

AUTOSAR

ANNIVERSARY 2003 - 2023

AUTOSAR Introduction

Part 1 - The AUTOSAR Partnership and Standardization



BOSCH Continental



STELLANTIS

TOYOTA VOLKSWAGEN GROUP

AUT20THSAR

ANNIVERSARY 2003 - 2023

AUTomotive Open System ARchitecture

AUTOSAR Mission

AUTOSAR is a global partnership of leading companies in the automotive and software industry to develop and establish the **standardized software framework** and **open E/E system architecture** for intelligent mobility.

AUTOSAR Vision

AUTOSAR will be the **global established standard** for **software** and **methodology** enabling **open E/E system architectures** for future intelligent mobility supporting high levels of dependability, especially safety and security.

AUTOSAR Partnership

Collaboration Model With Proven Track Record

AUTOSAR has succeeded in **bringing together main players** in automotive E/E system development **to form a powerful standard** that is successfully used all **around the world**.

AUTOSAR Partnership

The Advantage of a Strong Community

31 international automotive OEM are AUTOSAR partners.

21 are **under the 22 top-selling OEM** and covering **over 80%** of the **total market revenue** in 2019*.

Together with other Tier1 and Suppliers, our partners are collaborating to shape Future Intelligent Mobility.



*ref. to The 2019 Strategy&Digital Auto Report, strategy& - part of the PwC network

AUTOSAR Partnership

Types of Partnership



Premium Plus



Premium



Development



Associate



Attendee



Subscriber

| | Premium Plus | Premium | Development | Associate | Attendee | Subscriber |
|----------------------------|----------------------------------------------------------|---------------------------------------------------------------|----------------------------------------------------------------|-----------------------------------|----------------------------------|--------------------------------------------------|
| Motivation | Market leaders to drive innovations in AUTOSAR standards | Development and exploitation of AUTOSAR standards (size >100) | Development and exploitation of AUTOSAR standards (size < 100) | Exploitation of AUTOSAR standards | Development of AUTOSAR standards | Openness of AUTOSAR standards to eligible public |
| Annual Fee | 90,000 Euro | 31,000 Euro | 10,000 Euro | 21,000 Euro | Free | 3,000 Euro |
| Annual Contribution | 5 FTE + 1 FTE (Project Leader) | 1.5 FTE | 0.5 FTE | None | Individual agreement | None |

More Than 360 AUTOSAR Partners

9 Core Partners



65 Premium Partners



3 Premium Partners Plus



80 Development Partners

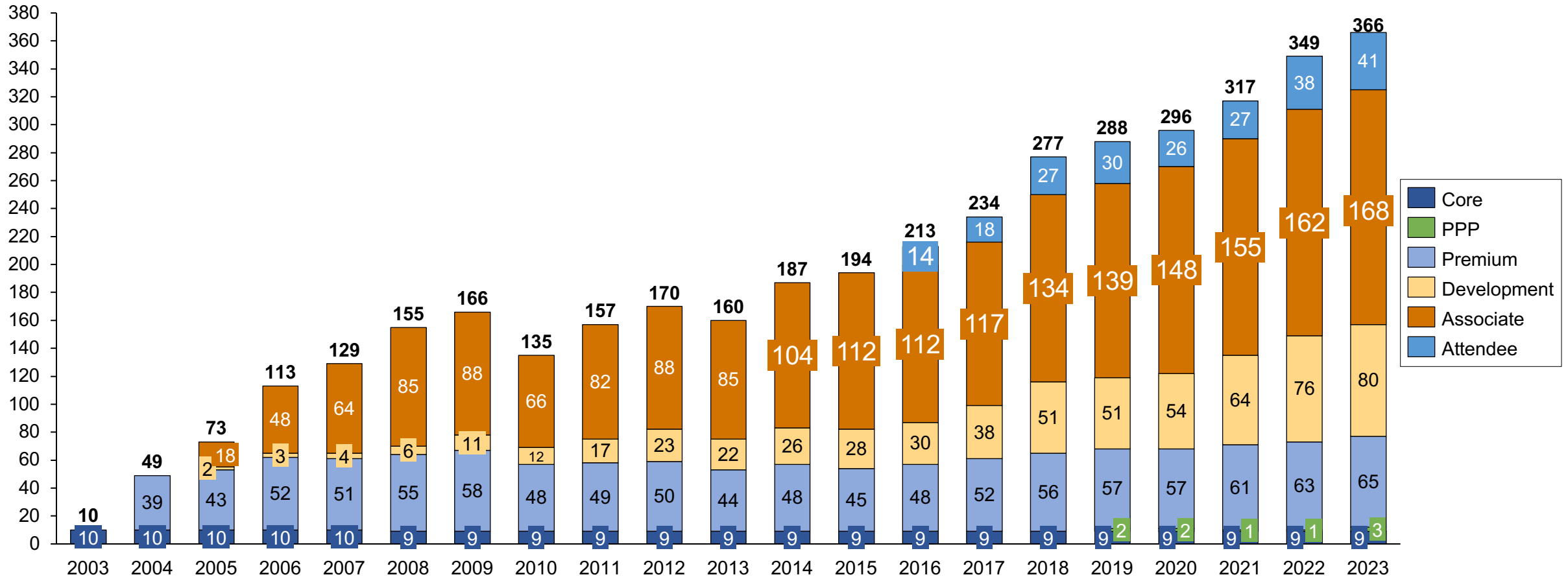


+ 168 Associate Partners

+ 41 Attendees

AUTOSAR Partnership

Partner Development Since 2003



AUTOSAR Partnership

Global Distribution of AUTOSAR Partners

42 Partners in North America

- 2 Core Partner
- 8 Premium Partner
- 6 Development Partner
- 22 Associate Partner
- 4 Attendee

158 Partners in Europe

- 6 Core Partner
- 1 Premium Partner Plus
- 28 Premium Partner
- 37 Development Partner
- 57 Associate Partner
- 29 Attendee

163 Partners in Asia

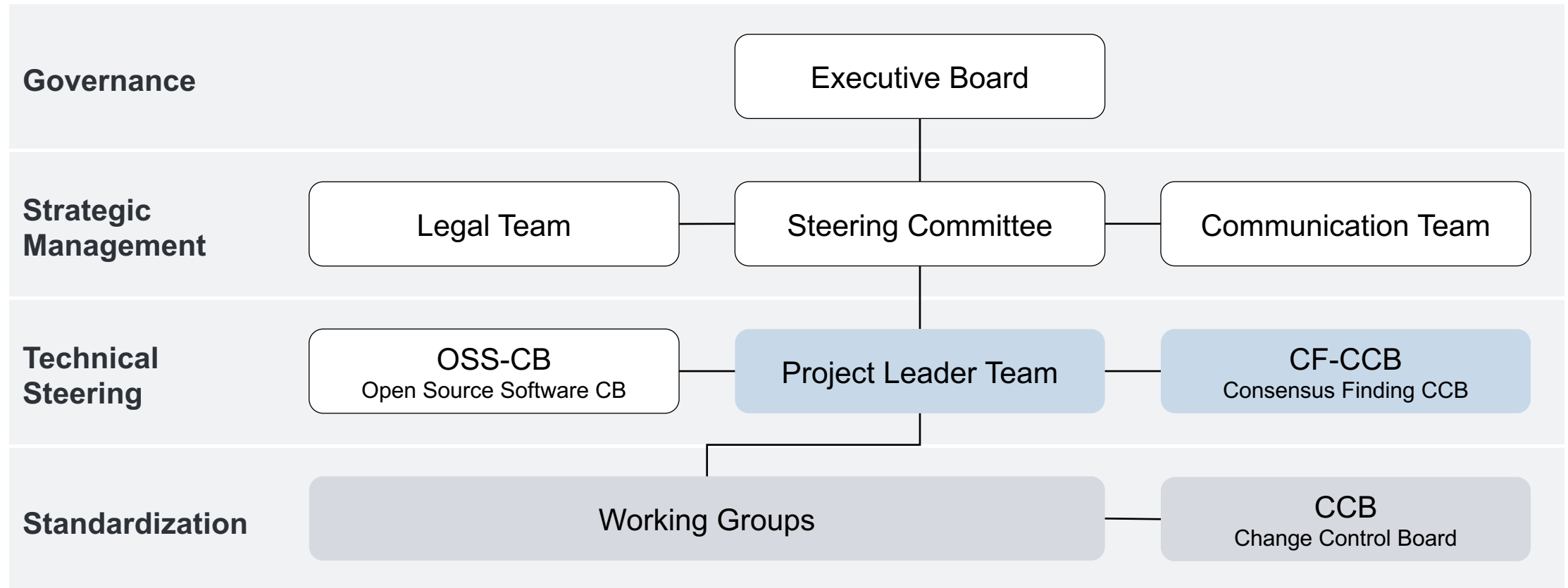
- 1 Core Partner
- 2 Premium Partner Plus
- 29 Premium Partner
- 35 Development Partner
- 89 Associate Partner
- 7 Attendee

3 Partners in Africa

- 2 Development Partner
- 1 Attendee

AUTOSAR Organization

Official Roles



□ Core Partner

■ Core Partner, Premium Partner Plus

■ Core Partner, Premium Partner Plus, Premium Partner, Development Partner

AUTOSAR Organization

Support Functions

AUTOSAR Internal Affairs Officer (IAO), Spokesperson and Regional Spokespersons

Business Administration

- Partner and User Management
- Finance
- Meeting Management

Communication Support

- Marketing

Technical Management

- Standards
- Software Development Engineering and Integration

Deliverable Management

- Change Management
- Quality Assurance
- Release Management

Legal Support

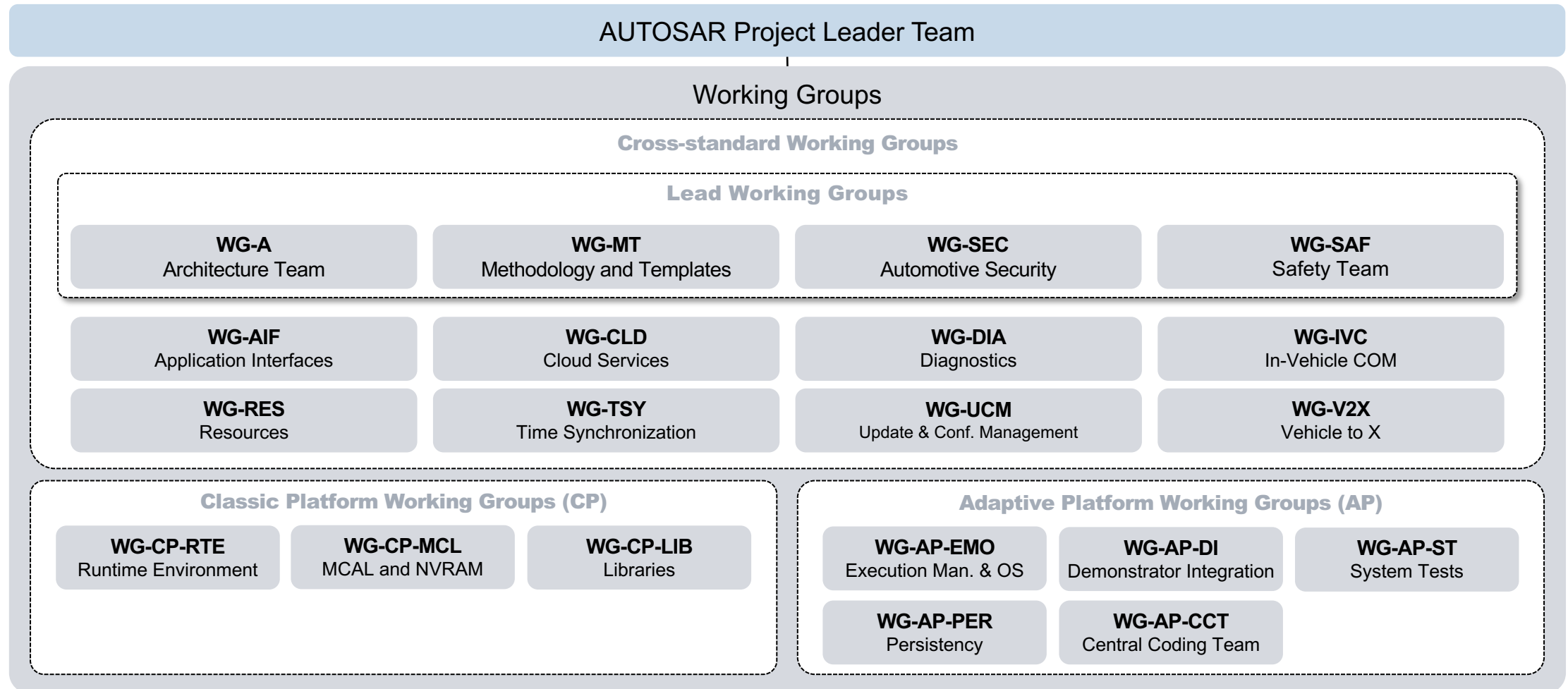
Requirements Management

Quality and Process Management

Technical Office and IT Infrastructure

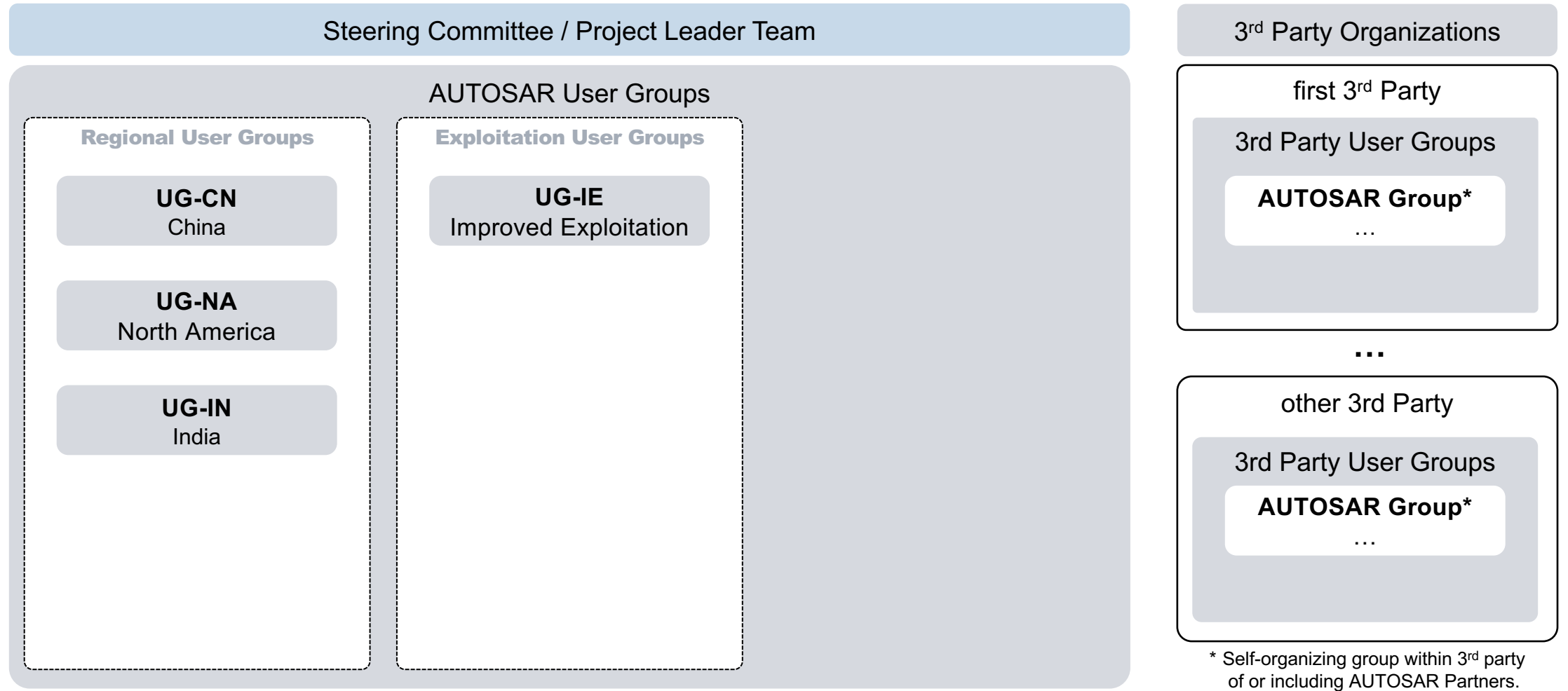
AUTOSAR Organization

Overview of Working Groups



AUTOSAR Organization

User Group Structure



* Self-organizing group within 3rd party of or including AUTOSAR Partners.

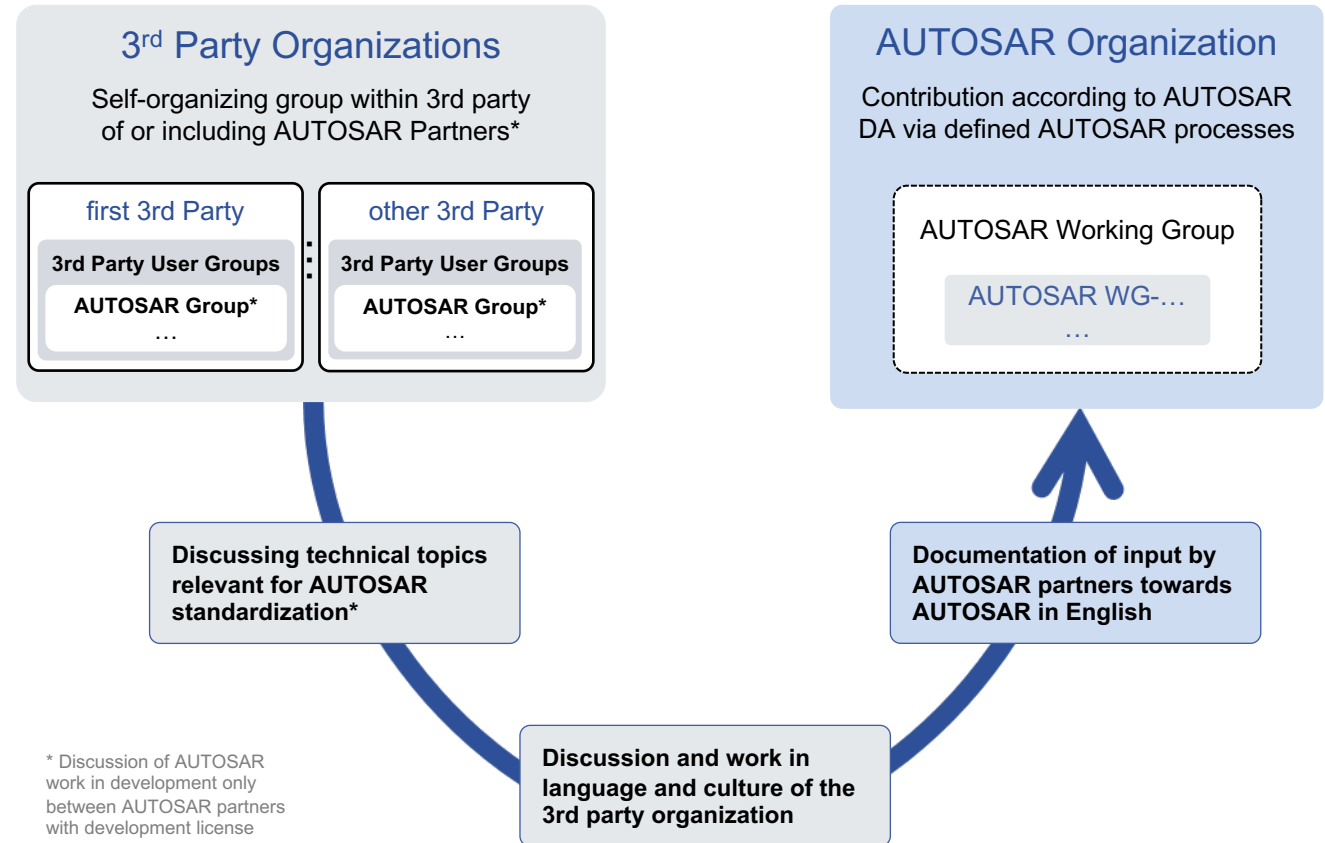
AUTOSAR Organization

3rd Party Group – Contribution of 3rd Party Technical Interests

Example Collaboration Model:

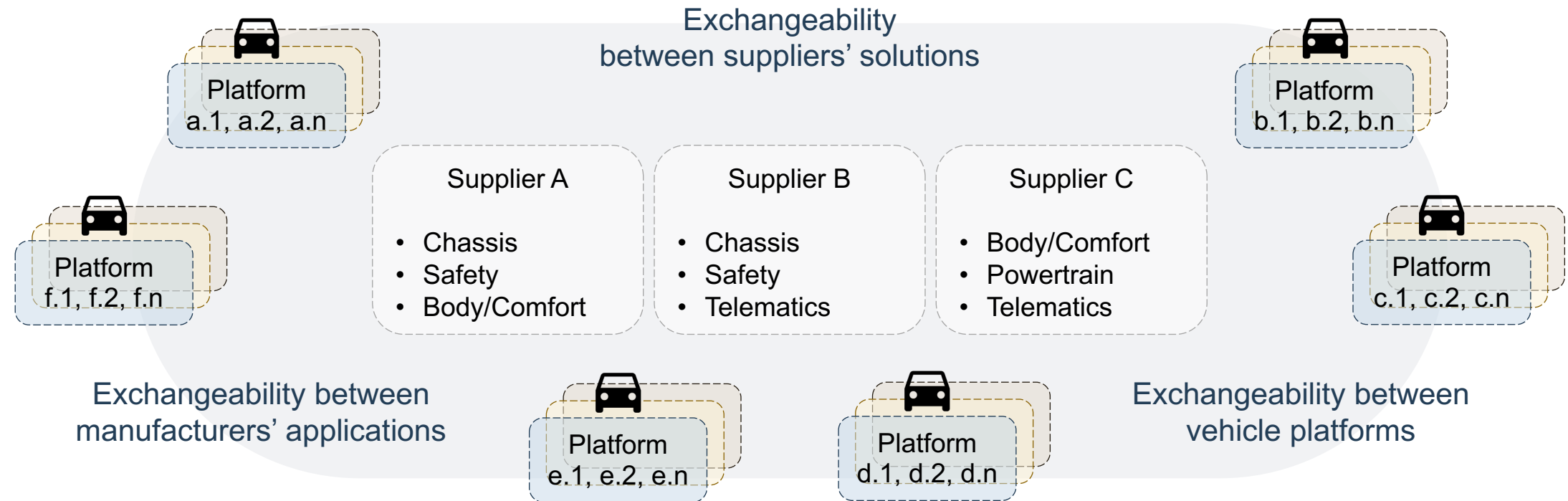
3rd parties technical interests are elaborated in 3rd party organizations

Interested 3rd party organizations establish internal groups to interface to AUTOSAR.



AUTOSAR Basic Principles

Benefits of a Software Framework

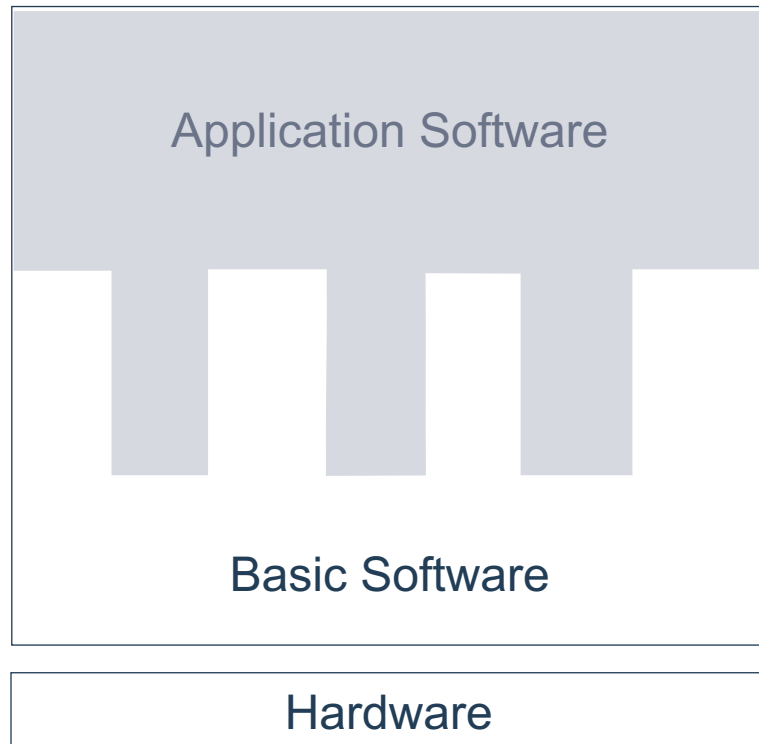


The **AUTOSAR Software Framework** promotes software module reuse and exchangeability.

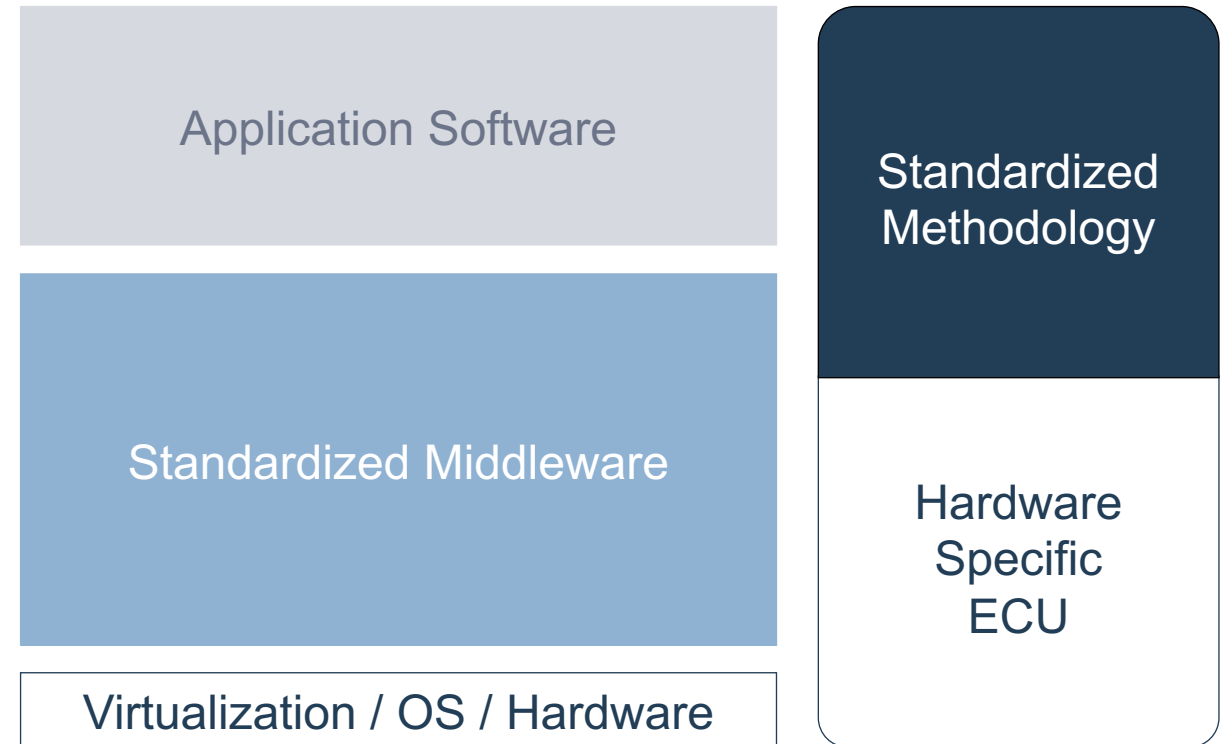
AUTOSAR Basic Principles

Proprietary vs. AUTOSAR Middleware Approach

Proprietary Solution



AUTOSAR™



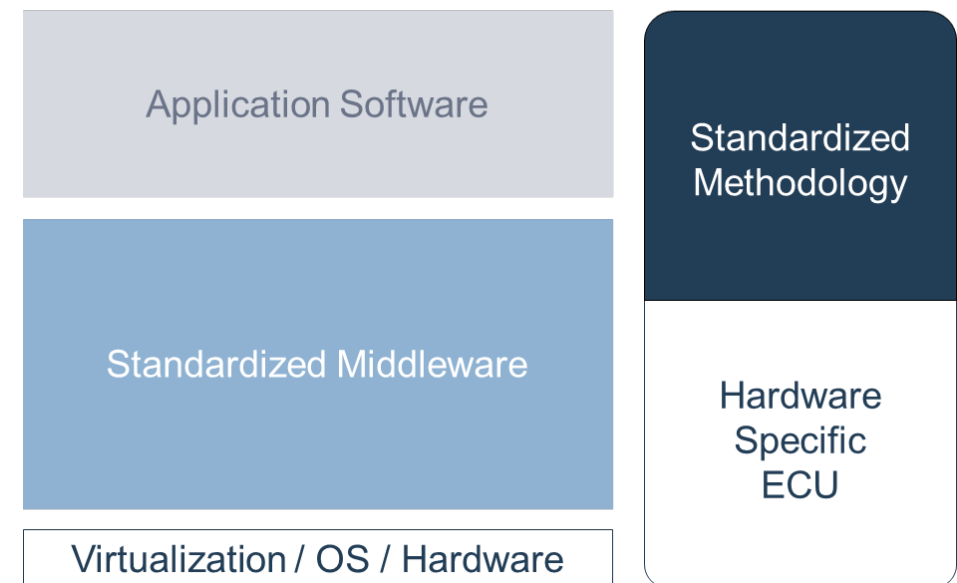
AUTOSAR Basic Principles

Benefits of the AUTOSAR Middleware Approach

AUTOSAR paves the way for innovative electronic systems with **improved performance, safety and security.**

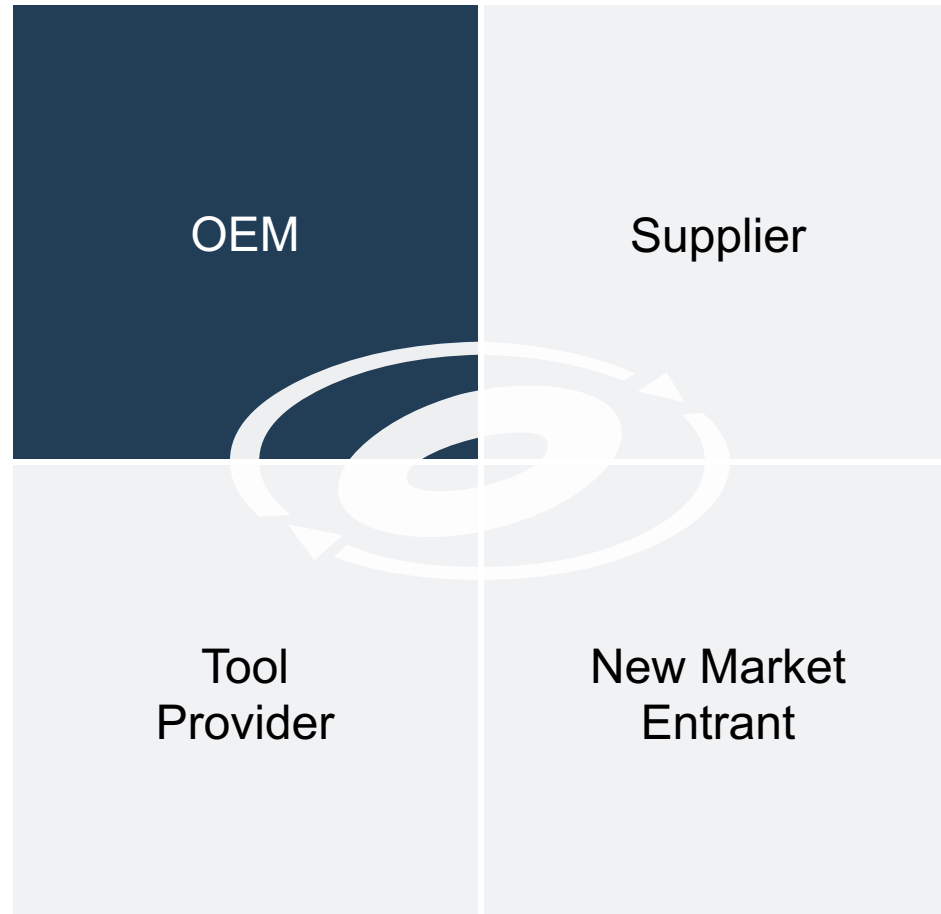
- **Hardware and software** widely **independent** of each other
- **Decouplable development** (by abstraction) through horizontal layers; therefore, **reduced** development **time** and **costs**
- **Enhanced quality** and **efficiency** through software reuse

AUTOSAR™



AUTOSAR Basic Principles

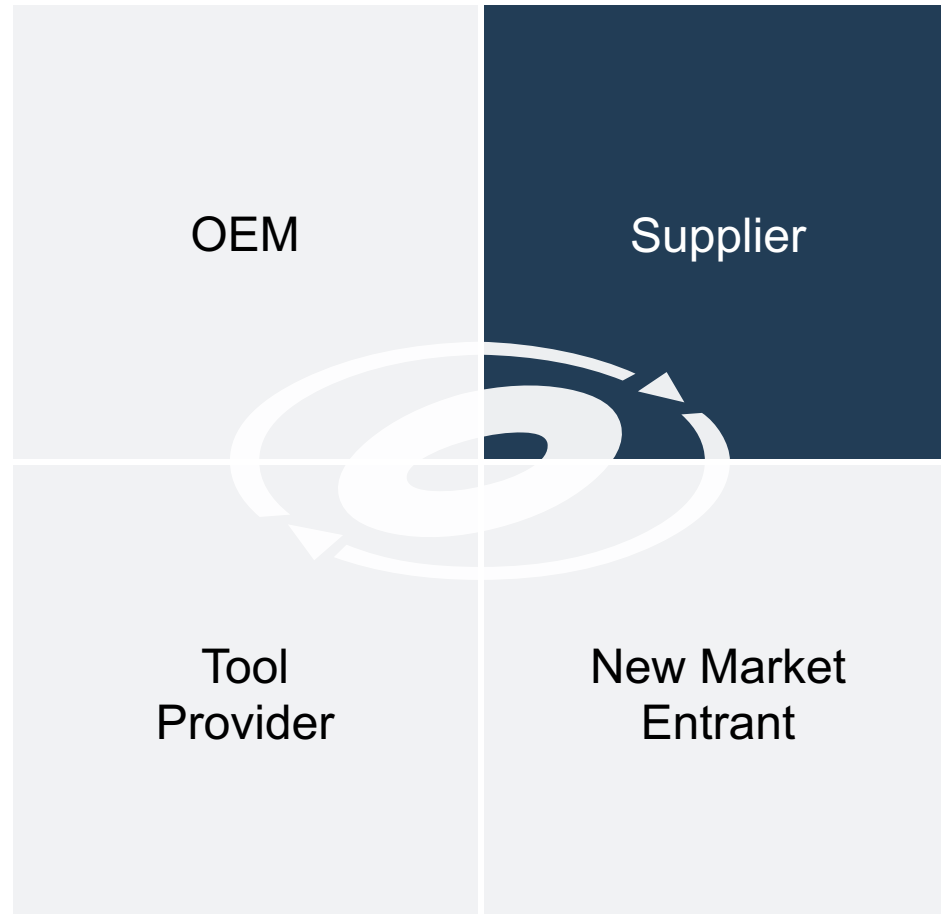
Benefits of Exploiting the Standard (1)



- Establish **distributed development** among suppliers
- Compete on innovative functions with increased **design flexibility**
- **Simplify** software and system **integration**
- **Reduce** overall software development **costs**

AUTOSAR Basic Principles

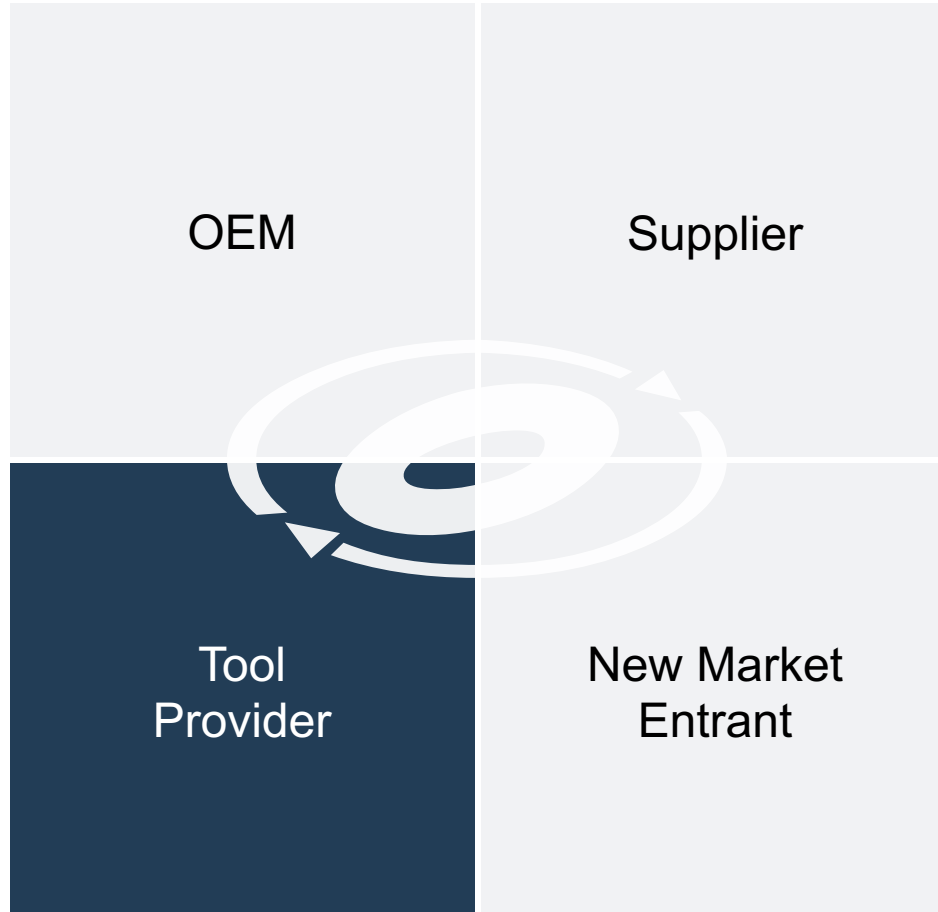
Benefits of Exploiting the Standard (2)



- Enhance efficient **variant handling**
- **Reuse software** modules across OEMs
- Increase efficiency of **application development**
- **Invent** new business models

AUTOSAR Basic Principles

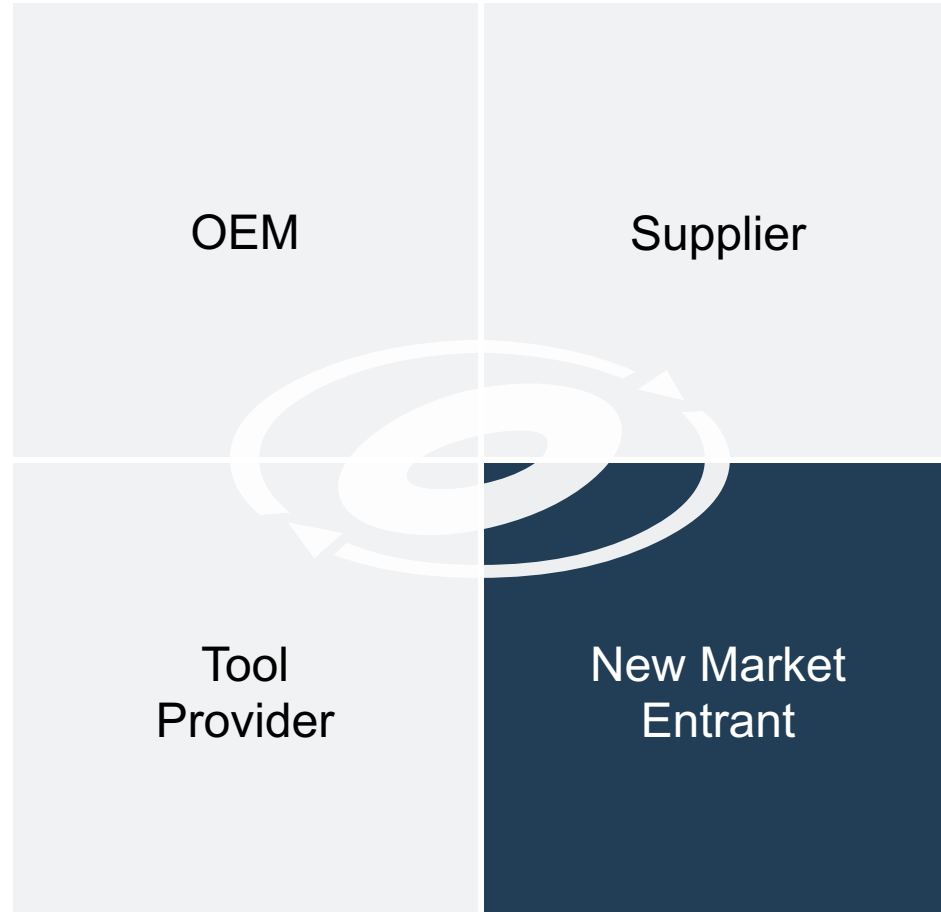
Benefits of Exploiting the Standard (3)



- Have an **interface** with development processes
- **Embed tools** into an overall tool environment

AUTOSAR Basic Principles

Benefits of Exploiting the Standard (4)



- Enable **new business models** through standardized interfaces
- **Understand easily** how automotive software is developed

Agenda

Part 1

- ▶ The AUTOSAR Partnership
- ▶ The AUTOSAR Standardization
 - Challenges in the Mobility Sector
 - The Software Framework

Part 2

- ▶ Architecture and Features
- ▶ Smart Solutions Based on AUTOSAR
- ▶ Processes and Quality

Challenges in the Mobility Sector

Selected Main Drivers for Standardization



Highly Automated Driving with Dependability

- Reliability
- Availability
- Maintainability
- Safety
- Security



V2X, Internet of Things, Cloud-Based Services

- Security
- QoS
- Over the Air (OTA) Update/Upgrade

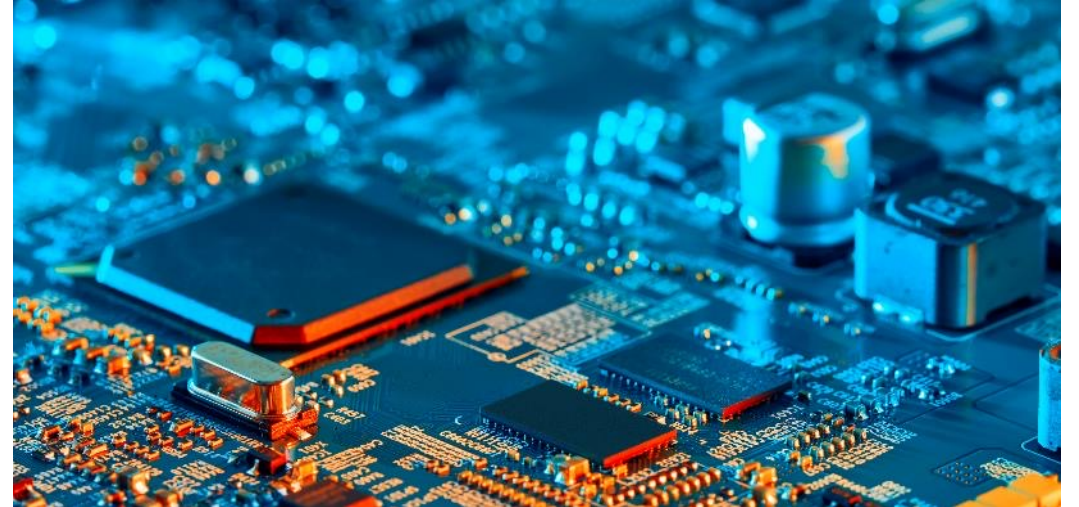
Challenges in the Mobility Sector

Selected Main Drivers for Standardization



Increasing Data Rates and Volume

- Automotive Ethernet
- 5G



New Automotive Processor Technologies

- Centralized multi-core processors

Challenges in the Mobility Sector

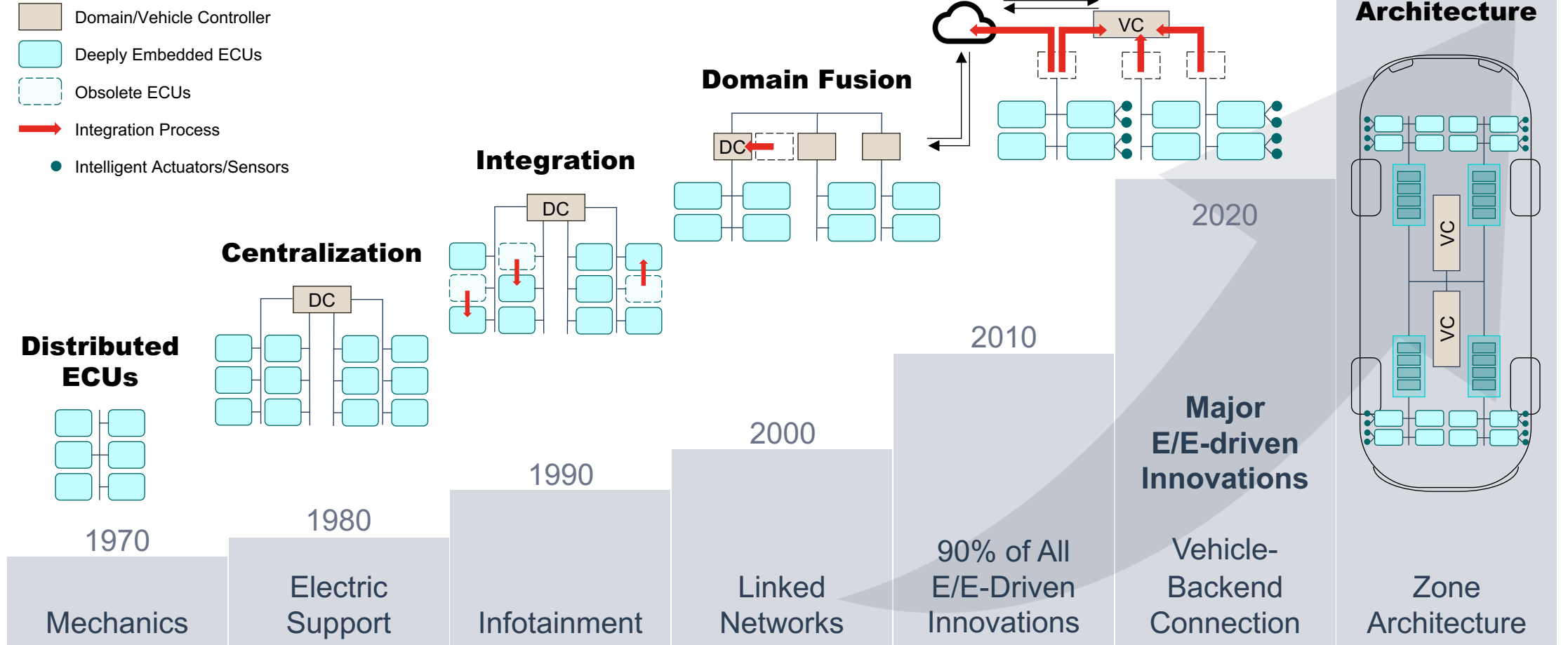
Highly Automated Driving - It's all About Trust!

High dependability will require

- a balance between **safety** and **availability** through redundancy and degradation concepts.
- **protection against** common cause or common mode **failures** through physical and software diversity.
- comprehensive system **monitoring** and **diagnosis**.
- high **system reliability**.
- Over The Air (**OTA**) serviceability.
- **certifiable** development processes.

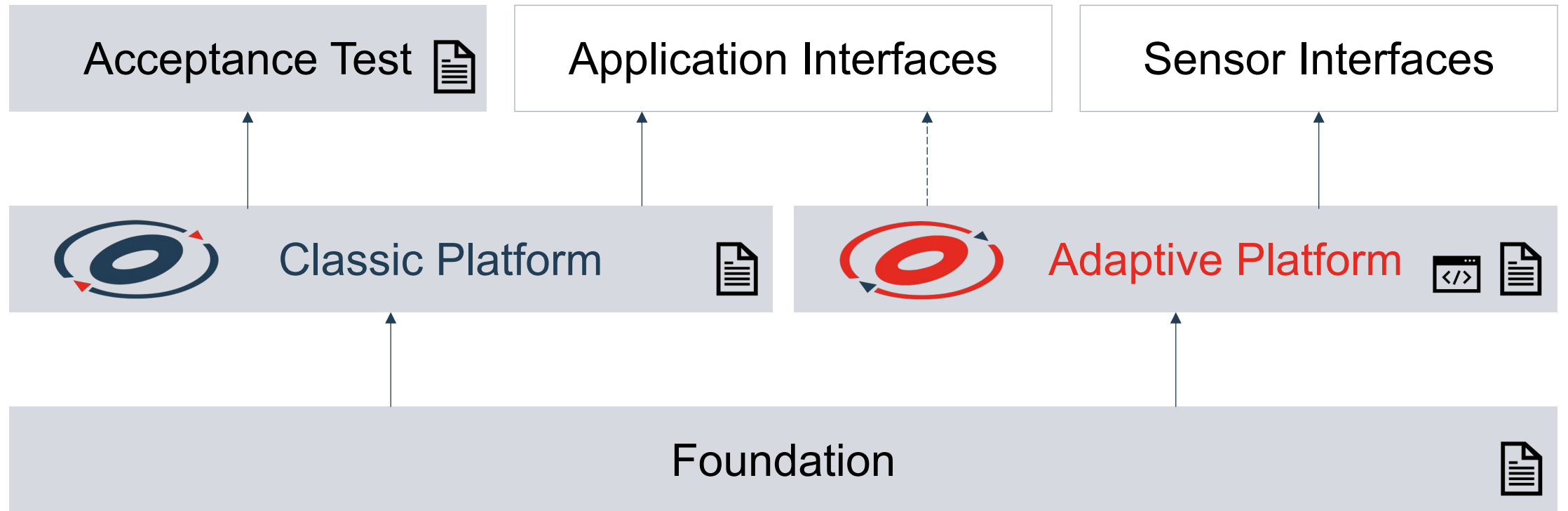
Challenges in the Mobility Sector

Driving Innovations in E/E Architectures



AUTOSAR Software Framework

Deliverables



Released as an own standard

Released as part of the standard it is extending

A ← B A extends B

A ←- B A is planned to extend B

Specification available

Demonstrator Code available

AUTOSAR Software Framework

The AUTOSAR Platforms

Classic Platform



High, in the range of micro-seconds

High, up to ASIL-D

Low, ~ 1000 DMIPs

Adaptive Platform



Mid, in the range of milli-seconds

High, at least ASIL-B

High, > 20.000 DMIPs

Collaboration E.g. Infotainment

Microsoft Windows, Android, Linux, Automotive Grade Linux, GENIVI, Robot Operating System (ROS)

Low, in the range of seconds

Low, QM

High, ~ 10.000 DMIPs

Real Time Requirements

Safety Criticality

Computing Power

AUTOSAR Adaptive Platform

Three Pillars for ADAS Applications



1. Safe and Secure



2. Connected



3. Dynamic and
Updateable

AUTOSAR Adaptive Platform

Three Pillars for ADAS Applications (1)



1. Safe and Secure

- External Communication:
DTLS



2. Connected

- In-Vehicle Communication:
SecOC • IPsec






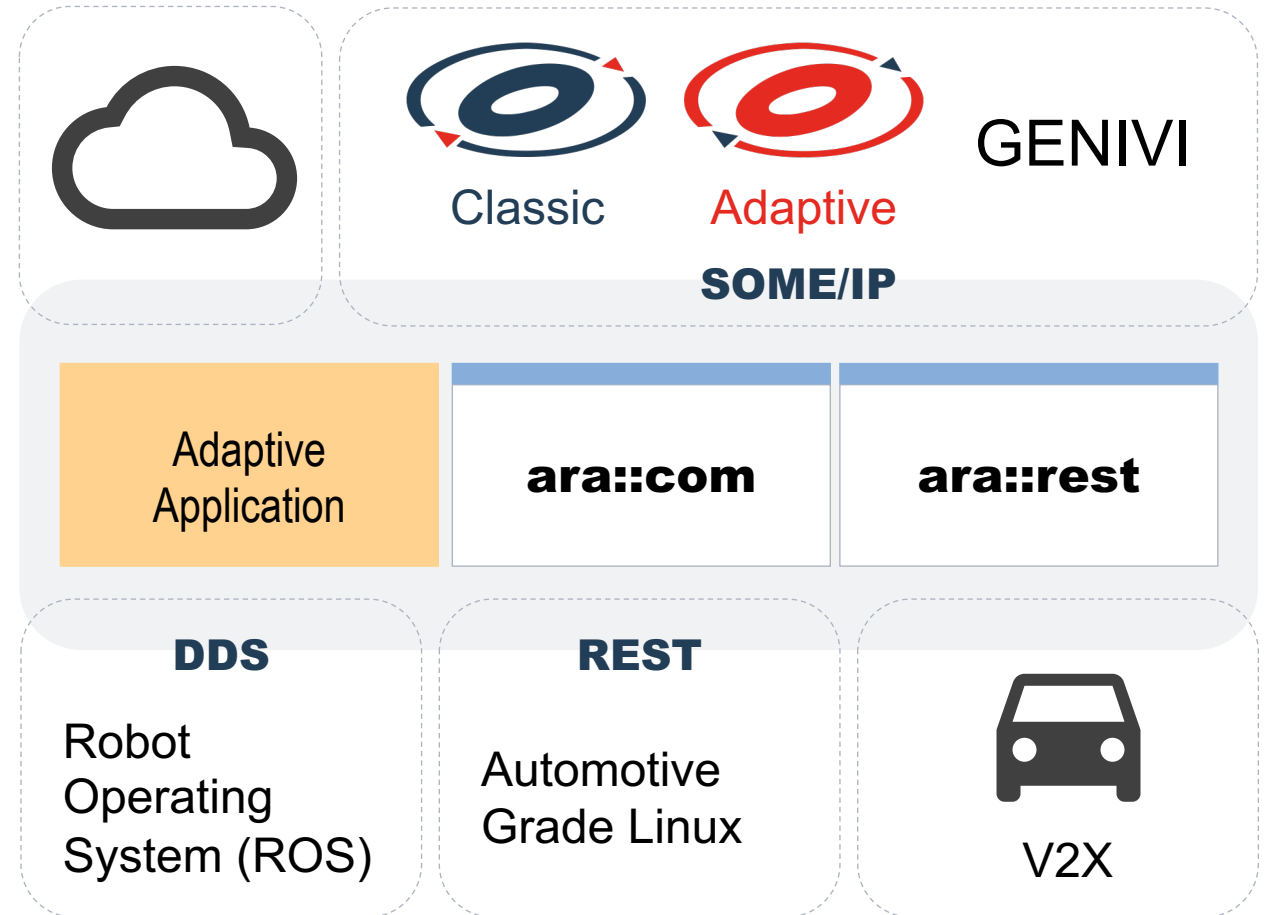
3. Dynamic and Updateable

- Platform
Process Separation • Process-Sys Separation • Safe Data Storage • Supervision • Failure Handling • Resource Budgeting • E2E for SOA • Exceptionless APIs • IAM • Crypto

AUTOSAR Adaptive Platform

Three Pillars for ADAS Applications (2)

-  1. Safe and Secure
-  2. Connected
-  3. Dynamic and Updateable




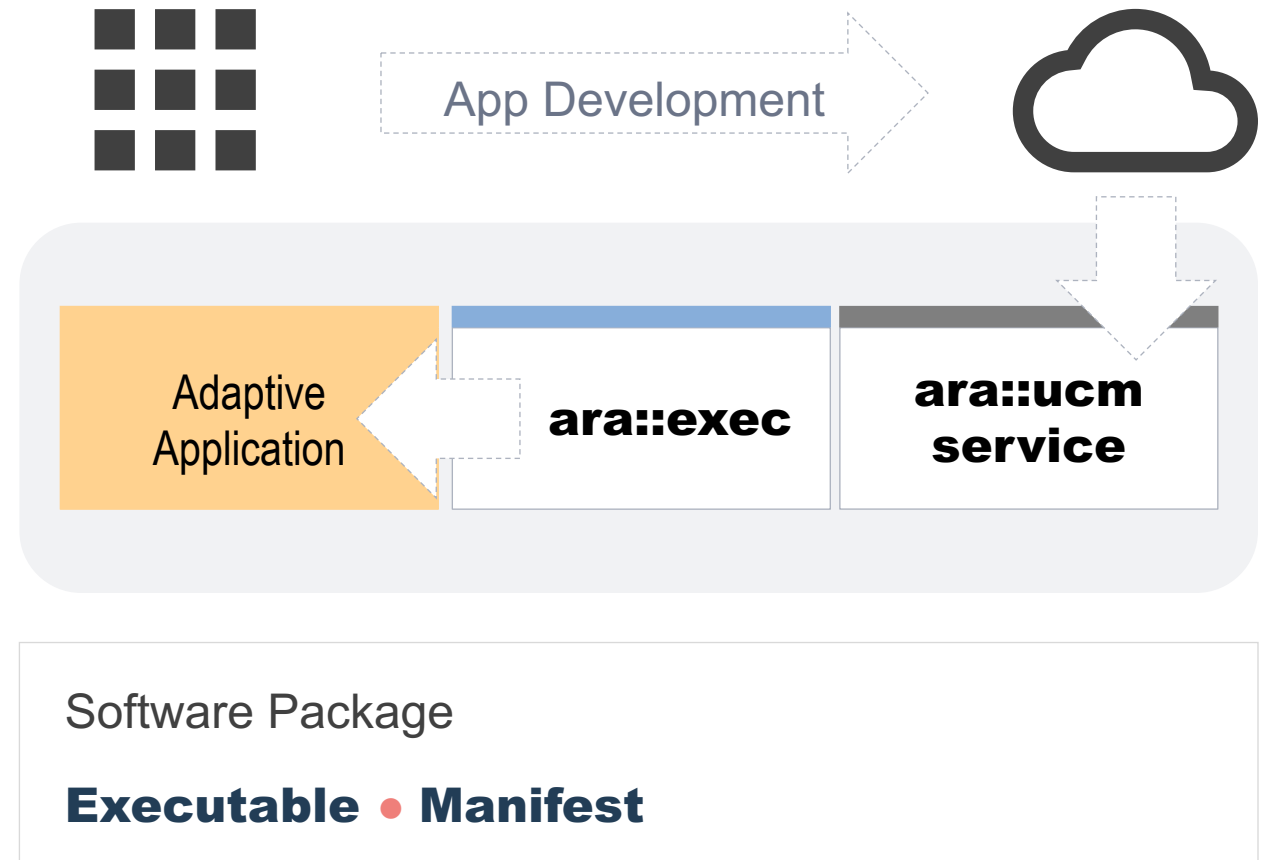
AUTOSAR Adaptive Platform

Three Pillars for ADAS Applications (3)

 1. Safe and Secure

 2. Connected


 3. Dynamic and Updateable



AUTOSAR Classic Platform

Four Pillars Form the Standard Solution for Today's Automobiles

 1. Functional Safety

 2. Efficiency

 3. Field Proven

 4. Performance

AUTOSAR Classic Platform

Four Pillars Form the Standard Solution for Today's Automobiles (1)



1. Functional Safety

- Mature safety features (e.g. watchdog, E2E communication protection, etc.)
- Scalable from QM up to ASIL D



2. Efficiency



3. Field Proven



4. Performance

AUTOSAR Classic Platform

Four Pillars Form the Standard Solution for Today's Automobiles (2)



1. Functional Safety

- AUTOSAR stacks from different vendors



2. Efficiency

- Cost effective by supporting a wide range of μ Controllers



3. Field Proven

- Flexible due to CDD



4. Performance

AUTOSAR Classic Platform

Four Pillars Form the Standard Solution for Today's Automobiles (3)



1. Functional Safety

- Mature by many years of application



2. Efficiency

- High quality due to widespread implementations



3. Field Proven

- Established distributed development processes with standardized methods and templates



4. Performance

AUTOSAR Classic Platform

Four Pillars Form the Standard Solution for Today's Automobiles (4)



1. Functional Safety

- Hard real time capabilities



2. Efficiency

- Event triggered applications



3. Field Proven

- Flexible through supporting a wide range of protocols and networks



4. Performance

- Scalable by configuration

AUTOSARTH

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Thank you for your attention

If you'd like to become a partner, contact us at:

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