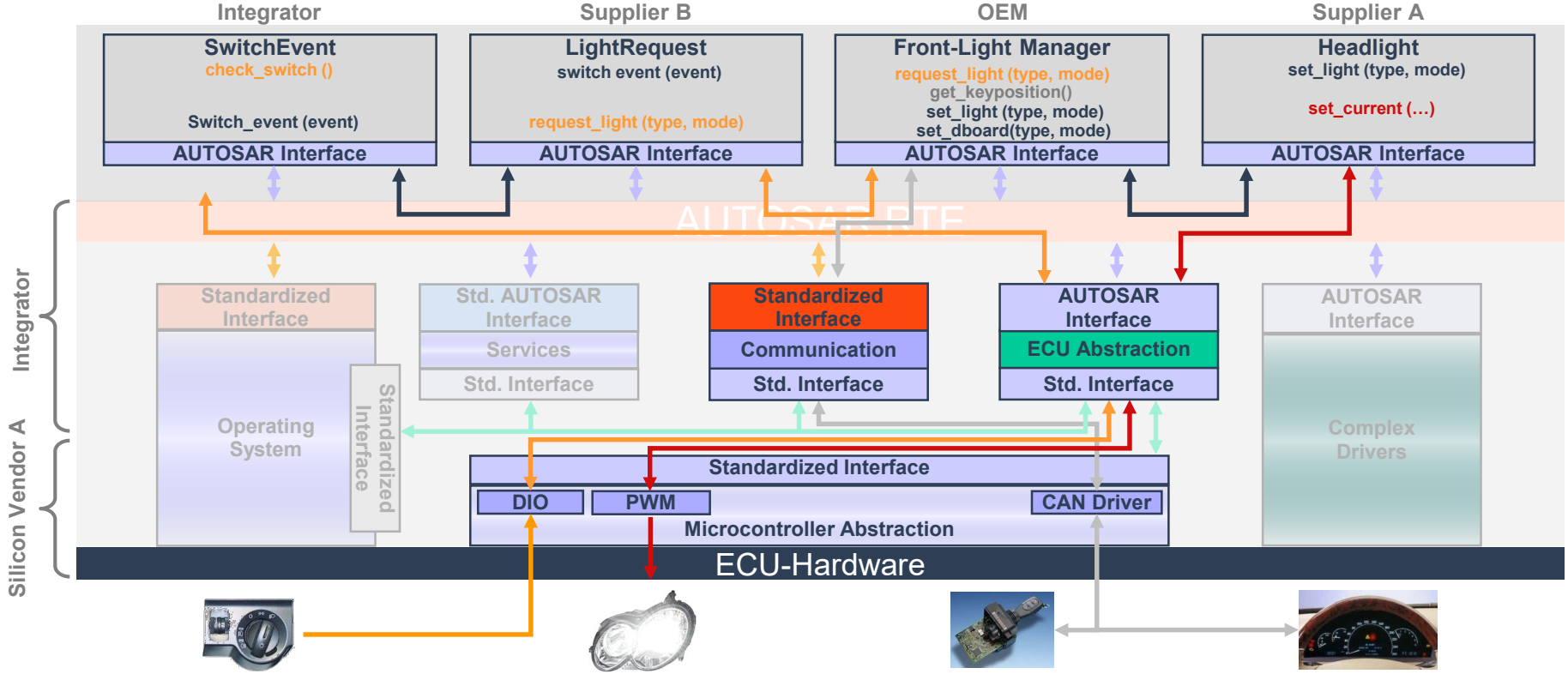
  - Software Architecture – AUTOSAR Defined Interfaces
  - Distribution ECUs
  - AUTOSAR Platform Application
- Processes and Quality

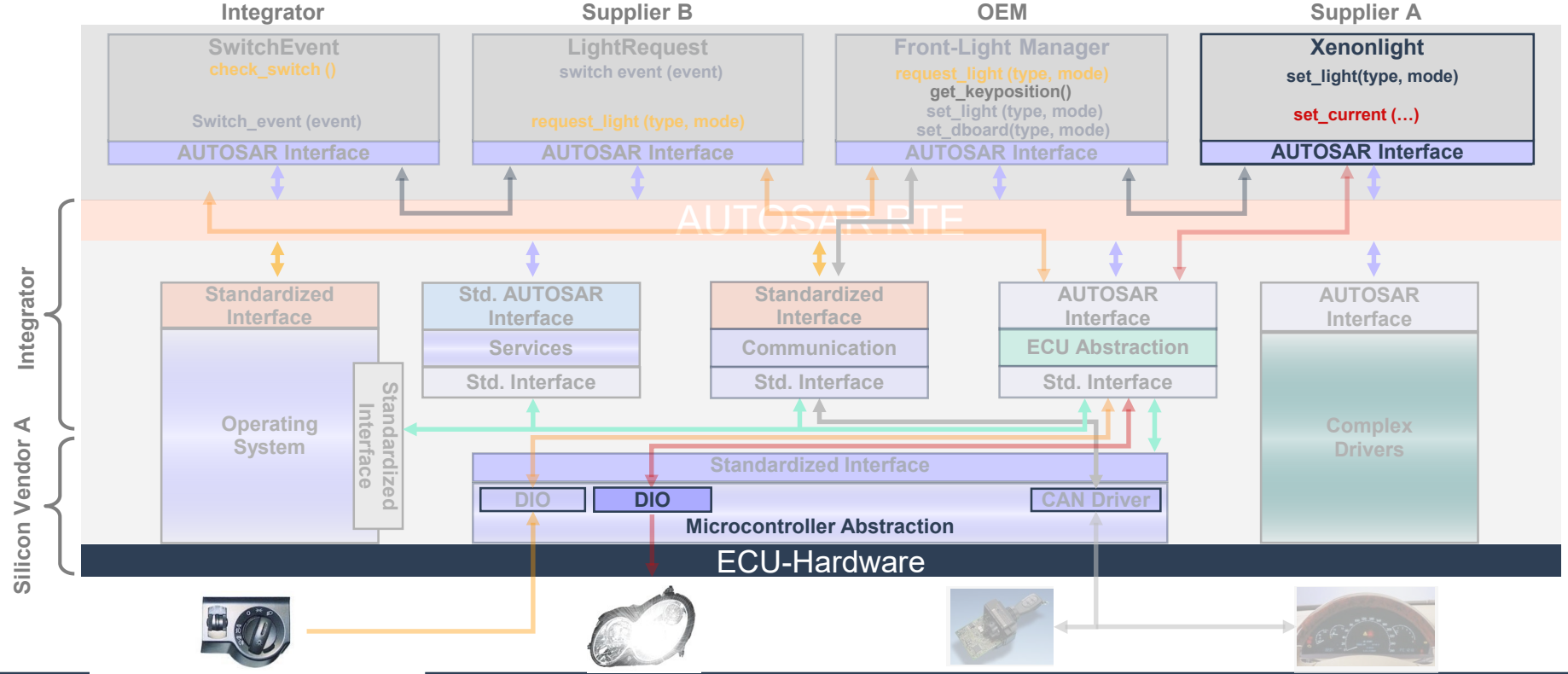
# Software Architecture – AUTOSAR Defined Interfaces

## Use Case 'Front Light Management': Exchange Type of Front Light



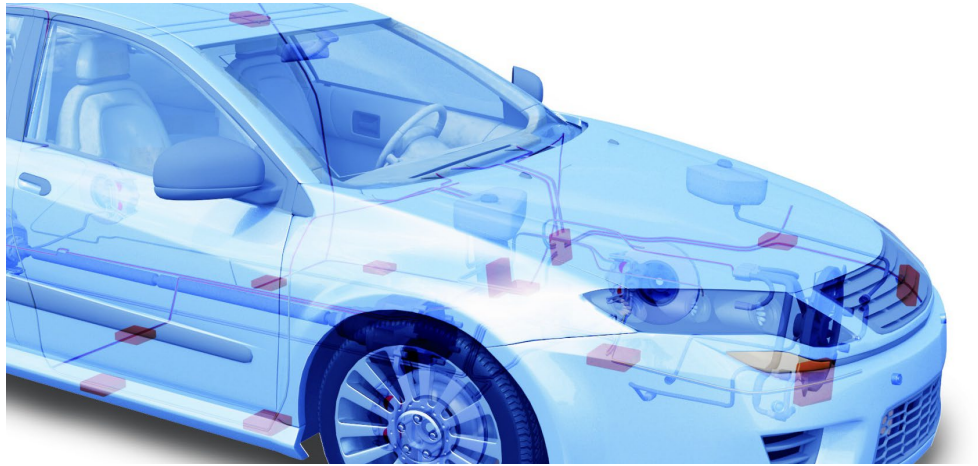
# Software Architecture – AUTOSAR Defined Interfaces

## Use Case 'Front Light Management': Exchange Type of Front Light

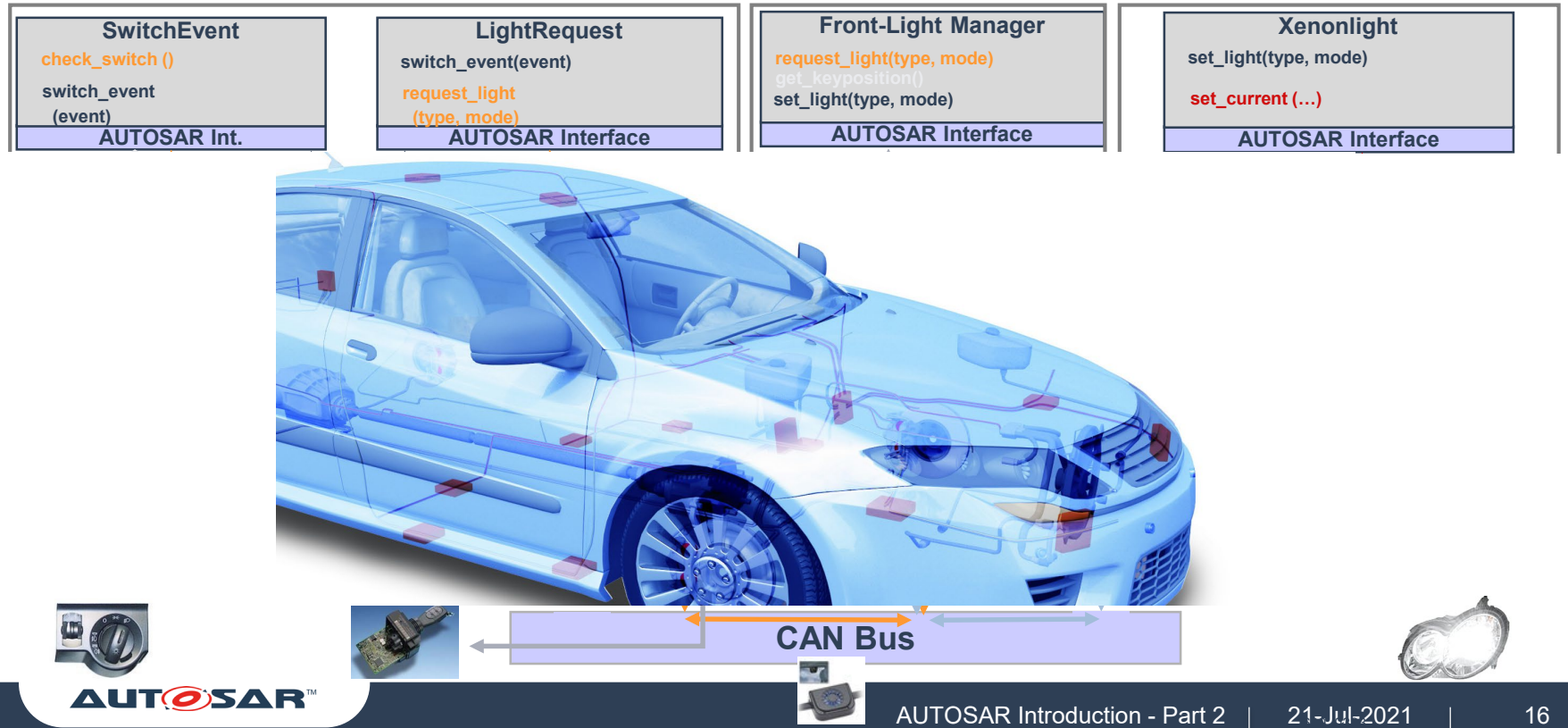


# Distribution ECUs

| SwitchEvent | LightRequest | Front-Light Manager | Xenonlight |
|---|---|---|---|
| switch_event (event) | switch_event(event)<br>request_light (type, mode) | request_light(type, mode)<br>set_light(type, mode) | set_light(type, mode)<br>set_current (…) |
| AUTOSAR Int. | AUTOSAR Interface | AUTOSAR Interface | AUTOSAR Interface |

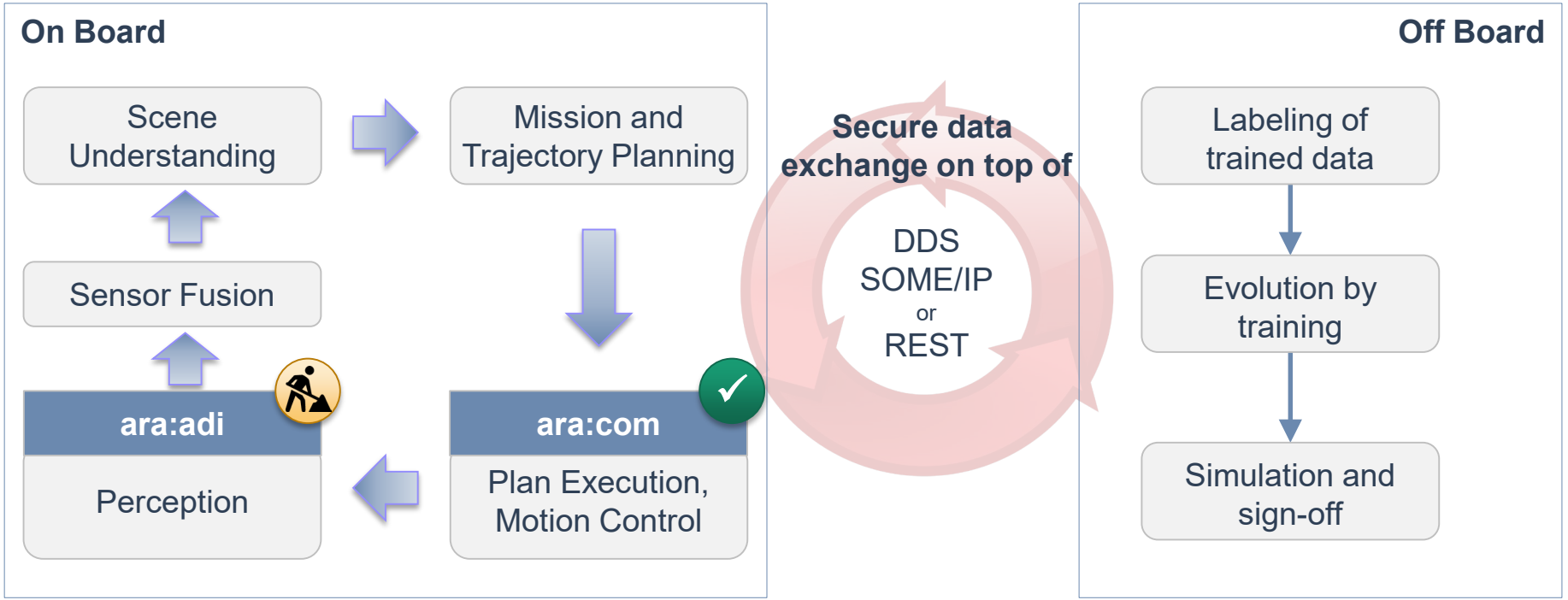


# Distribution on ECUs – ‘Front-Light Management’

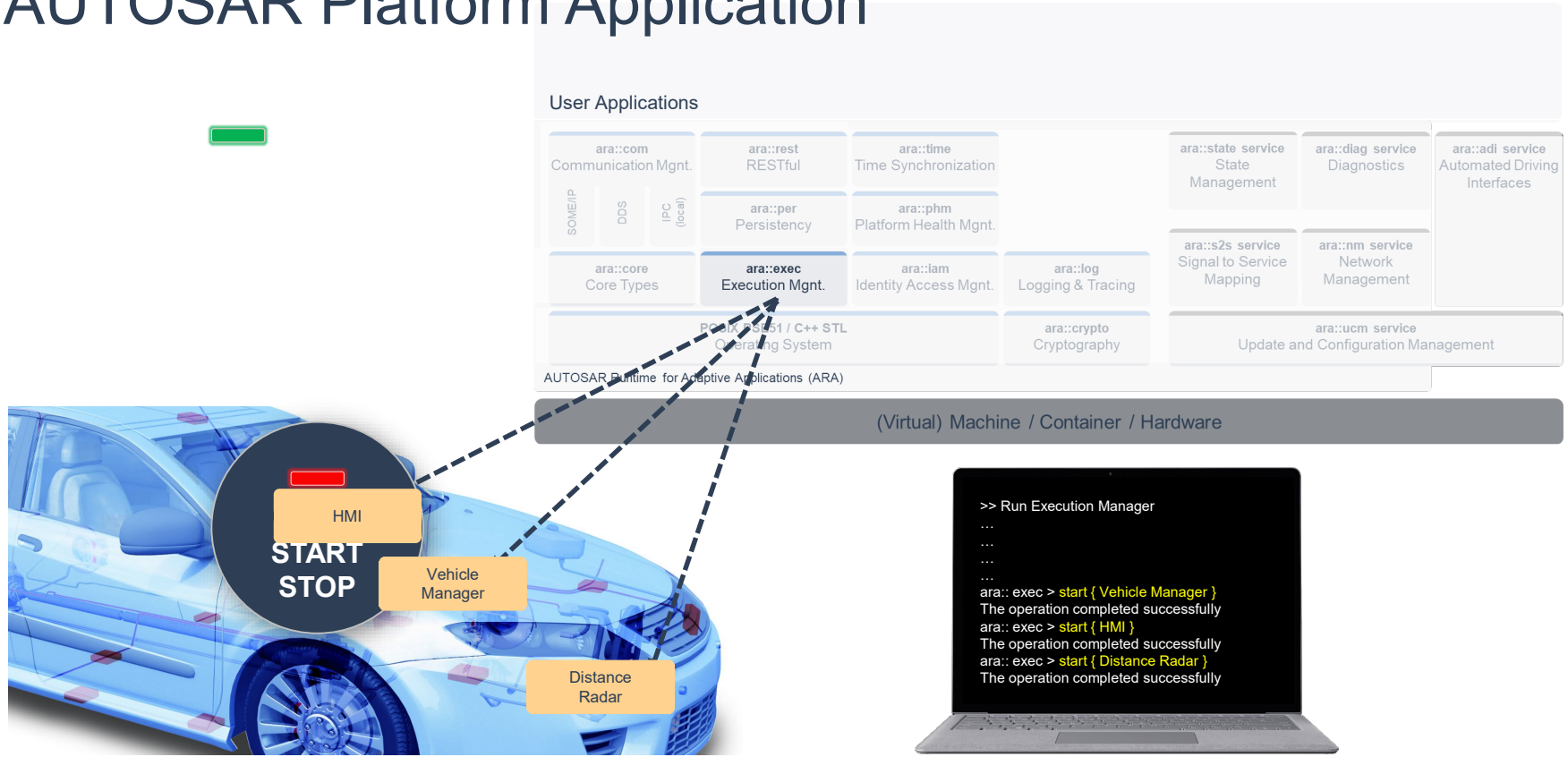


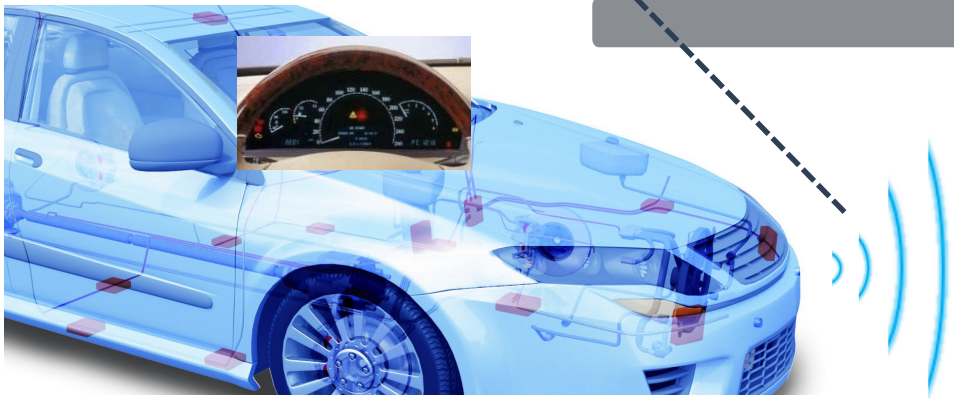
# AUTOSAR Platform Application

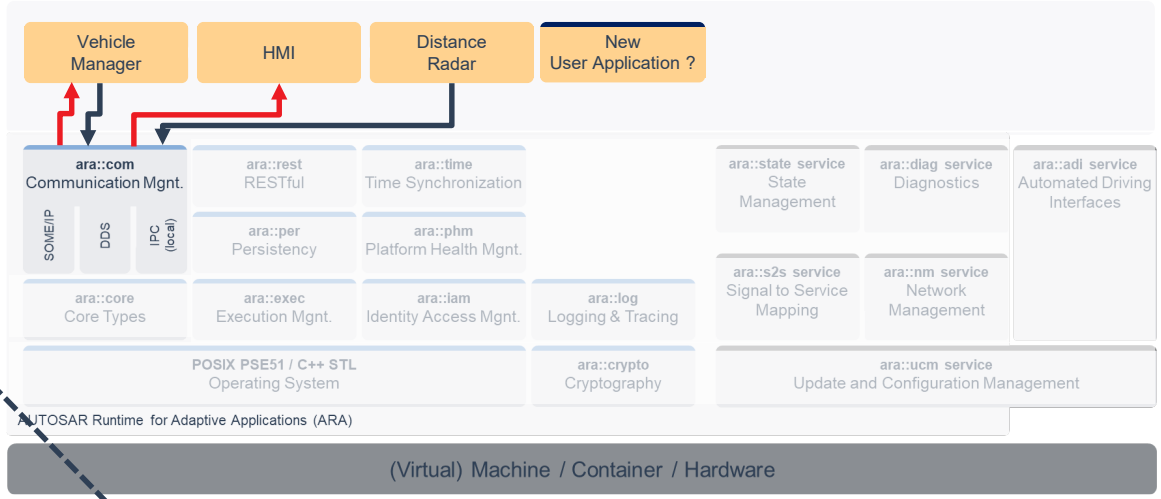
## Continuous improvement cycle for ADAS systems

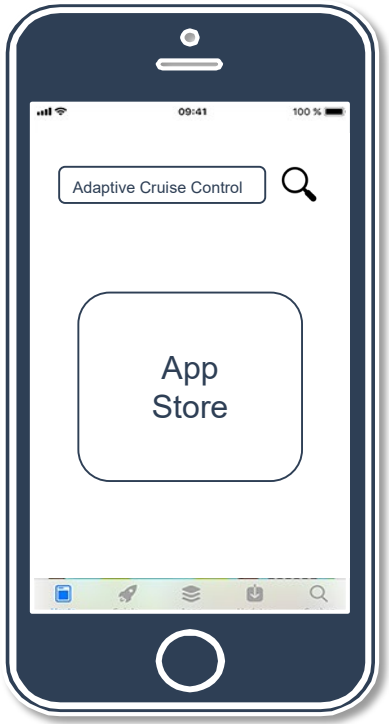


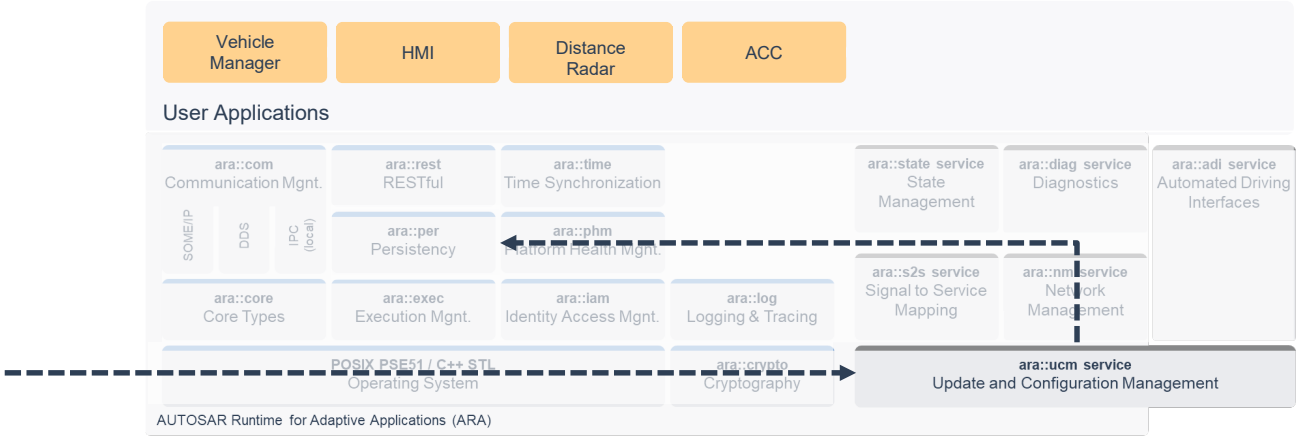
# AUTOSAR Platform Application






Vehicle Manager
HMI
Distance Radar
New User Application ?
ara::com Communication Mgnt.
SOME/IP
DDS
IPC (local)
ara::rest RESTful
ara::time Time Synchronization
ara::per Persistency
ara::phm Platform Health Mgnt.
ara::core Core Types
ara::exec Execution Mgnt.
ara::iam Identity Access Mgnt.
ara::log Logging & Tracing
ara::state service State Management
ara::diag service Diagnostics
ara::adi service Automated Driving Interfaces
ara::s2s service Signal to Service Mapping
ara::nm service Network Management
POSIX PSE51 / C++ STL Operating System
ara::crypto Cryptography
ara::ucm service Update and Configuration Management
AUTOSAR Runtime for Adaptive Applications (ARA)
(Virtual) Machine / Container / Hardware


09:41
100 %
Adaptive Cruise Control
App
Store


Vehicle Manager
HMI
Distance Radar
ACC
User Applications
ara::com
Communication Mgnt.
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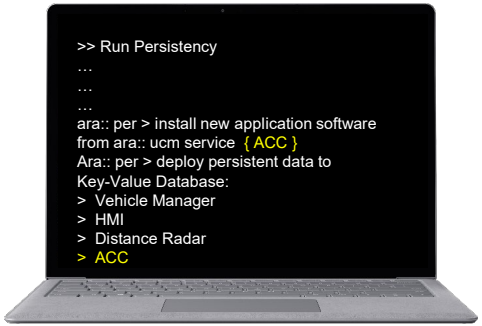
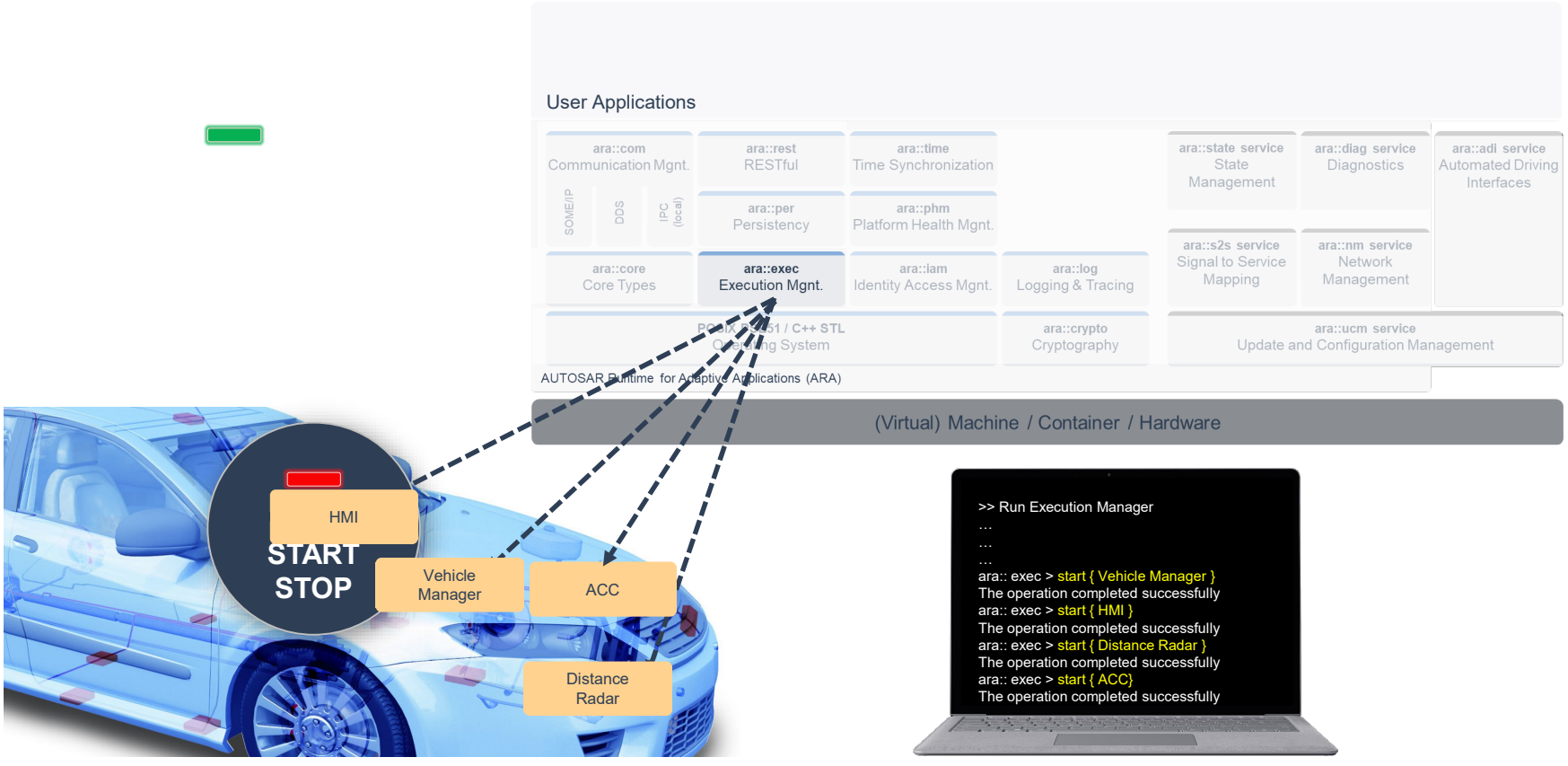

>> Run Persistency
…
…
…
ara:: per > install new application software
from ara:: ucm service { ACC }
Ara:: per > deploy persistent data to
Key-Value Database:
> Vehicle Manager
> HMI
> Distance Radar
> ACC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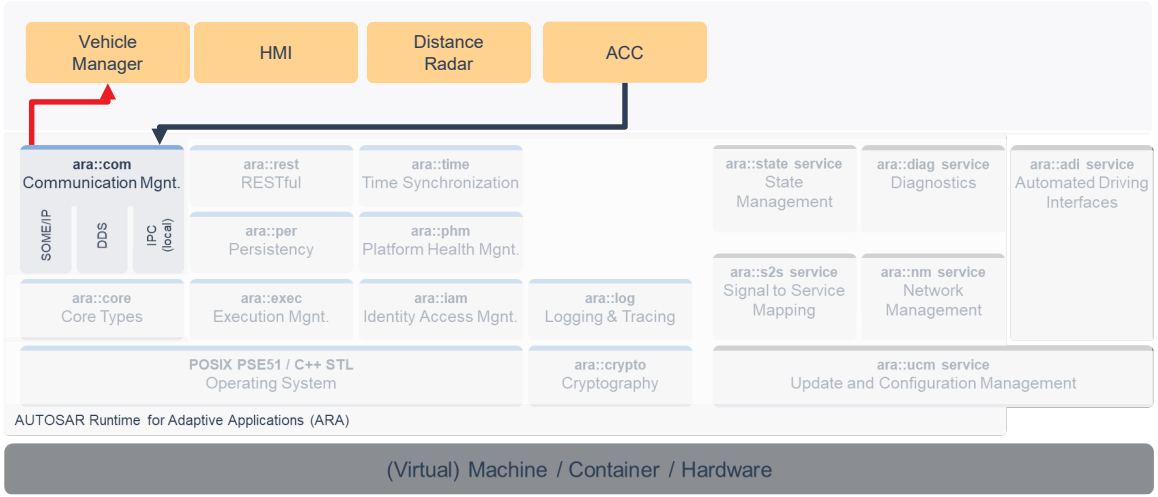
(Virtual) Machine / Container / Hardware
HMI
START
STOP
Vehicle Manager
ACC
Distance Radar
>> Run Execution Manager
…
…
…
ara:: exec > start { Vehicle Manager }
The operation completed successfully
ara:: exec > start { HMI }
The operation completed successfully
ara:: exec > start { Distance Radar }
The operation completed successfully
ara:: exec > start { ACC}
The operation completed successfully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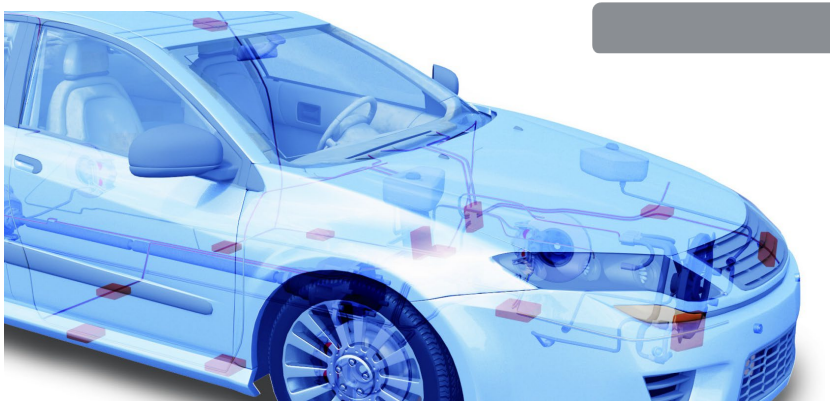
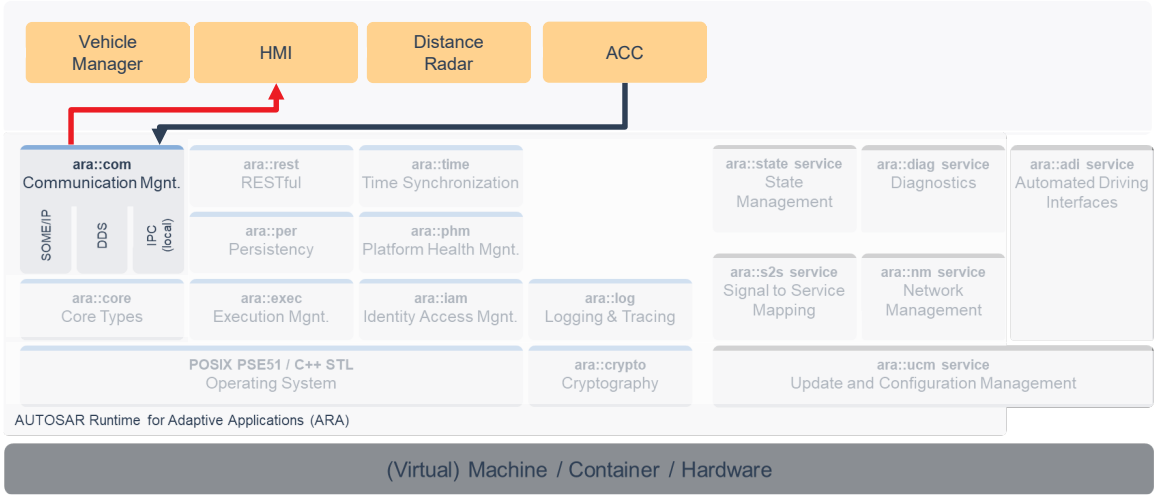



ACC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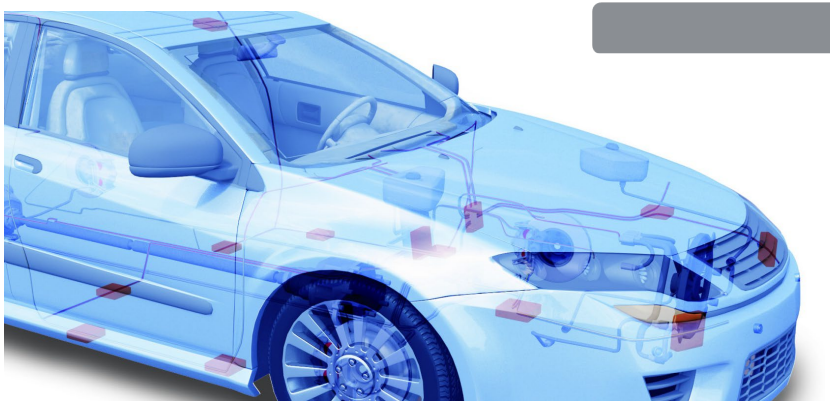
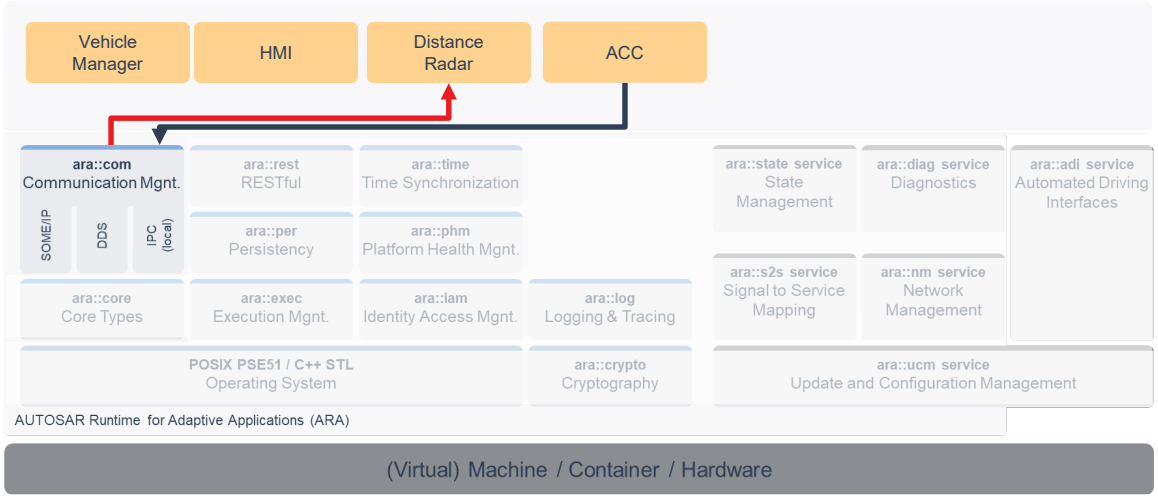



48°F
ACC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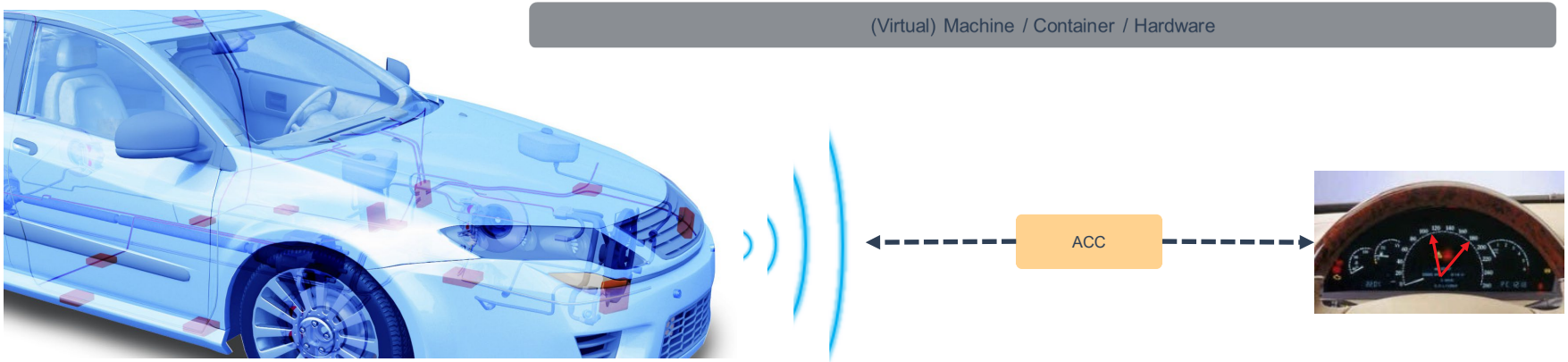
ACC

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  - AUTOSAR Adaptive Platform Development Approach

# AUTOSAR Adaptive Platform Development Approach

## Specification

**Identify needs & use-cases:**

1) Concepts
2) Features
3) Requirements

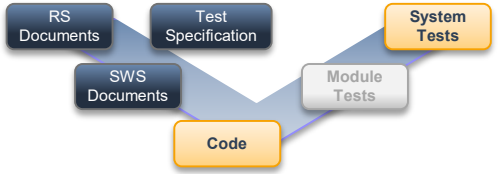
**Quality:**

- TF-ARC approval
- Cross team review
- Lifecycle :
  preliminary → draft → valid

## Implementation

**Gain speed:**

1) Spec validation
2) Reduce room for spec interpretation
3) Training / dissemination of AP



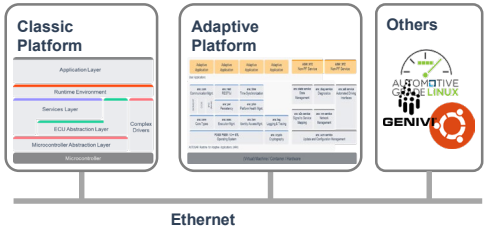

**Attracting environment for coders:**

- Appealing technology (C++, Yocto, Git, …)
- Modern use case (ADAS EBA)
- Handy documentation (Wiki)
- Peer programming sessions

## Demonstration

**Gain trust:**

1) Advertises the progress
2) Highlights some specific features




**Show AUTOSAR interoperability**

- of classic and adaptive platforms
- but also with others

**Best tradeoff between commercial cooperation & compatibility between different vendors**

AUTOSAR™

# Thank you

## for your attention

If you'd like to become a partner, contact us at: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admin@autosar.org
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