AUTOSAR the Next Generation – The Adaptive Platform

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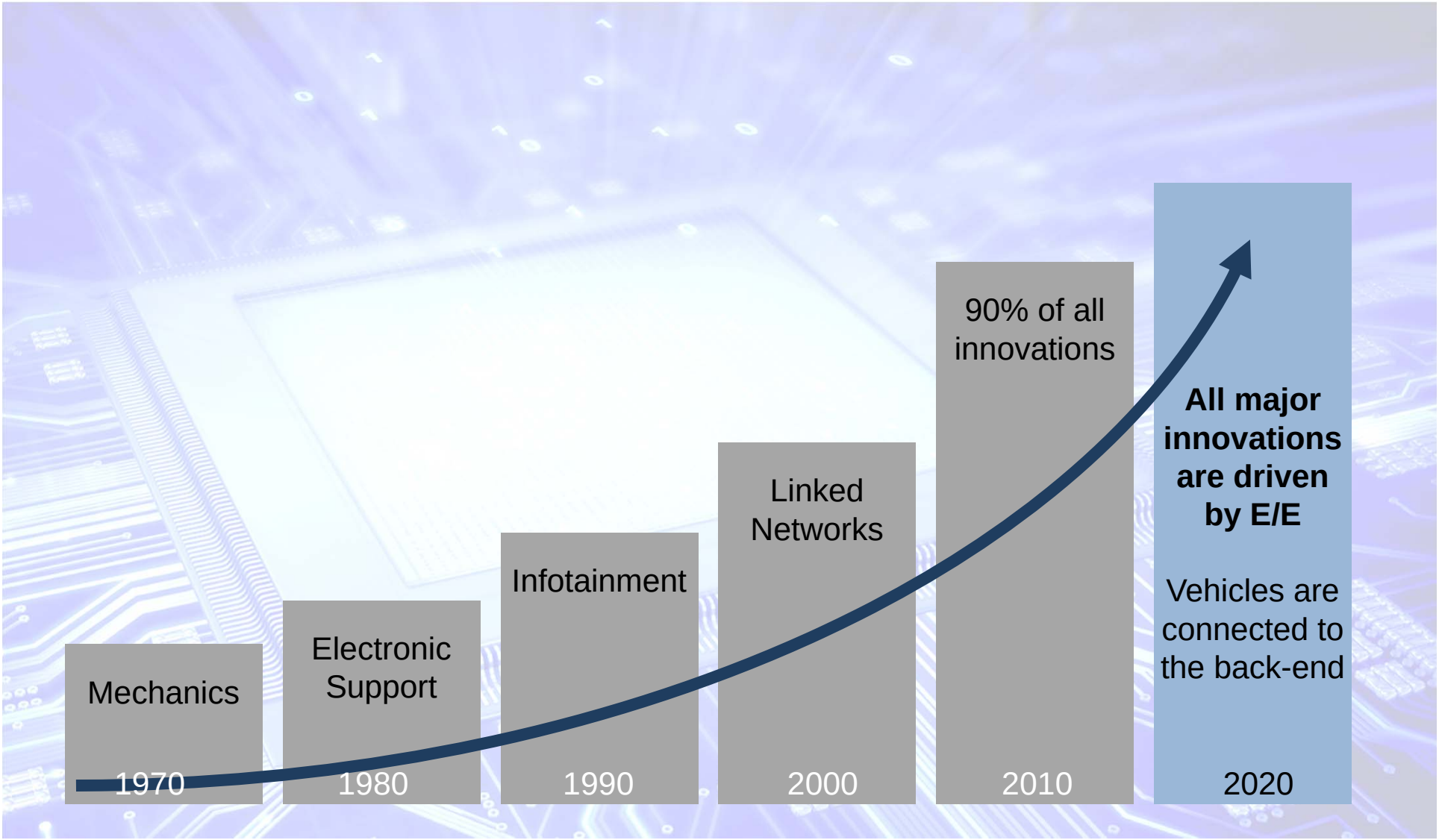
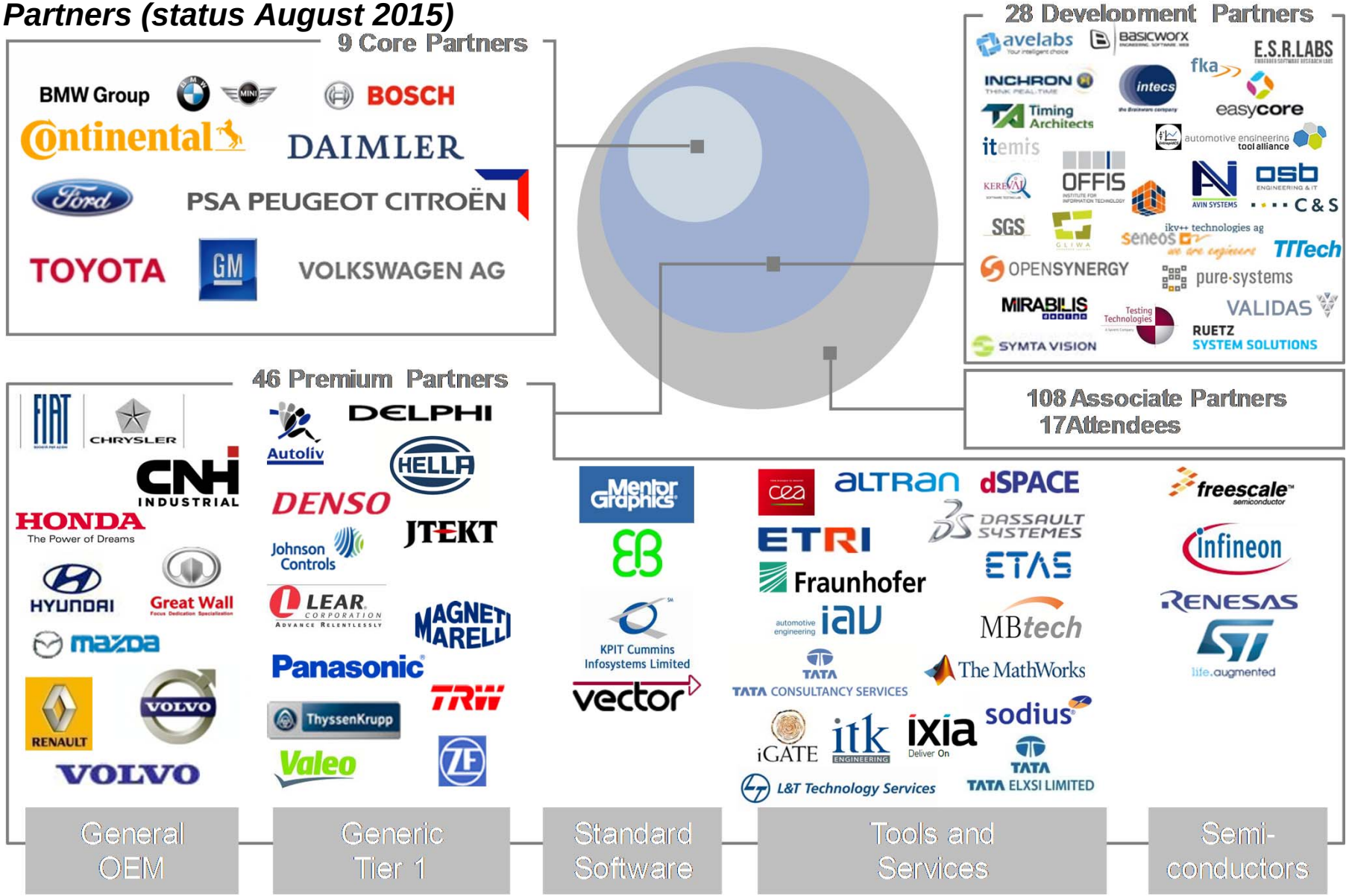
Overview

- Introduction
  - Why AUTOSAR?
- AUTOSAR Classic
  - Overview and achievements
- Game changers
  - New challenges and use-cases
  - New functions
- Future of AUTOSAR
  - Adaptive Platform
  - New cooperation model

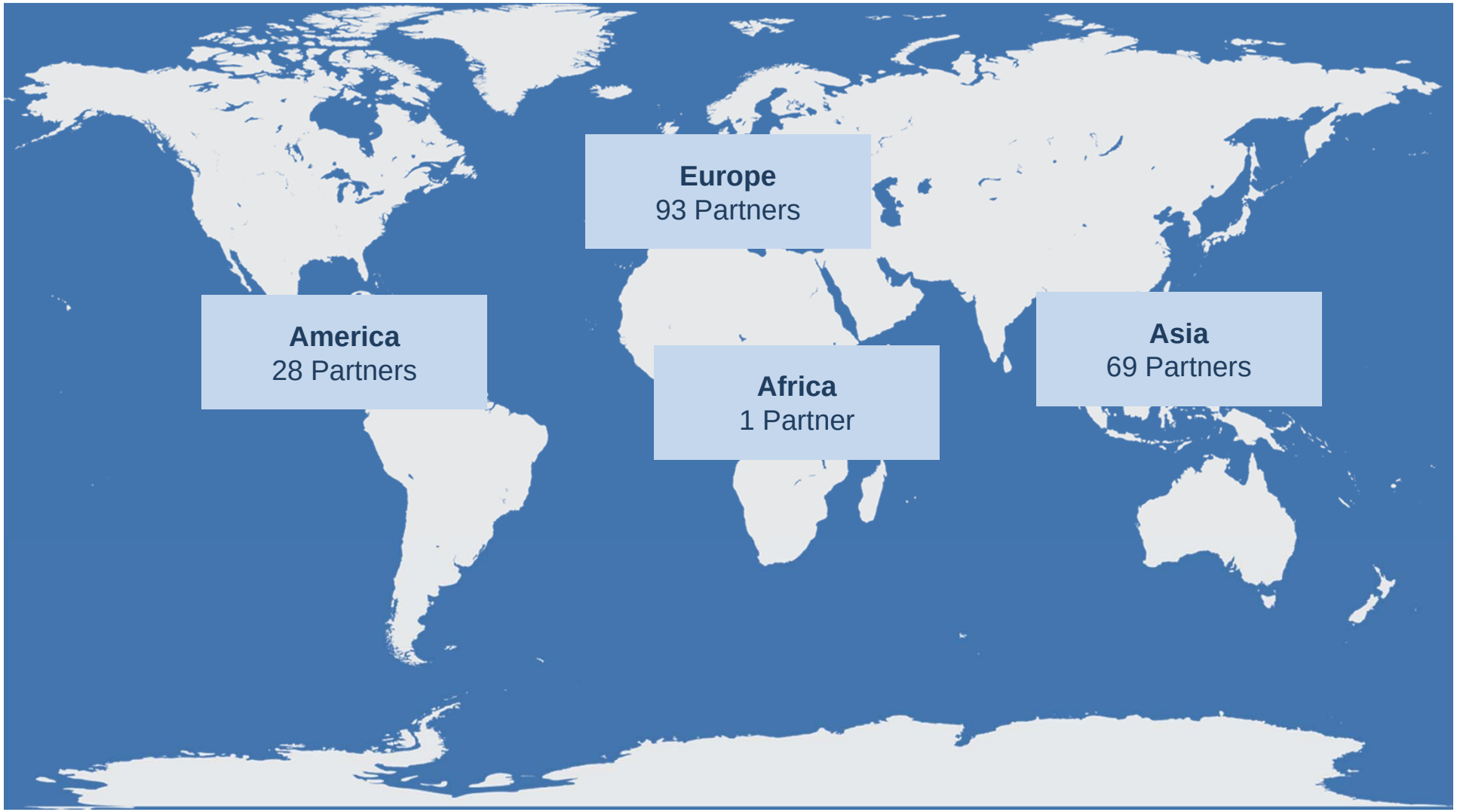
E/E innovations in vehicle development are increasing



Partners (status August 2015)



AUTOSAR has become a global standard
Partners 2015



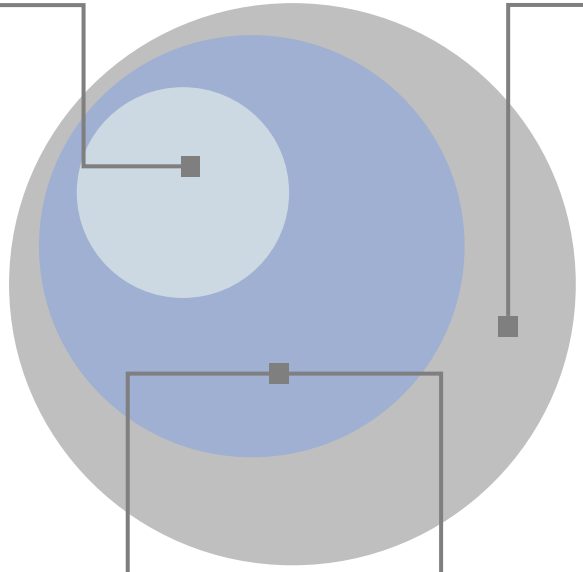
Running the AUTOSAR partnership: three tier partnership structure

Core Partners

- Organizational control
- Administrative control
- Exploitation of the AUTOSAR standard

Associate Partners

- Users of the AUTOSAR standard
- Exploitation of the AUTOSAR standard



Premium Partners

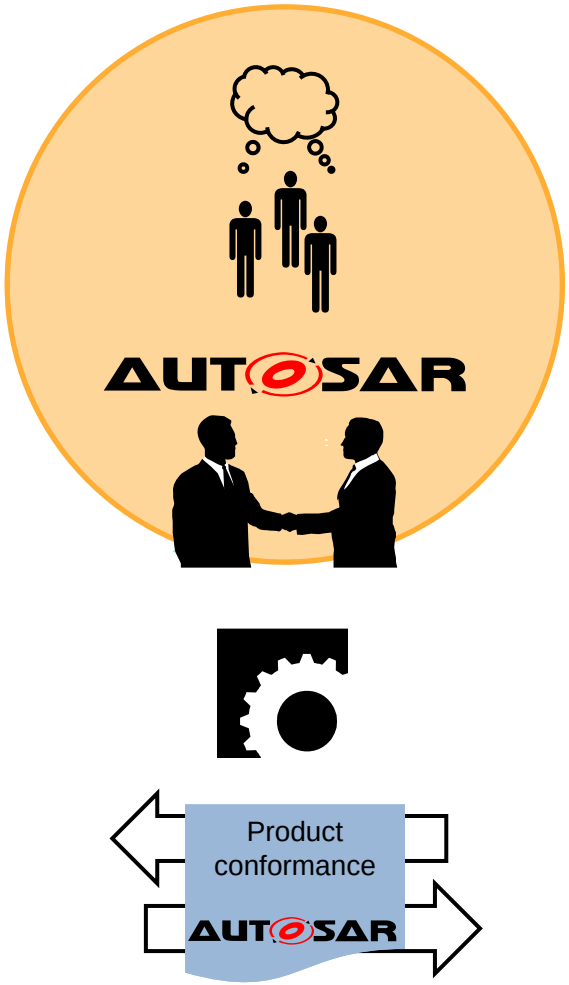
- Contributing in working groups
- Exploitation of the AUTOSAR standard

Development Partners

- Dedicate expertise contributions in working groups
- Exploitation of the AUTOSAR standard

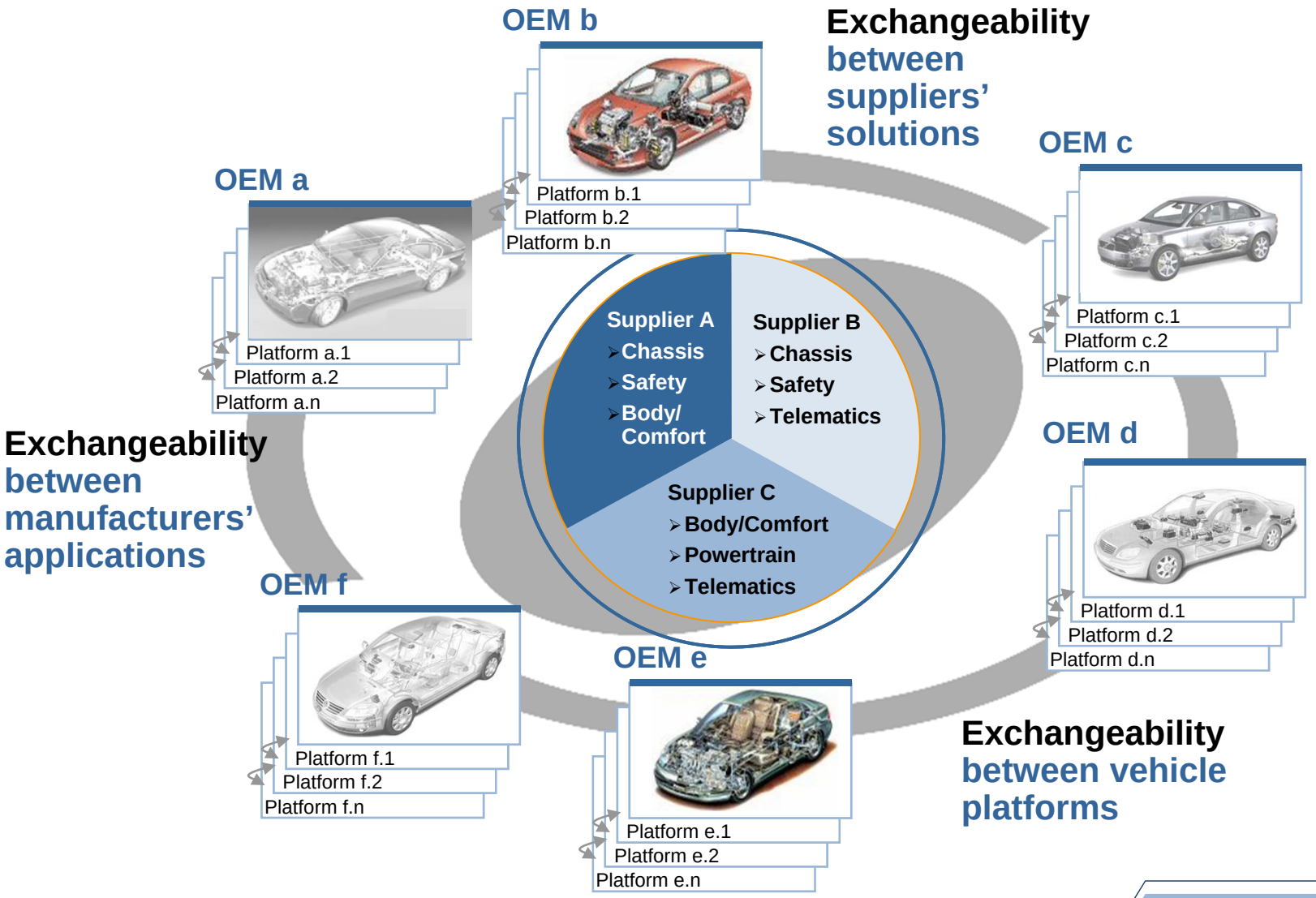
The principles of the development cooperation

- All Partners jointly develop a common automotive standard.
- AUTOSAR Partners grant each other a non-exclusive, non-transferable license under its essential intellectual property rights.
- AUTOSAR Partners do not assert against each other when commercially exploiting the AUTOSAR standard.
- As part of their exploitation of AUTOSAR, AUTOSAR Partners develop AUTOSAR compliant products.
- AUTOSAR Partners commit for product conformance to AUTOSAR specifications to ensure interoperability.

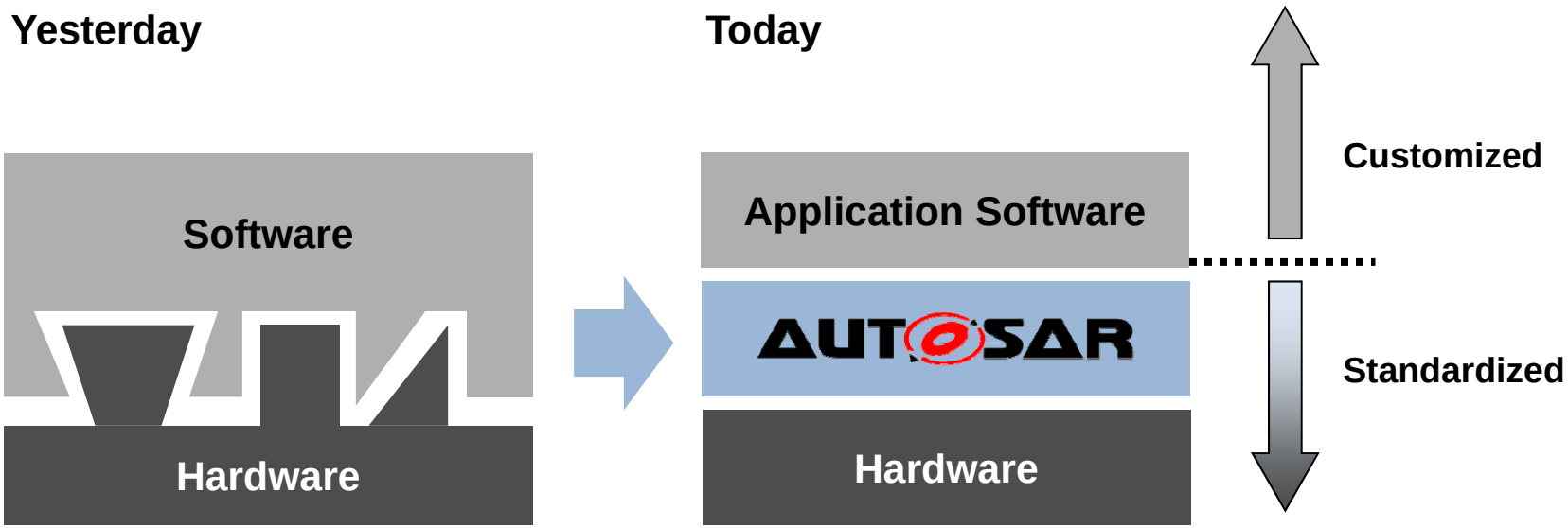


Cooperate on standards, compete on implementation.

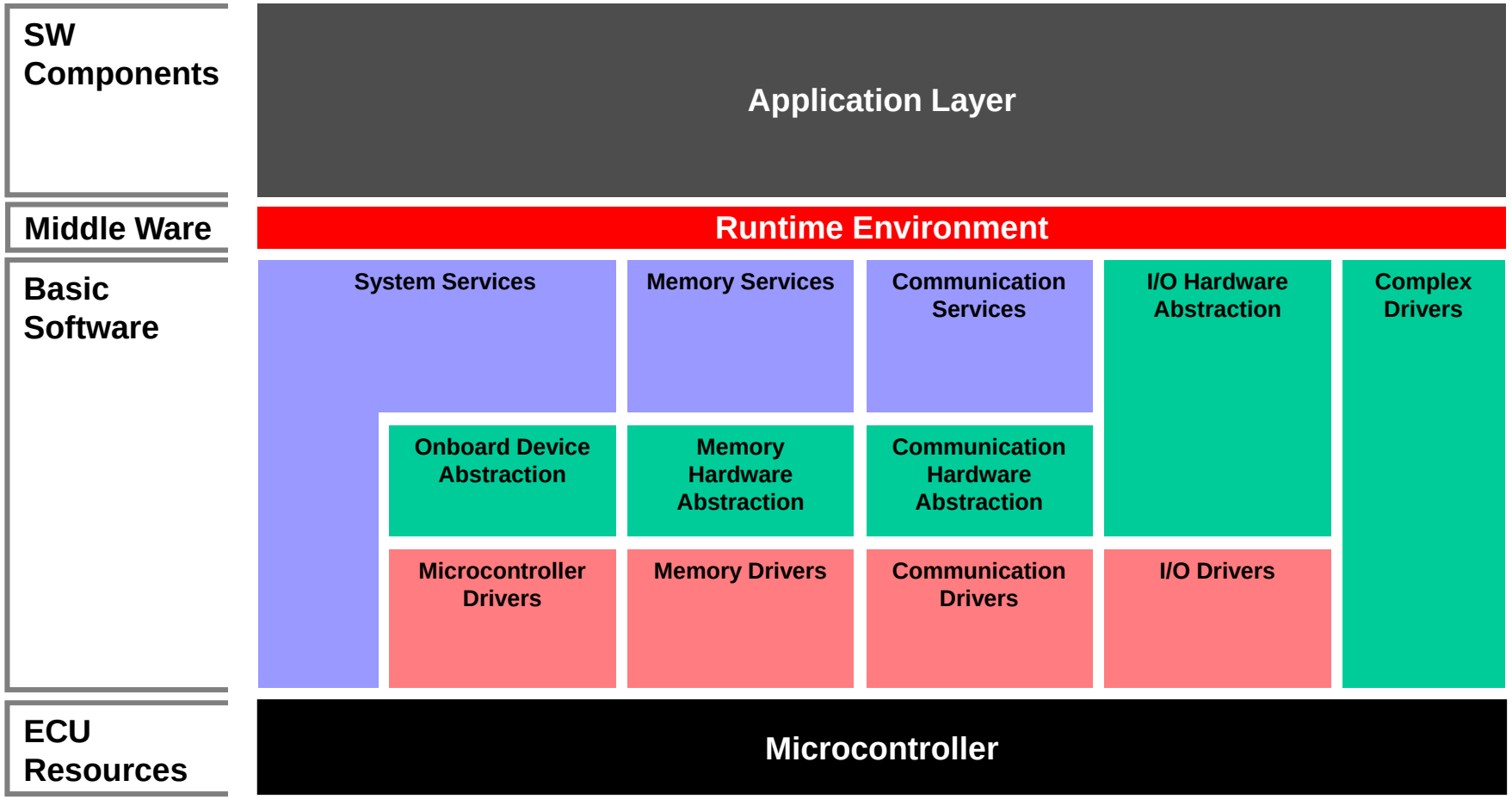
Complexity management by reuse and exchangeability



Exploring AUTOSAR: hardware-independent architecture



Exploring AUTOSAR: software architecture



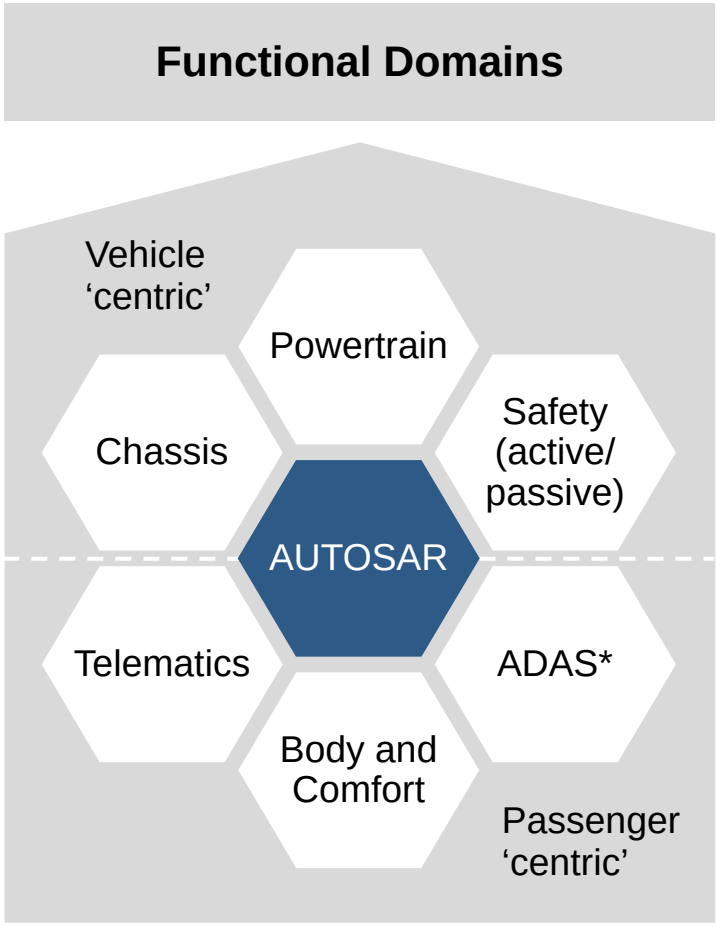
Concept and functional domains

The AUTOSAR project objectives will be met by

- specifying and
- standardizing

the central architectural elements across functional domains, allowing industry competition to focus on implementation.

Cooperate on standards, compete on implementation.



* Advanced Driver Assistance Systems

AUTOSAR focus today

Major principles

- Ensure stabilization of releases
- Max. 2 releases are maintained simultaneously
- Consider market needs of AUTOSAR partners

Content

- Architecture
- Methodology
- Application interfaces

Process & Quality

- Promote global use of the standard
- Establish a flexible work package structure
- Clear release and revision numbering scheme
- Ensure backward compatibility
- Life cycle plan for each release
- Continuous incorporation of new concepts
- Only validated concepts to be incorporated

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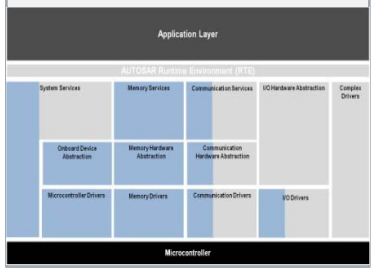
AUTOSAR achievements and outlook (1/2)
Milestones, just to name a few

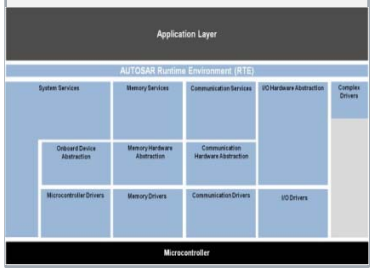
2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013

AUTOSAR founded

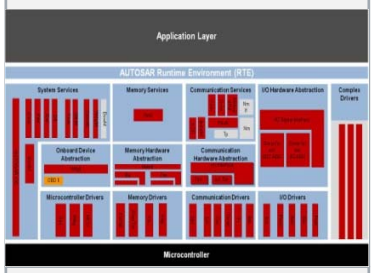
First release



Basic SW complete



Feature enrichment

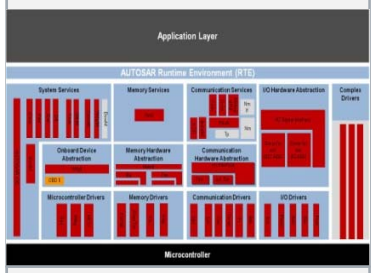


- Multicore support
- Functional safety
- Ethernet
- …

Derived applications

New development methods

Release 4.1.1



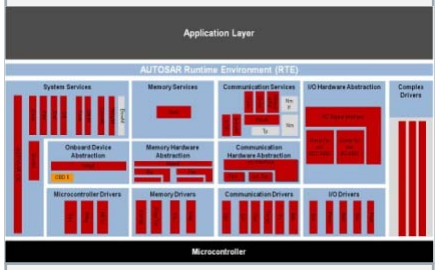
- Timing analysis
- Diagnostics
- Acceptance testing
- …

AUTOSAR achievements and outlook (2/2)
Milestones, just to name a few

2013	2014	2015	2016

10 years of AUTOSAR
6th OC Nov 13

Release 4.2.1



Large data communication via Ethernet and CAN FD

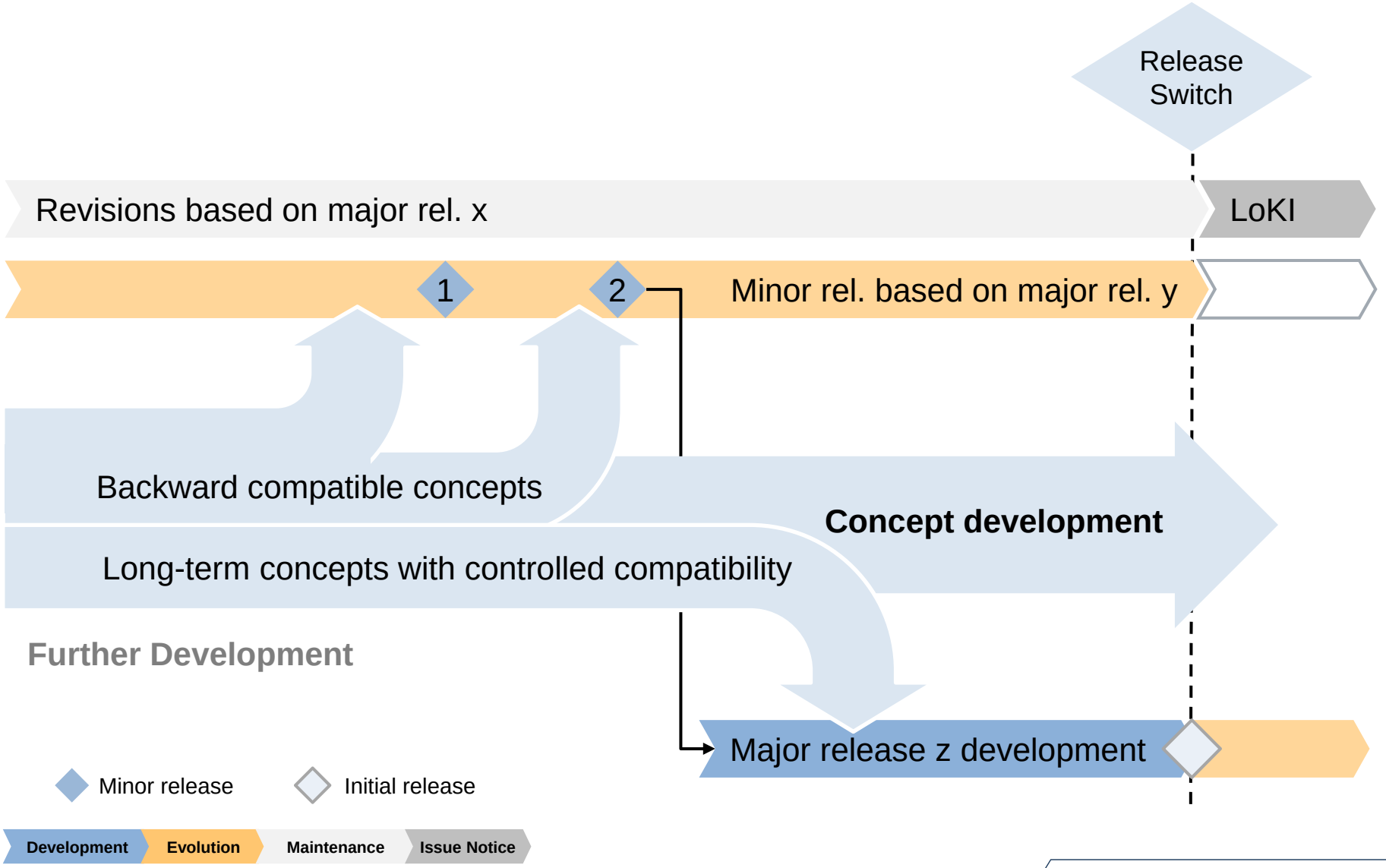
Integration of non-AUTOSAR systems

…

Release 4.3.0

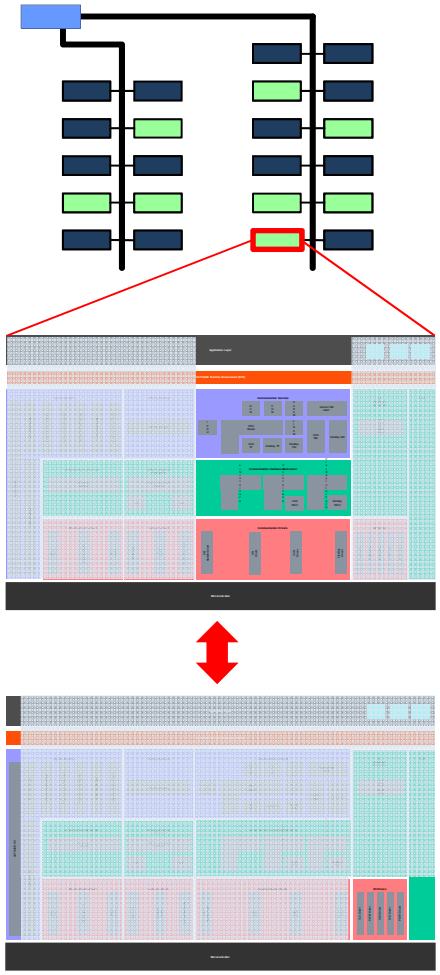
Long Term Objectives:
- Quality
- Maturity
- Backward compatibility
- Closing gaps
- Market needs
- Effort

AUTOSAR release management
The principle of maximal two (2!) active major releases



Exploring AUTOSAR:
Example: energy efficient technologies

- Partial Networking
  - Shutting down and starting up communication of groups of ECUs (Partial Network Cluster - PNC) during normal bus communication.
  - ECUs that shall be shut down require special transceiver hardware.
- Pretended Networking
  - ECU local approach to switch into a low power mode while keeping up bus communication, e.g. by using mechanisms of ECU degradation.
- ECU Degradation
  - ECU local approach to reduce the number of active components and/or semiconductors in an ECU, e.g. degrade line drivers, MCU capabilities.



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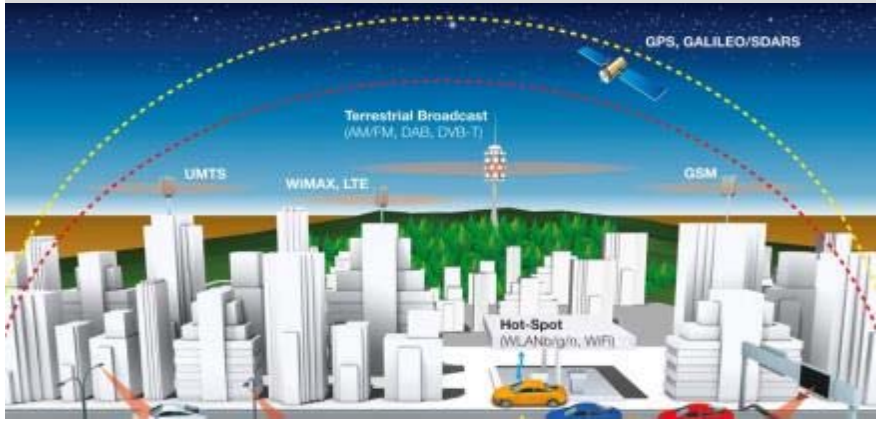
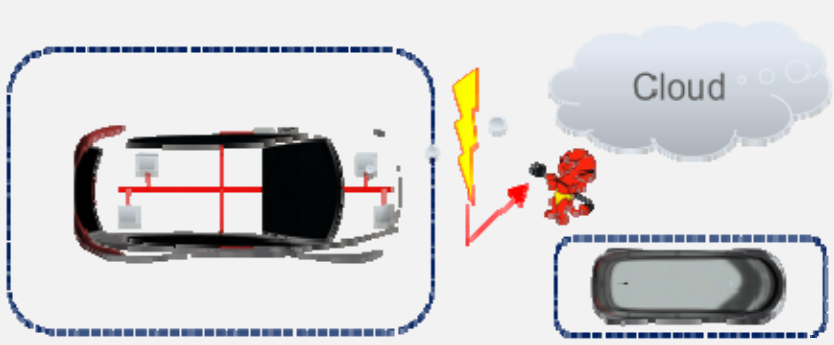
Starting Point: selected main drivers

Main drivers for new automotive software systems have been determined.

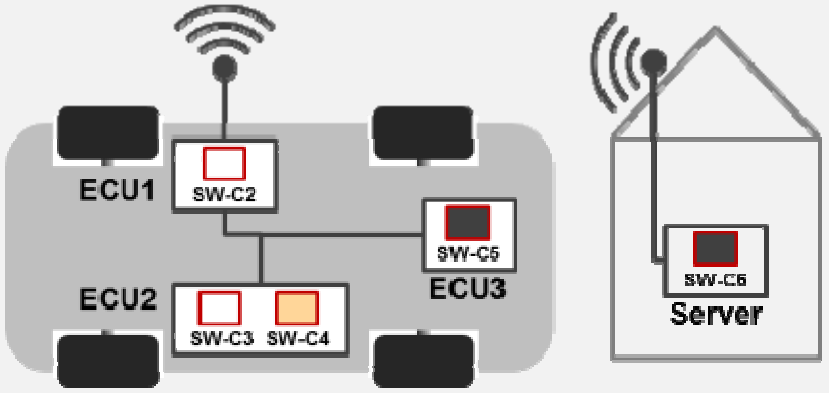
Highly automated driving

Car-2-X applications





Vehicle in the cloud



Increased connectivity

Selected main drivers for new automotive software systems (1/4)

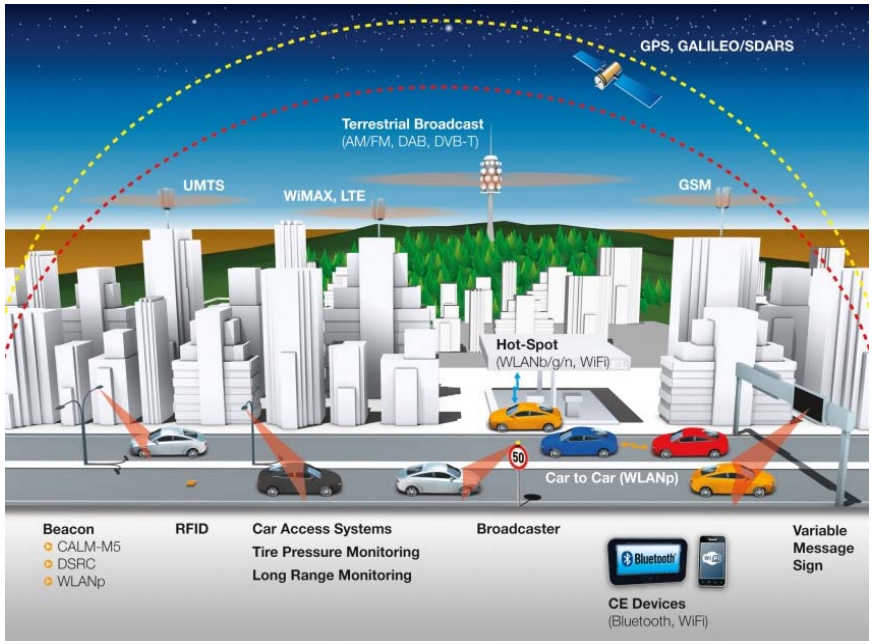
Highly automated driving will be on the road.

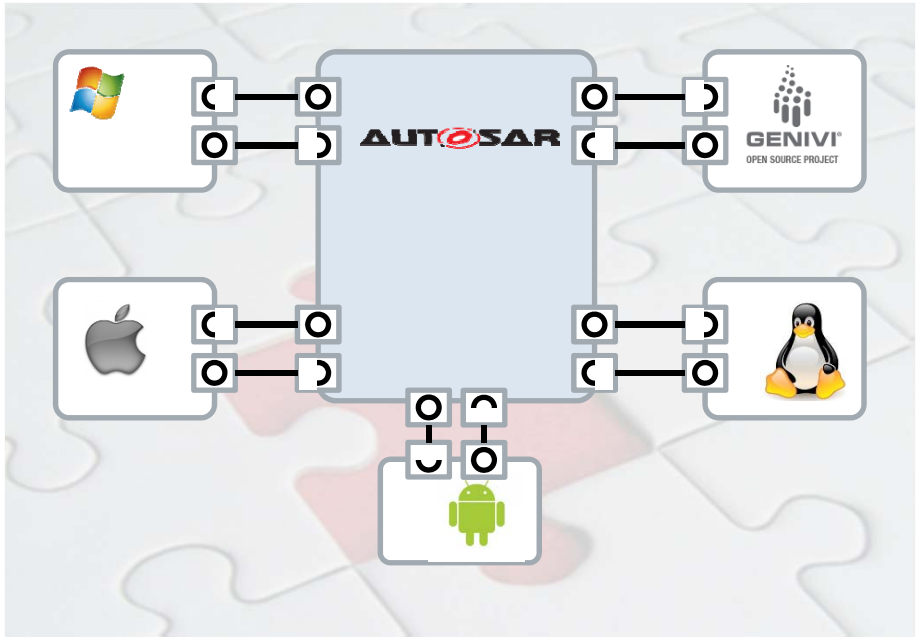
Use cases

- Support dependable systems including fail-operational systems
- Support of cross domain computing platforms
- Support of high-performance micro-controllers and computing
- Distributed and remote diagnostics
- …

Selected main drivers for new automotive software systems (2/4)

Car-2-X applications will require the interaction of vehicles and off-board systems.



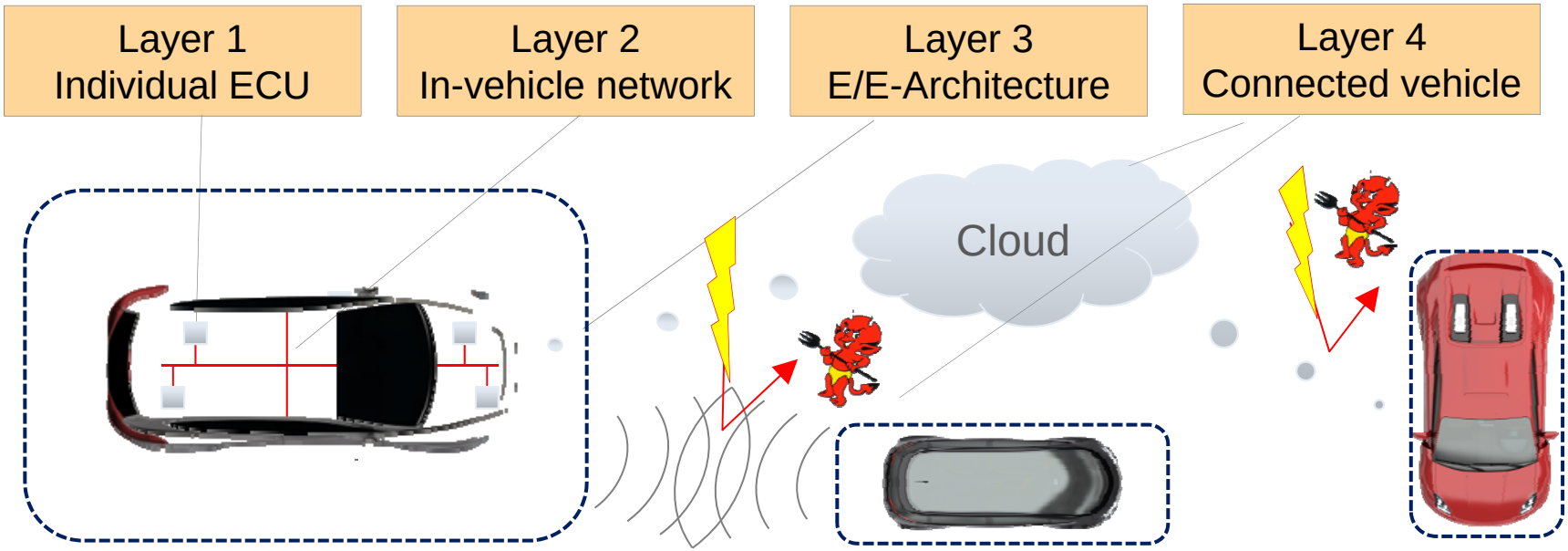


Use cases

- Support cloud interaction
- Software as product
- Integration of non-AUTOSAR systems
- …

Selected main drivers for new automotive software systems (3/4)

Vehicle in the cloud will require dedicated means for security.

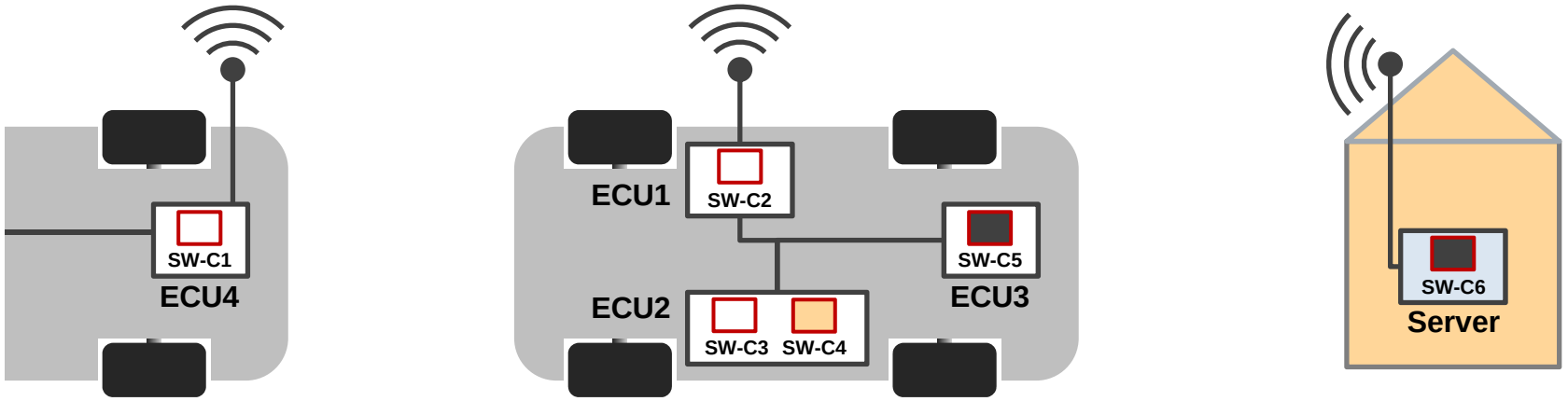


Use cases

- Secure on-board communication
- Security architecture
- Secure cloud interaction
- …

Selected main drivers for new automotive software systems (4/4)

Upcoming use cases will lead to a stronger interaction of automotive software systems.

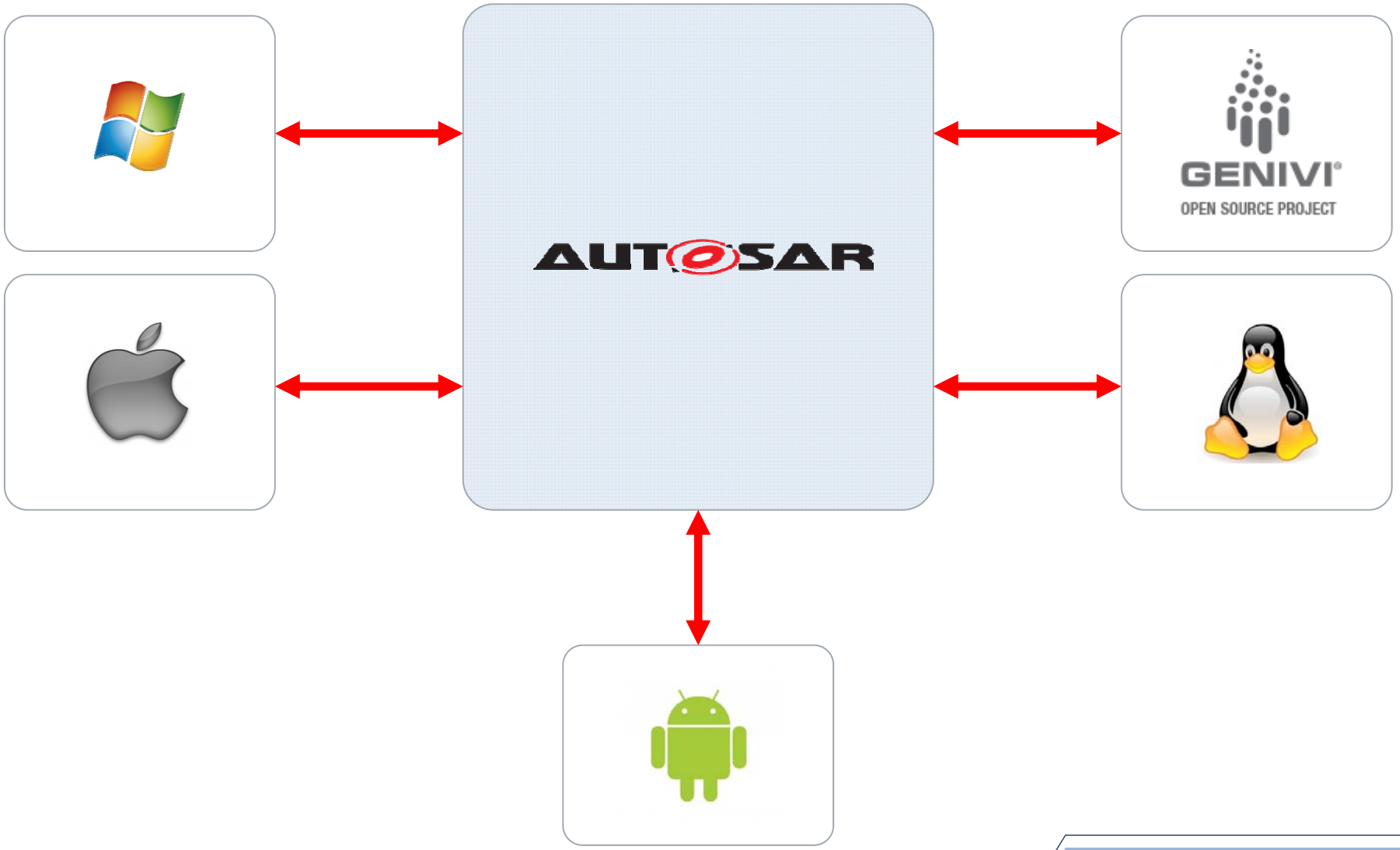


Static application Dynamic application Car-2-X application

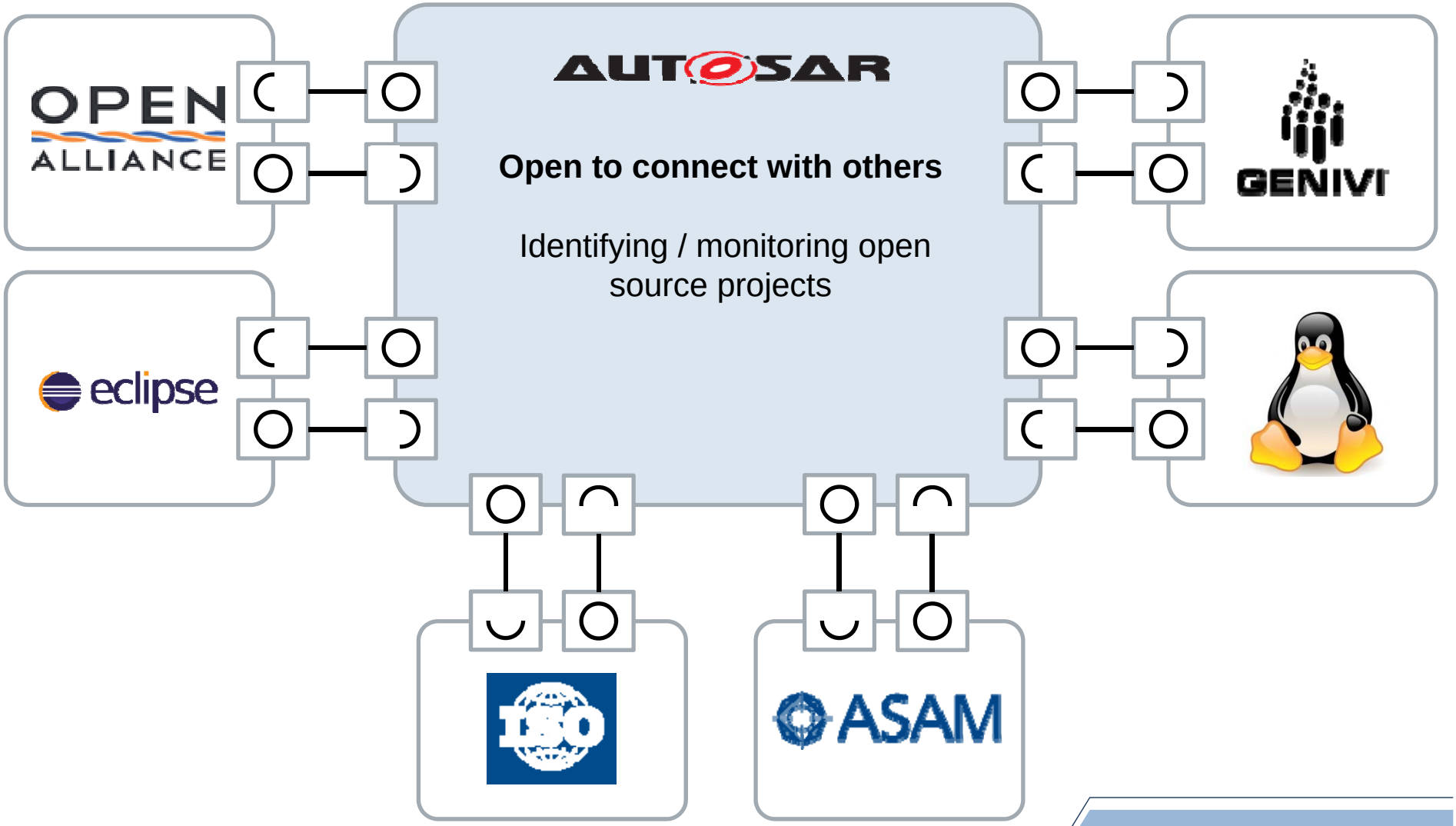
Use cases

- Consideration of non-AUTOSAR and off-board systems within methodology
- Dynamic deployment of software components
- Interaction with non-AUTOSAR and off-board systems

Influence by new players



Cooperation with other standards



Challenges for the AUTOSAR partnership

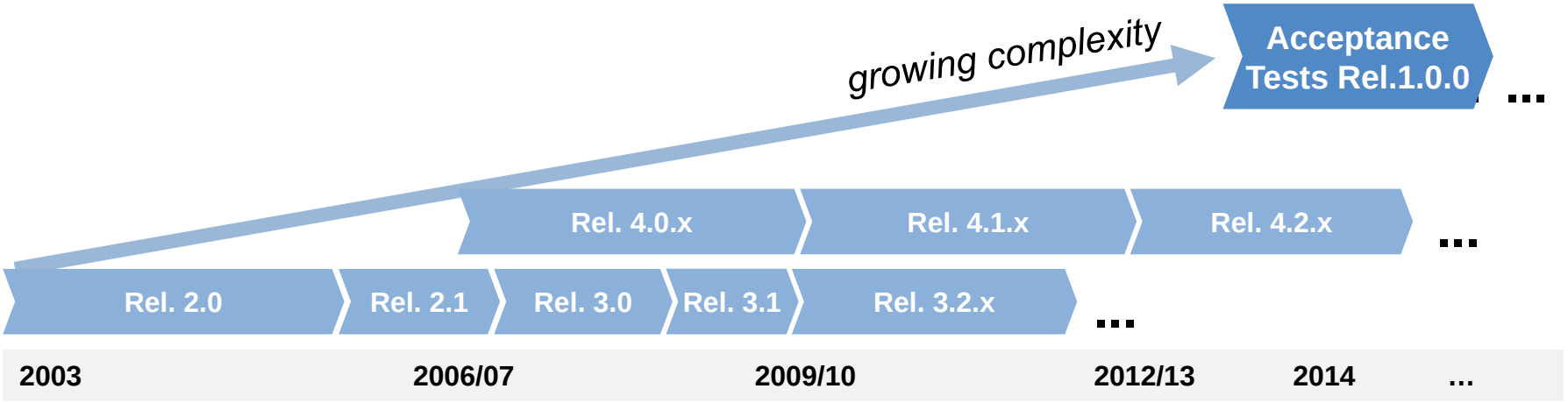
Cooperation

- Efficient cooperation with other standardization bodies and/or open source projects
- New cooperation models to reduce time-to-market while increasing quality
- New players in the automotive industry
- Adaptation of development speed

Development

- Support major new features, future market needs and current technology trends
- Fast, efficient and high quality of software standardization by implementation
- Using existing software solutions for standardization, e.g. from consumer electronics
- Frontloading of validation and early availability of implementation

Introduction of AUTOSAR products



- Over the years AUTOSAR continued to expand
- The worldwide growth of AUTOSAR evokes new challenges for the standard as well as for the organization and its partners
- AUTOSAR's answer to this growing complexity: AUTOSAR products

AUTOSAR products

Goals

- Increase flexibility of releases
- Keep standard manageable while extending it
- Facilitate application of the standard

AUTOSAR products

- AUTOSAR Classic Platform (today)
- AUTOSAR Acceptance Tests (today)
- AUTOSAR Adaptive Platform (planned)
- AUTOSAR Foundation (planned)

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Future of AUTOSAR

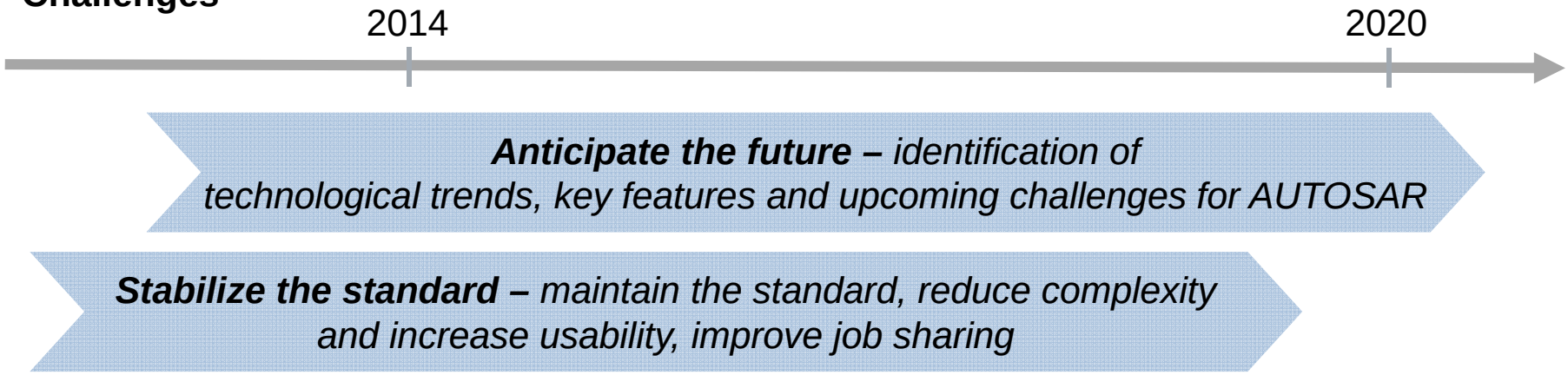
- Adaptive Platform
- New cooperation model

Future of AUTOSAR: objectives and challenges

Objectives

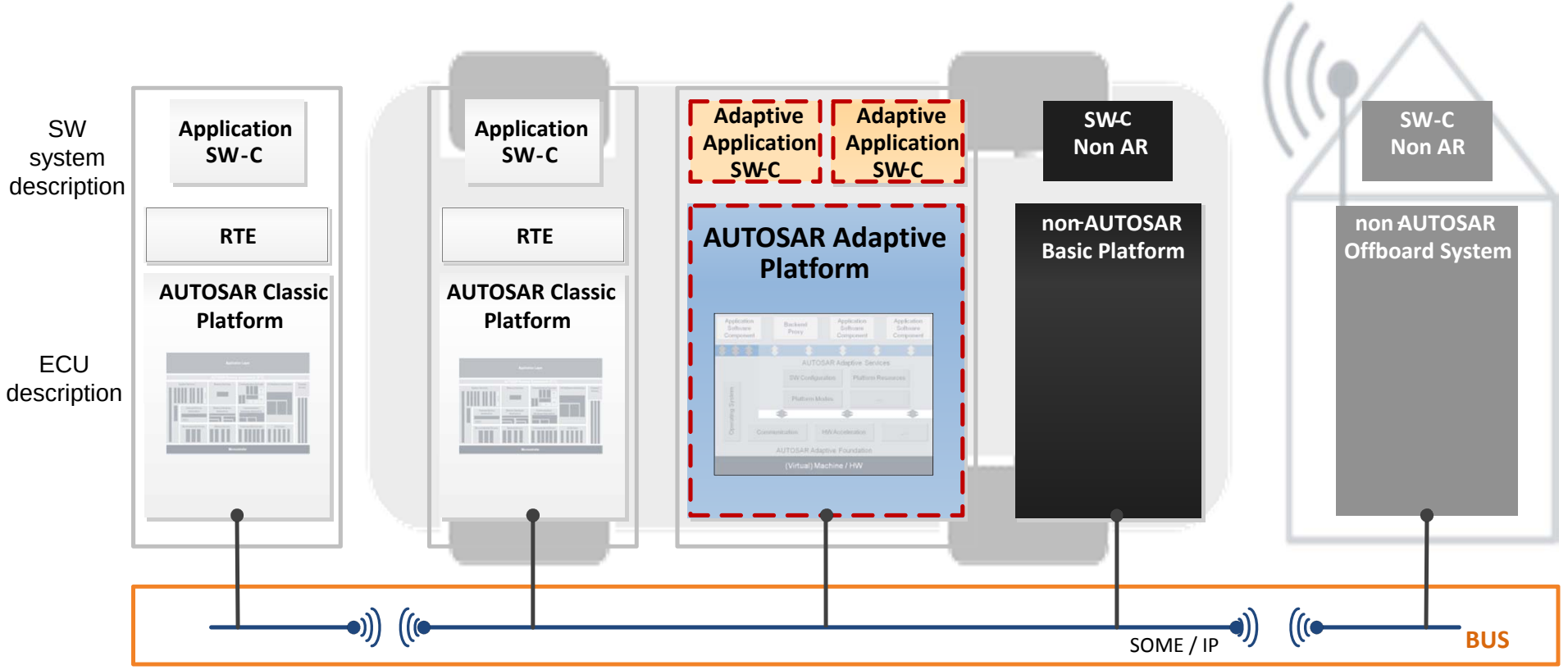
- Maintain stability and compatibility of existing standard
- Main directions for the future:
  - Reflect new use cases of today's and future market needs
  - Adapt to upcoming market needs
  - Support new technologies

Challenges



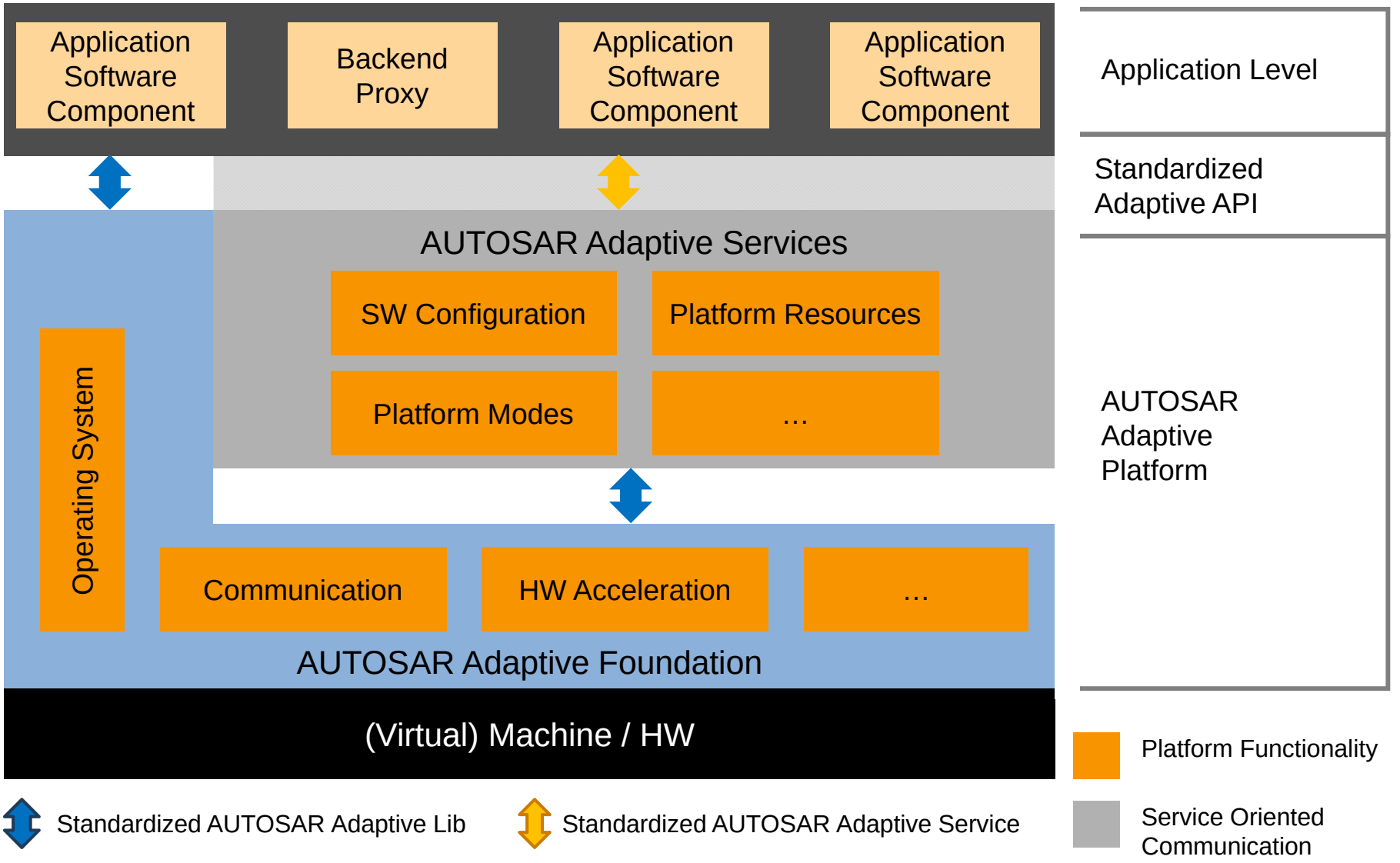
New AUTOSAR product: The Adaptive Platform

Extend AUTOSAR Classic Platform by support of adaptive deployment and interaction with non AUTOSAR systems.



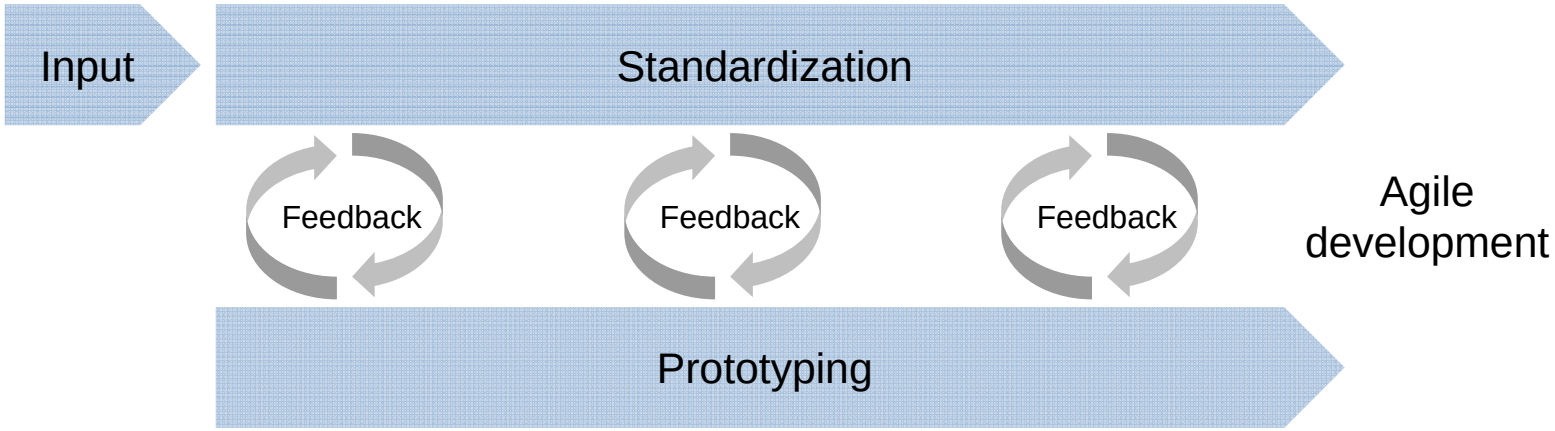
Common Bus Interface Specification

Architecture of the AUTOSAR Adaptive Platform



Standardization process and specification validation

Specifications will be validated in parallel with the standardization.

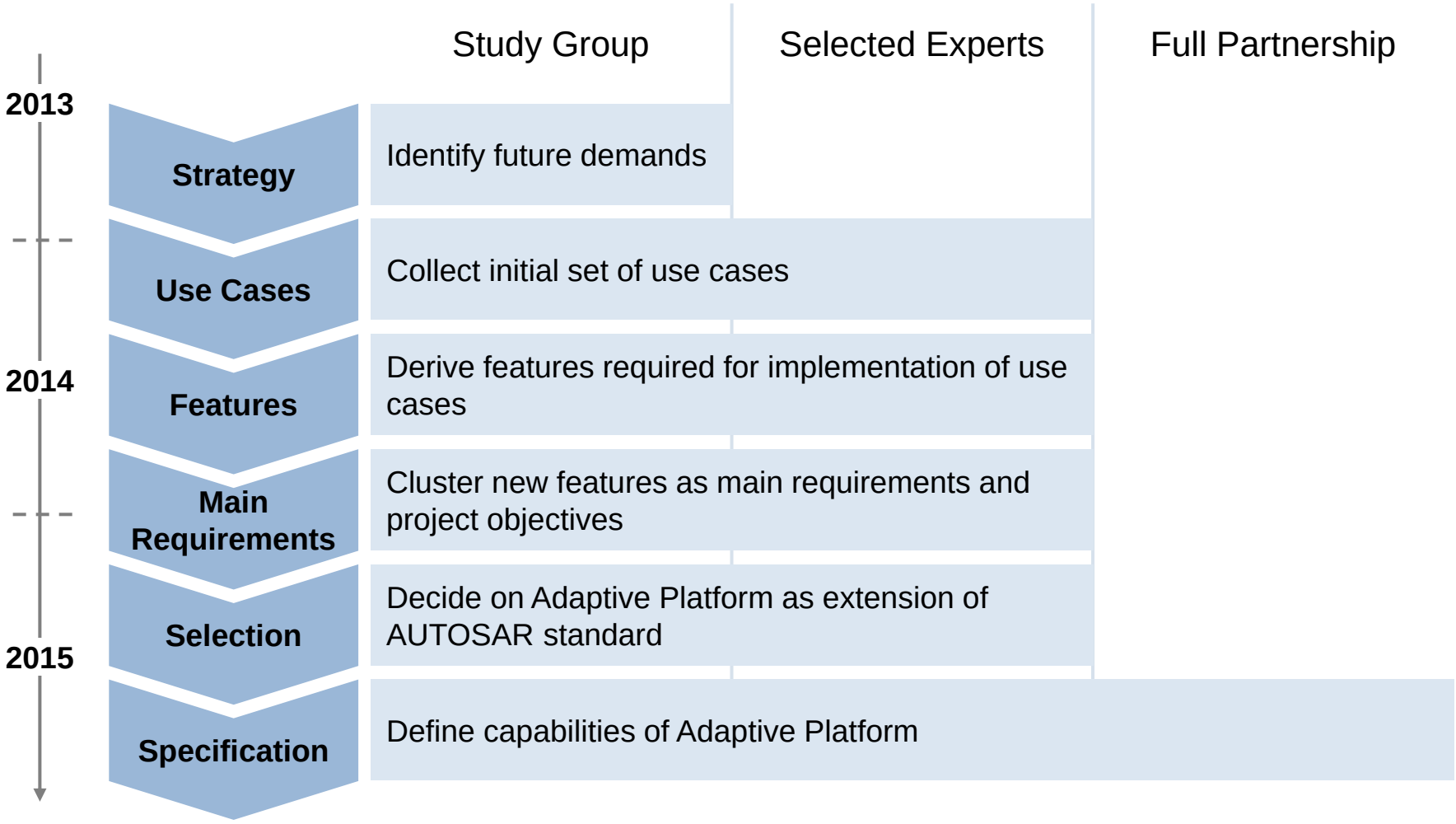


Upcoming feasibility studies

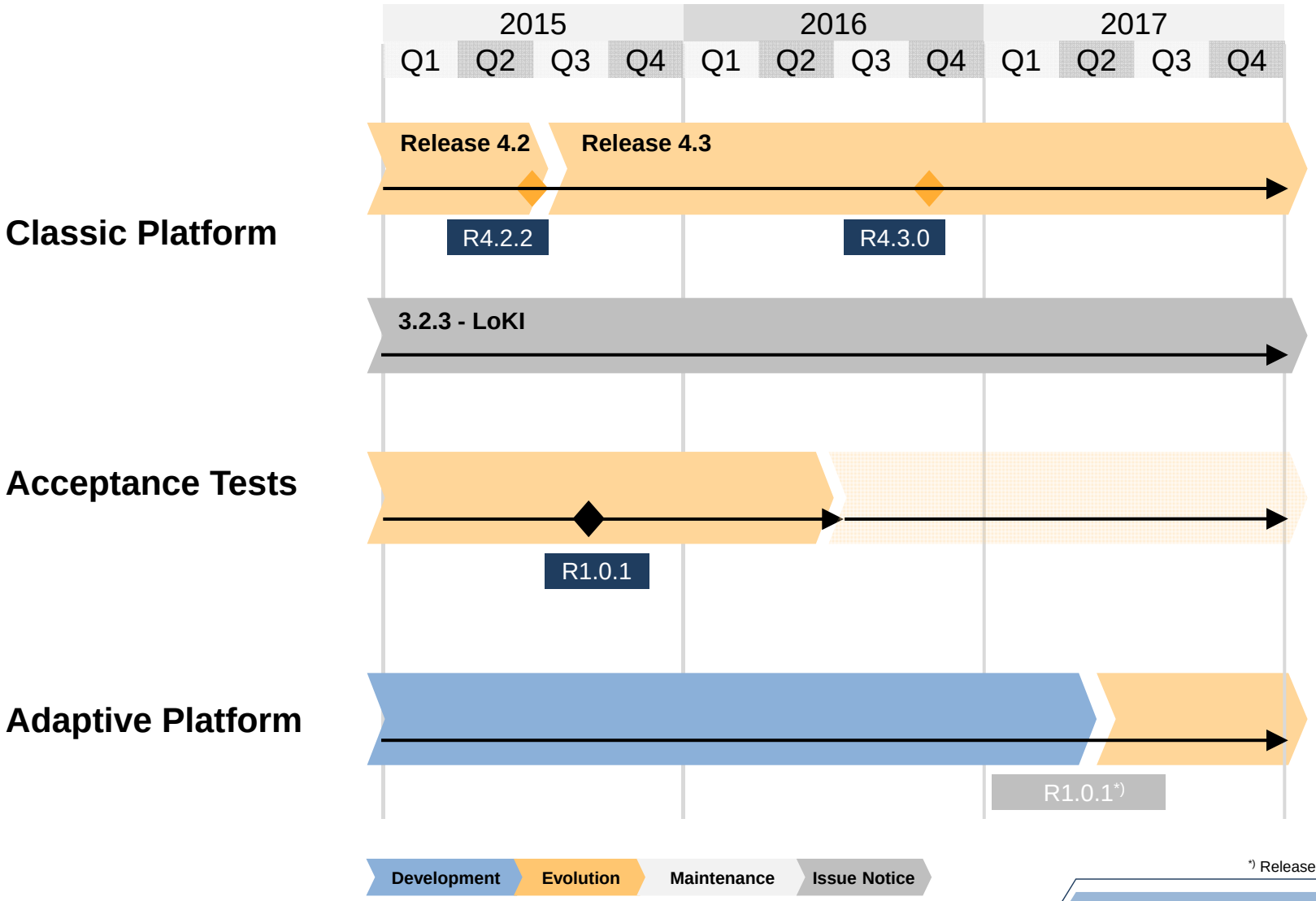
- Operating system definition based on POSIX
- Middleware technologies for the implementation of service oriented communication, e.g. SOME/IP
- Definition of execution model(s) to support the different use cases of access freedom, e.g. full access, sandboxing
- Use of package format and managers for application deployment

Approach to requirements elicitation and decision making

AUTOSAR took strategic responsibility and incrementally extended the level of contribution.



Releases and revisions of AUTOSAR



Summary

Achievements

- Established a worldwide standard focusing on automotive applications
- Release 4.2.2 ready for series production
- Acceptance Tests Release 1.0.0 released

AUTOSAR Products

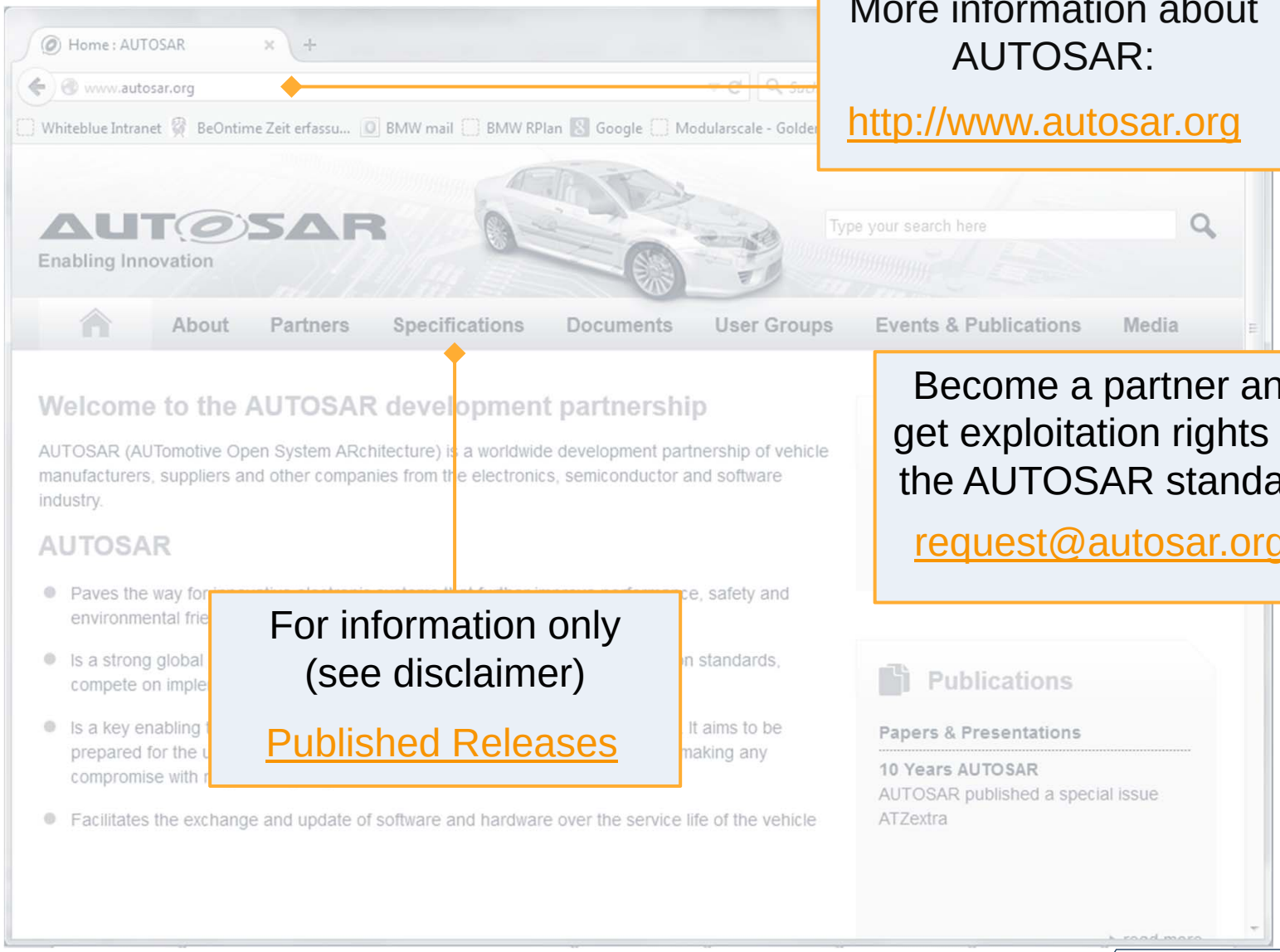
- Already launched: AUTOSAR Classic Platform and AUTOSAR Acceptance Tests
- Planned: AUTOSAR Adaptive Platform and AUTOSAR Foundation

Future of AUTOSAR

- Improvement and stabilization of existing standard
- Anticipate the future: identification of technological trends, key features and next challenges for AUTOSAR
- Feasibility studies started in January 2015

AUTOSAR will continue to be the automotive standard excluding multimedia.

More information available online



More information about AUTOSAR:

http://www.autosar.org

Become a partner and get exploitation rights for the AUTOSAR standard

request@autosar.org

For information only (see disclaimer)

Published Releases

Do you have questions?

Cooperate on standards, compete on implementation.