High performance controllers in automotive

Business case

6 LEVELS OF AUTONOMOUS DRIVING

L 0
NO AUTOMATION

Manual control . The human performs all driving task(steering, Acceleration, braking,etc)

L 1
DRIVER ASSISTENCE

The vehicle features a single automated system(e.g it monitors speed through cruise control).

L 2
PARTIAL AUTOMATION

ADAS. The vehicle can perform steering and acceleration . The human still monitors all tasks and can take control at any time.

L 3
CONDITIONAL AUTOMATION

Environmental detection capabilities. The vehicle can perform most driving tasks , but human override is still required.

L 4
HIGH AUTOMATION

The vehicle performs all driving tasks under specific circumstances . Geofencing is required. Human override is still an option.

L 5
FULL AUTOMATION

The vehicle performs all driving tasks under all conditions . Zero human attention or interaction is required.

EU employment + Add to myFT

Europe's trucker shortage becoming 'extremely dangerous'

Dearth of drivers blamed on soaring demand, low wages and poor working conditions

Save

The Sharing Economy and the Future of Personal Mobility: New Models Based on Car Sharing

Olga Novikova

> *"You cannot separate the buildings out from the infrastructure of cities and the mobility of transit."*
>
> Norman Foster
> The Rt Hon. The Lord Foster of Thames Bank, OM
> Architect

The sharing economy is an emerging phenomenon that shapes the cultural, economic, and social landscape of our modern world. With variations of the concept of the sharing economy emerging in so many fields, the area of shared mobility – the shared use of a motor vehicle, bicycle, or other mode that enables travellers to gain short-term access to transportation modes on an on-demand basis – has developed as the forerunner of the transformation to be expected in other areas. This article examines how the sphere of personal mobility has been affected by the growth of sharing economy. It contributes to the growing body of shared mobility literature by uncovering innovative mobility-based models that represent solutions on the intersection of shared mobility, physical infrastructure, and integrated-mobility schemes.

Requirements

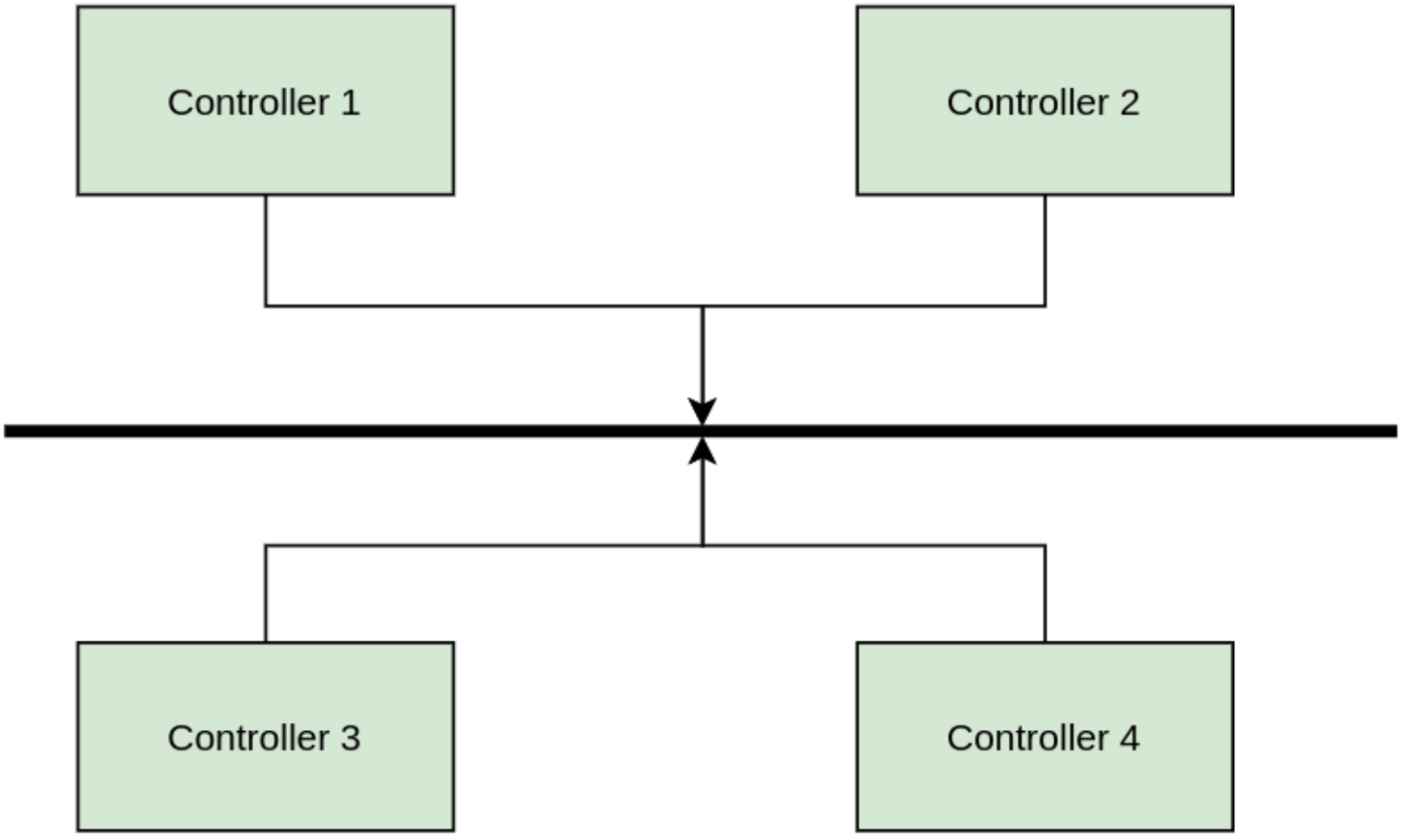
- Functional safety
- Interoperability
- Reliability
- Security

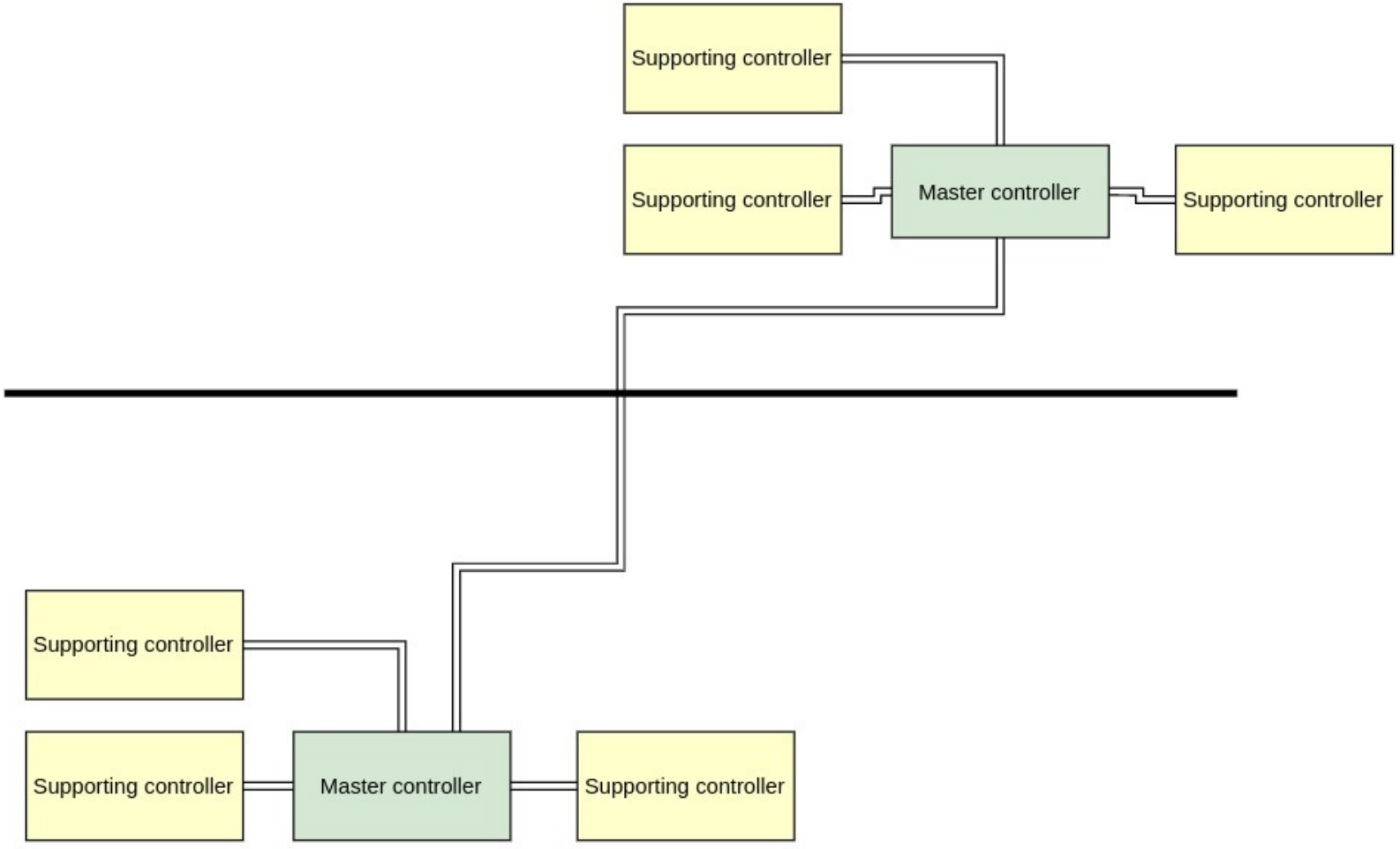
ASIL determination

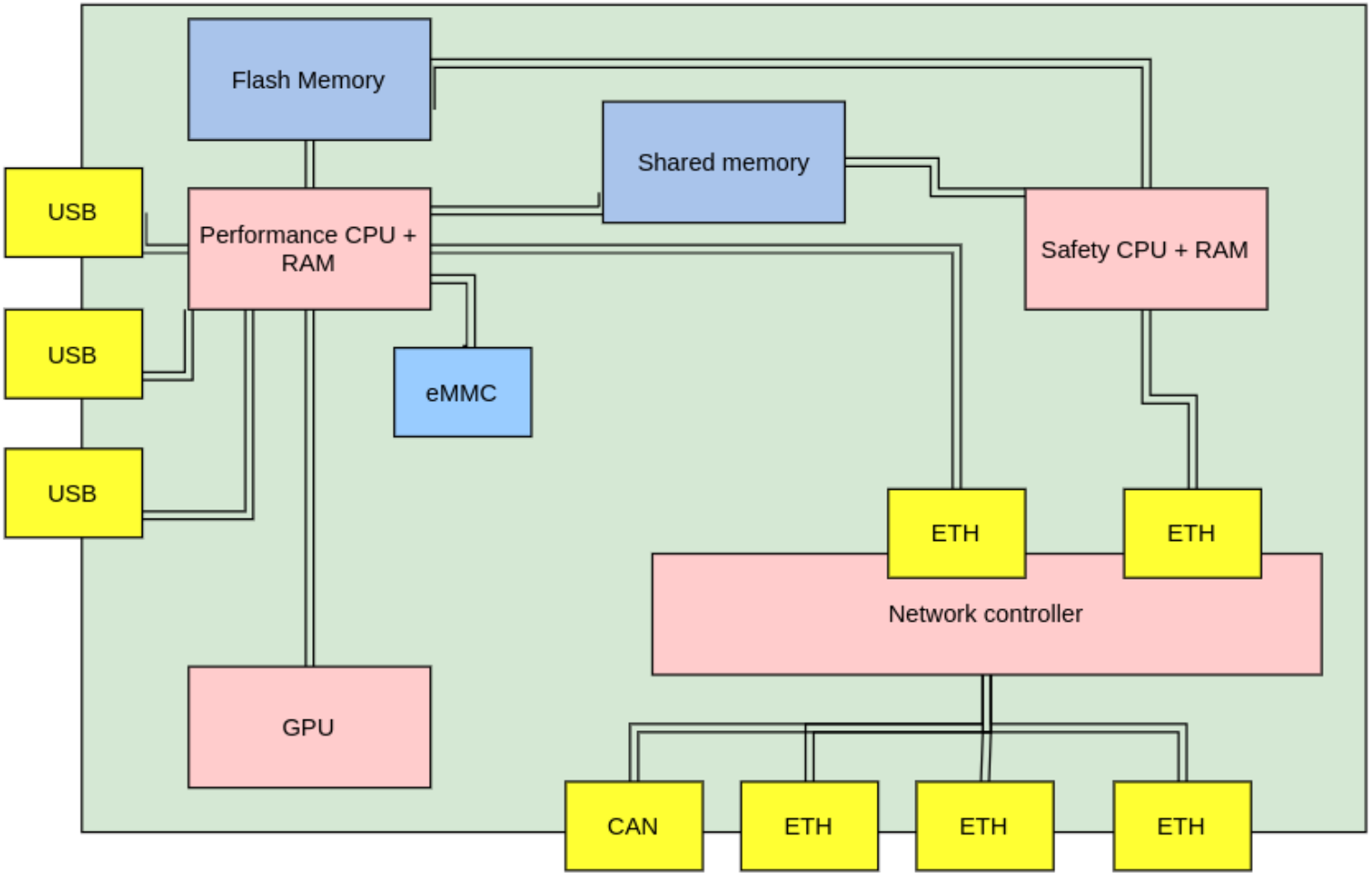
		C1	C2	C3
S1	E1	QM	QM	QM
	E2	QM	QM	QM
	E3	QM	QM	A
	E4	QM	A	B
S2	E1	QM	QM	QM
	E2	QM	QM	A
	E3	QM	A	B
	E4	A	B	C
S3	E1	QM	QM	A
	E2	QM	A	B
	E3	A	B	C
	E4	B	C	D

Architecture

- HW architecture before
- HW architecture of the future
- 2C architecture
- SW architecture
  - Hypervisor
  - Safety OS
  - Performance OS

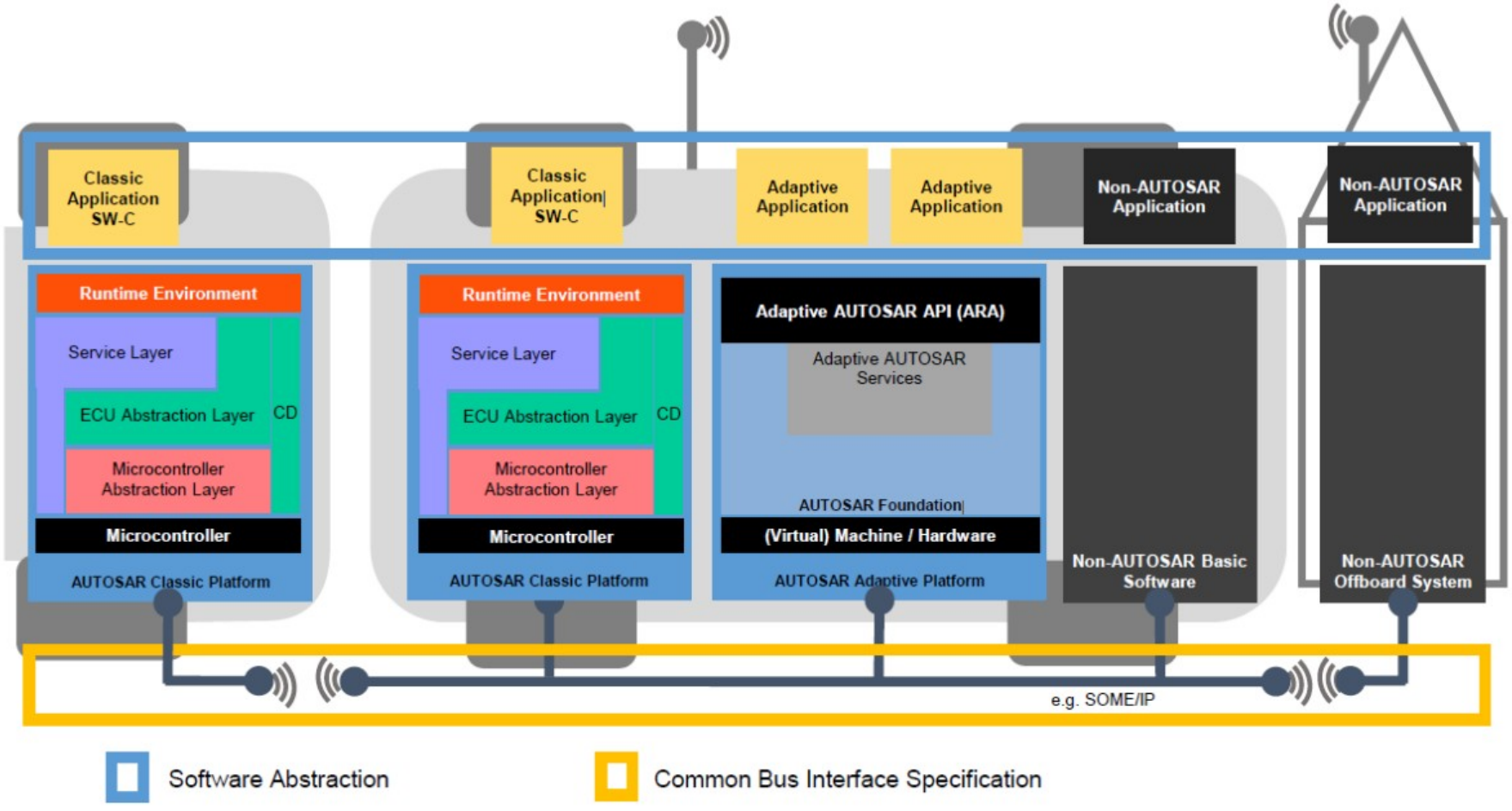

Controller 1
Controller 2
Controller 3
Controller 4

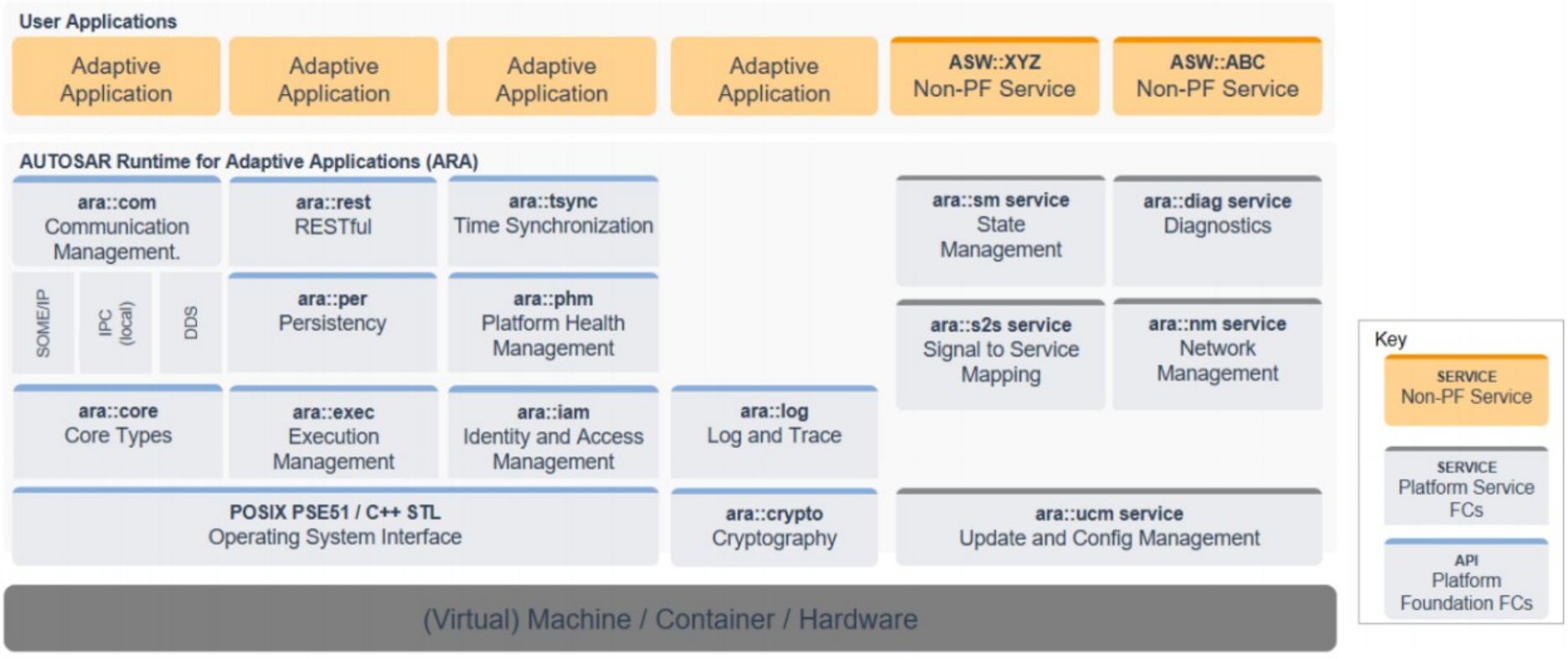

Supporting controller
Supporting controller
Master controller
Supporting controller
Supporting controller
Supporting controller
Master controller
Supporting controller


Flash Memory
Shared memory
USB
Performance CPU + RAM
Safety CPU + RAM
USB
eMMC
USB
ETH
ETH
Network controller
GPU
CAN
ETH
ETH
ETH

Networking

- CAN bus
- Ethernet
- PCIe


Classic Application SW-C
Classic Application SW-C
Adaptive Application
Adaptive Application
Non-AUTOSAR Application
Non-AUTOSAR Application
Runtime Environment
Service Layer
ECU Abstraction Layer
CD
Microcontroller Abstraction Layer
Microcontroller
AUTOSAR Classic Platform
Runtime Environment
Service Layer
ECU Abstraction Layer
CD
Microcontroller Abstraction Layer
Microcontroller
AUTOSAR Classic Platform
Adaptive AUTOSAR API (ARA)
Adaptive AUTOSAR Services
AUTOSAR Foundation
(Virtual) Machine / Hardware
AUTOSAR Adaptive Platform
Non-AUTOSAR Basic Software
Non-AUTOSAR Offboard System
e.g. SOME/IP
Software Abstraction
Common Bus Interface Specification


User Applications
Adaptive Application
Adaptive Application
Adaptive Application
Adaptive Application
ASW::XYZ Non-PF Service
ASW::ABC Non-PF Service
AUTOSAR Runtime for Adaptive Applications (ARA)
ara::com Communication Management.
ara::rest RESTful
ara::tsync Time Synchronization
ara::sm service State Management
ara::diag service Diagnostics
SOME/IP
IPC (local)
DDS
ara::per Persistency
ara::phm Platform Health Management
ara::s2s service Signal to Service Mapping
ara::nm service Network Management
ara::core Core Types
ara::exec Execution Management
ara::iam Identity and Access Management
ara::log Log and Trace
POSIX PSE51 / C++ STL Operating System Interface
ara::crypto Cryptography
ara::ucm service Update and Config Management
(Virtual) Machine / Container / Hardware
Key
SERVICE Non-PF Service
SERVICE Platform Service FCs
API Platform Foundation FCs

High performance chips

- GPU architecture
- Network routing acceleration
- FPGAs
- Accessing chips from Linux – OpenCL

TBD

- How to easily integrate components from different vendors?
- Common API on all layers
- Improving safety for L4-L5
- Overcoming HW shortages
- Vehicle communication
- Security