



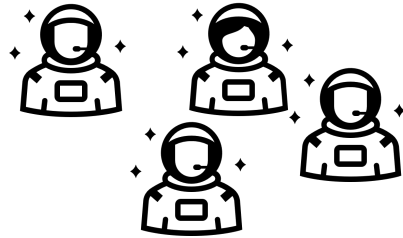
Adaptive Cruise Control Demo Application for AUTOSAR Adaptive (ADAAA)

Dr André Fischer (Manager ZF Middleware Platform) | DISS2 | DI

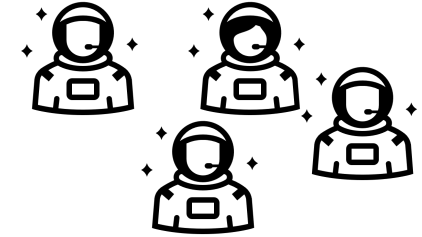
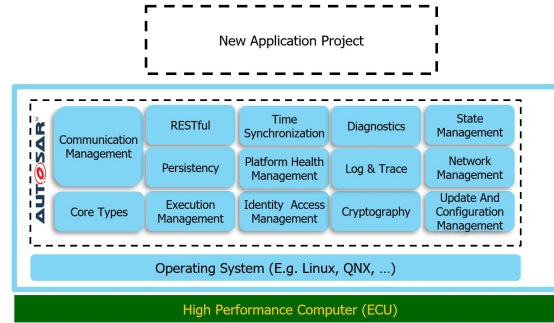
(Eclipse Foundation - SDV Contribution Day June, 30th 2022)



Background: AUTOSAR Adaptive and Automotive Application SW



ZF inhouse Expert Team
for ADAPTIVE Autosar



ZF Application developers

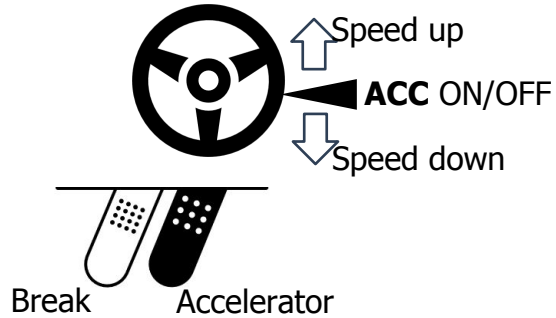
AUTOSAR Adaptive is a Standard Specification for Automotive Base Software relevant ...

- for Service Oriented Architectures (SoA)
- on High Performance Computers (HPCs)
- in Software Defined Vehicle (SDV)

ZF SW engineers new to Adaptive AUTOSAR are educated with dedicated example project called ADAAA

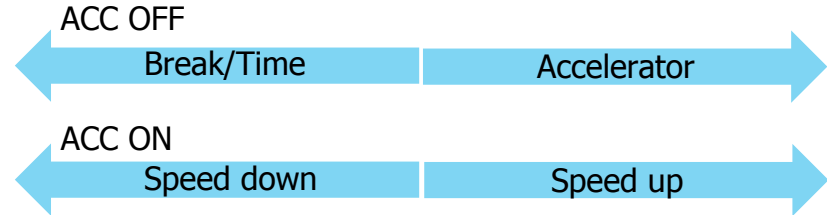
What is the Adaptive Cruise Control Demo Application?

UseCase

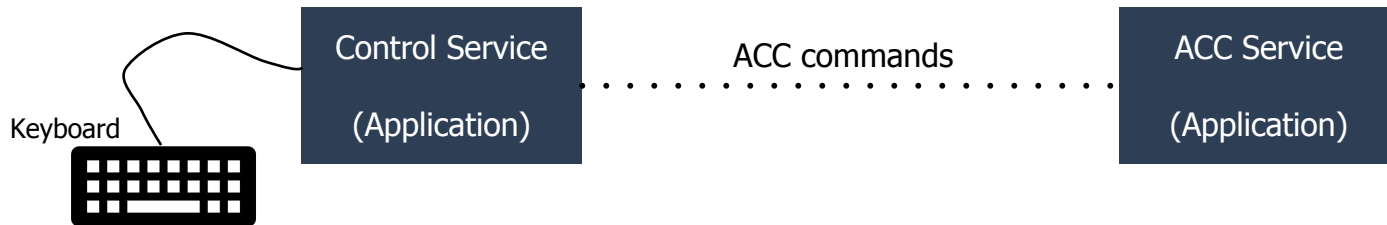


deceleration

acceleration

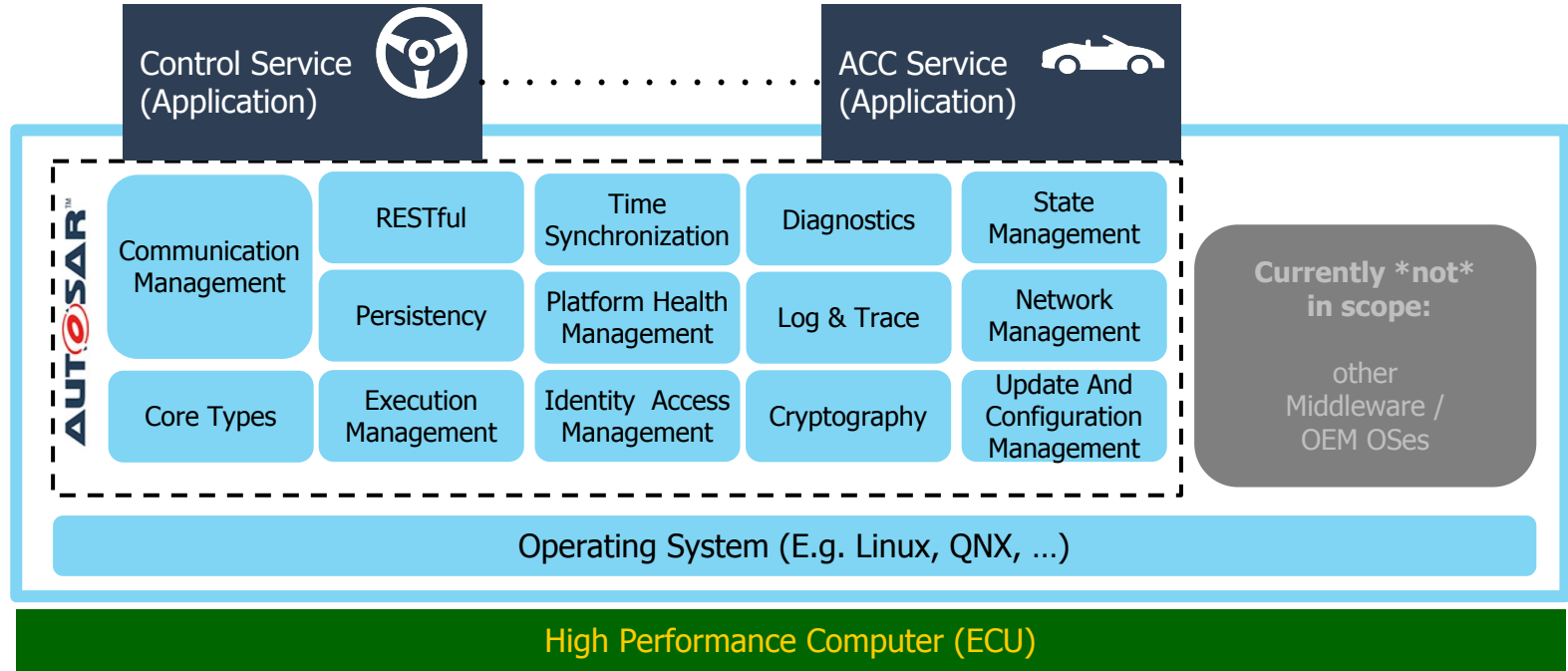


Application



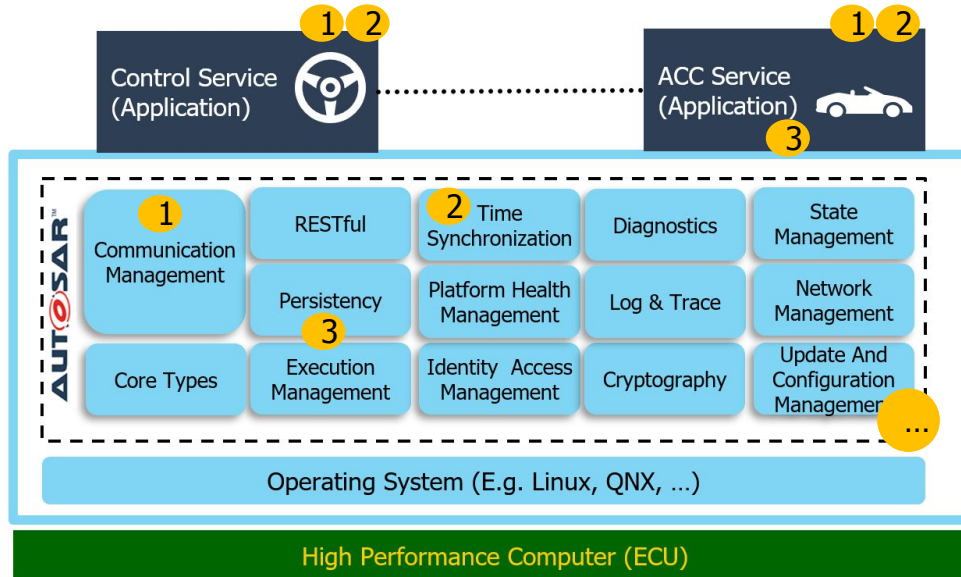
ACC - basic vehicle function example as illustrative context to explore Adaptive AUTOSAR

ACC Demo App integration with Adaptive Autosar



Primary goal of the Demo App is to illustrate the integration in AUTOSAR Adaptive

ACC Demo App integration with Adaptive Autosar



Com. Mgmt 1
Sending ACC control commands from Control Service to ACC Service

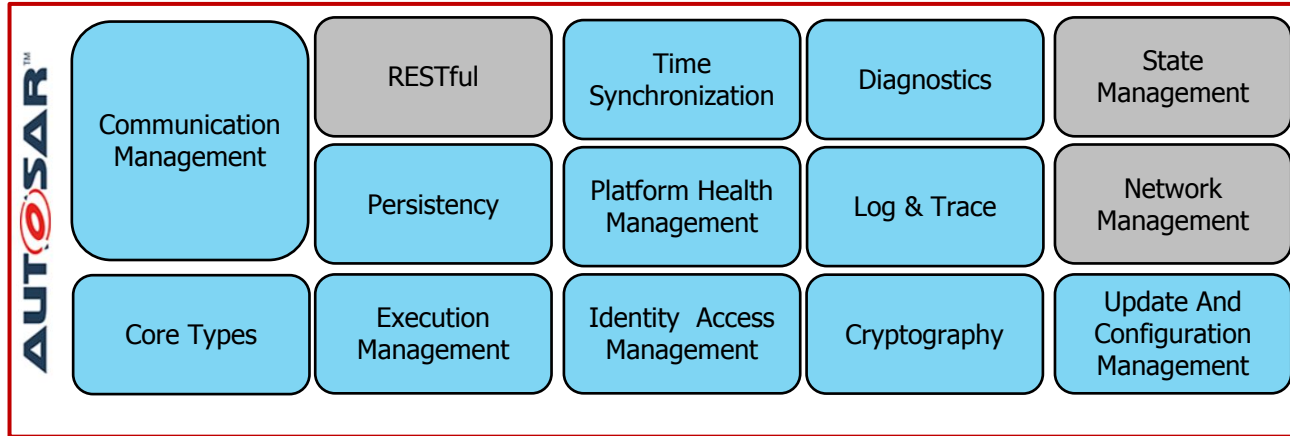
Time Sync 2
Sync the clocks of both applications across two machines

Persistency 3
Persist drive cycle counter and ACC usage at high speeds

Concept: ACC "flavored" Integration examples along the AUTOSAR Adaptive Functional clusters

Scope Goal: Full Functional cluster coverage by ADAAA

AUTOSAR Adaptive Functional Clusters



Current functional cluster coverage is at about 80% with the ambition for full coverage

Additional Content

In Addition to code:

- Documentation
- Example requirements
- Integration architecture
- Build setup
- Test cases

Documentation

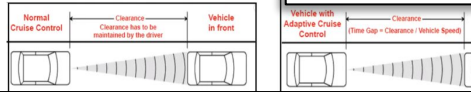
Adaptive Cruise Control

Adaptive Cruise Control (ACC) is an Advanced feature for road vehicles that automatically adjusts the vehicle's speed to maintain a safe distance from the vehicle ahead. Control is based on sensor information. A car may use a radar, laser sensor or a camera setup. When the car is approaching another vehicle ahead, then it constitutes Level One automation on the automated driving scale. The driver is required to take control at any time.

Normal Cruise Control Vs Adaptive Cruise Control

In Normal cruise control, the driver will just set the speed. The driver has to intervene if the car is too close to the vehicle ahead.

In Adaptive cruise control with the sensors like LIDAR, the car will see that the car ahead has slowed and adjust its speed accordingly.



Example Requirements

Description

The Communication Manager shall provide an interface for the DCC application to call service methods of the Keyboard application.

4.7.2 Persistency

4.7.2.1 --

CodeBeamer reference:	RSW-27921
Revision:	2
Priority:	--
Severity:	--
Status:	Approved

Description

The DCC application shall store a key value pair in the persistent memory at the end of each drive cycle.

App Source Code & Build setup

configs

include

models

source

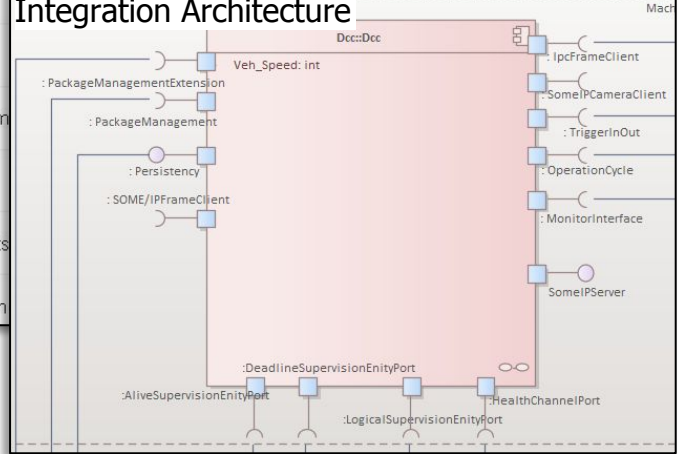
.clang-format

.gitignore

CMakeLists

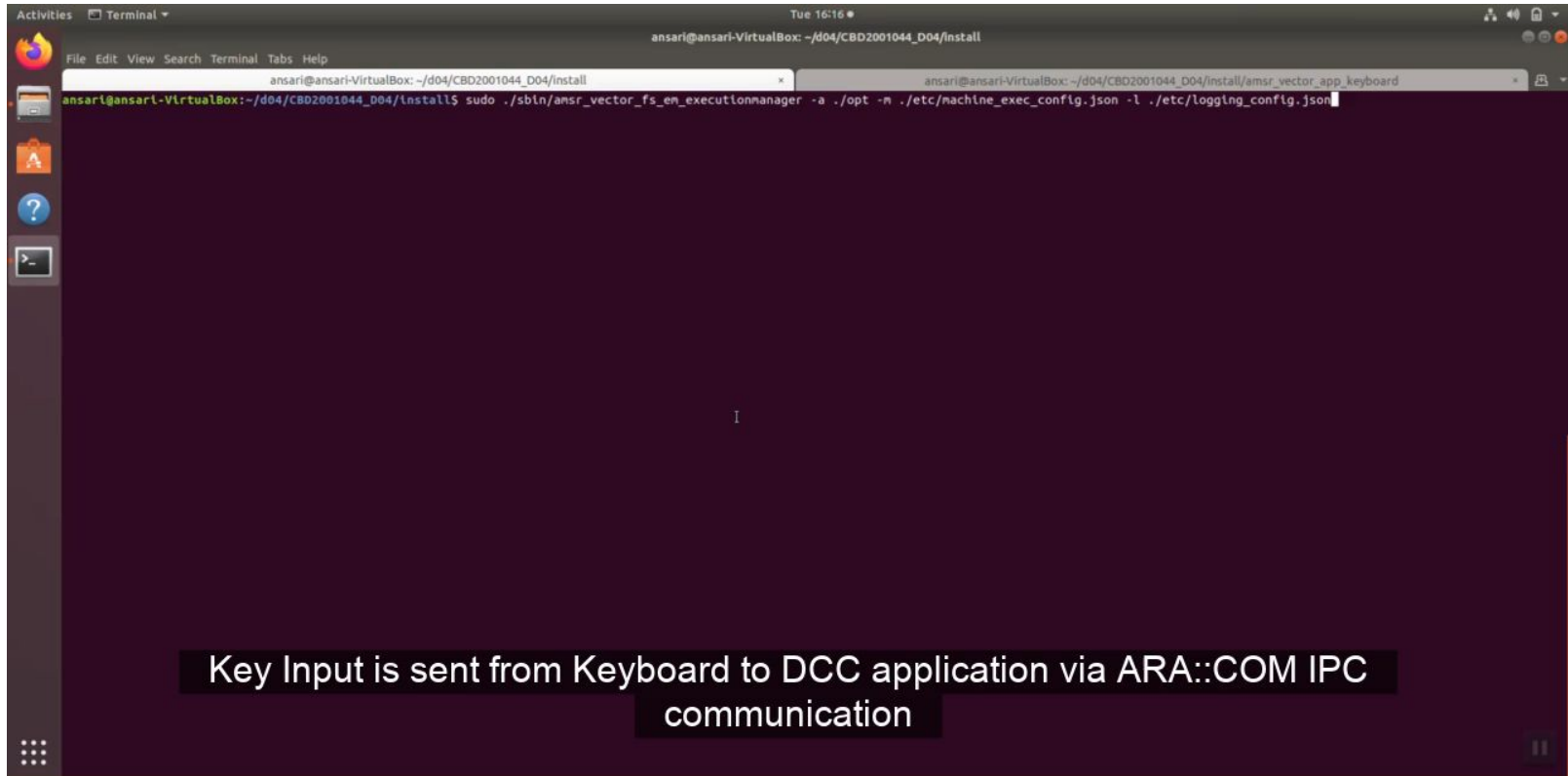
README.m

Integration Architecture



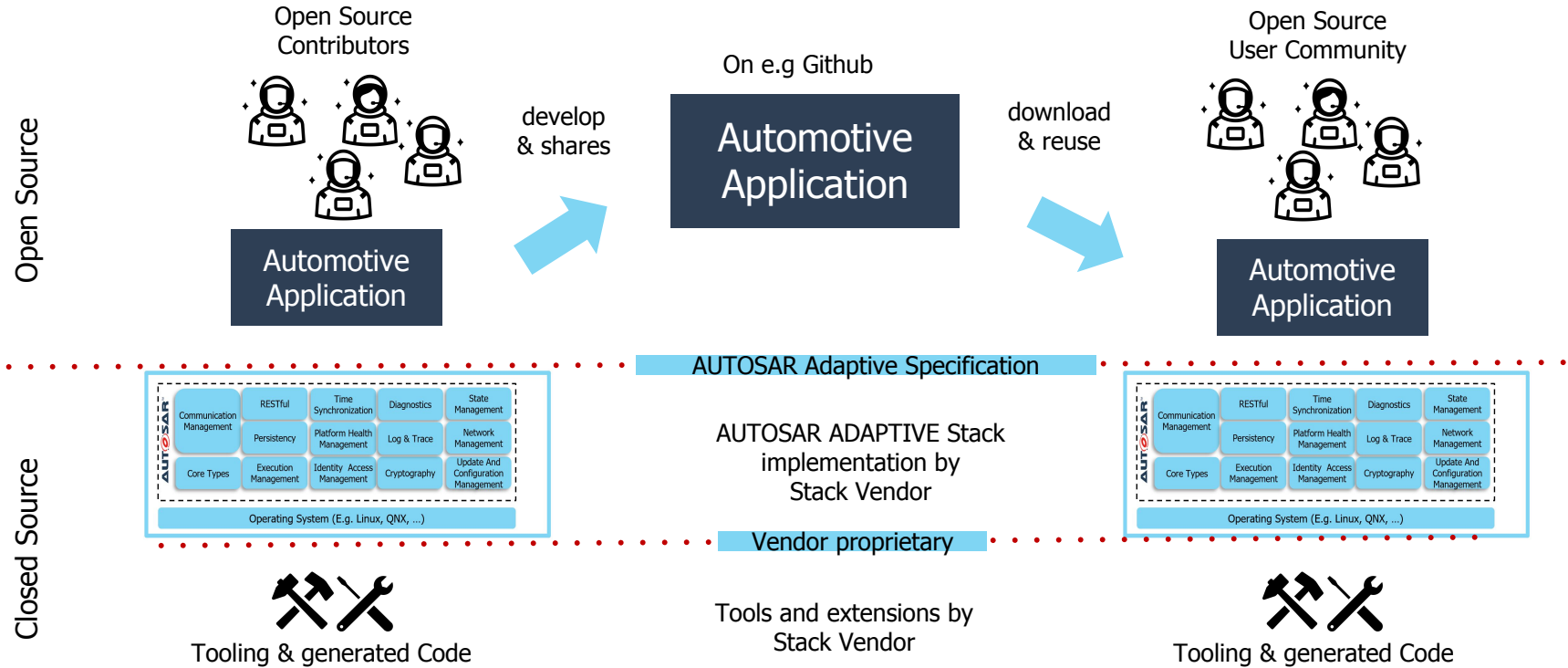
The ADAAA contribution will contain tutorial and support content in addition to the application source

Demo



Key Input is sent from Keyboard to DCC application via ARA::COM IPC communication

Challenge: Vendor dependency for AUTOSAR Adaptive stack



Various AUTOSAR Adaptive Stacks exist, not 100% compatible, not released as Open Source

Goals of the contribution

Initial ADAAA contribution by ZF to:

- Share insights and experience into AUTOSAR Adaptive methodology
- Engage with the Open Source community
- Build AUTOSAR Adaptive expertise on common basic examples across the community

Future ZF efforts together with OS community

- Add more tutorial content
- Complete Functional Cluster coverage
- Maintain code base for upcoming AUTOSAR Adaptive releases
- Support different AUTOSAR Adaptive stacks
- ...

looking forward to get it started together!

Thank you

