

AUTOSAR

ANNIVERSARY 2003-2023

COVESA and AUTOSAR Collaboration – Overview

Enabling Continuous Innovation

Michael Niklas-Höret, AUTOSAR Steering
Committee
April 25th 2023

COVESA All Members Meeting

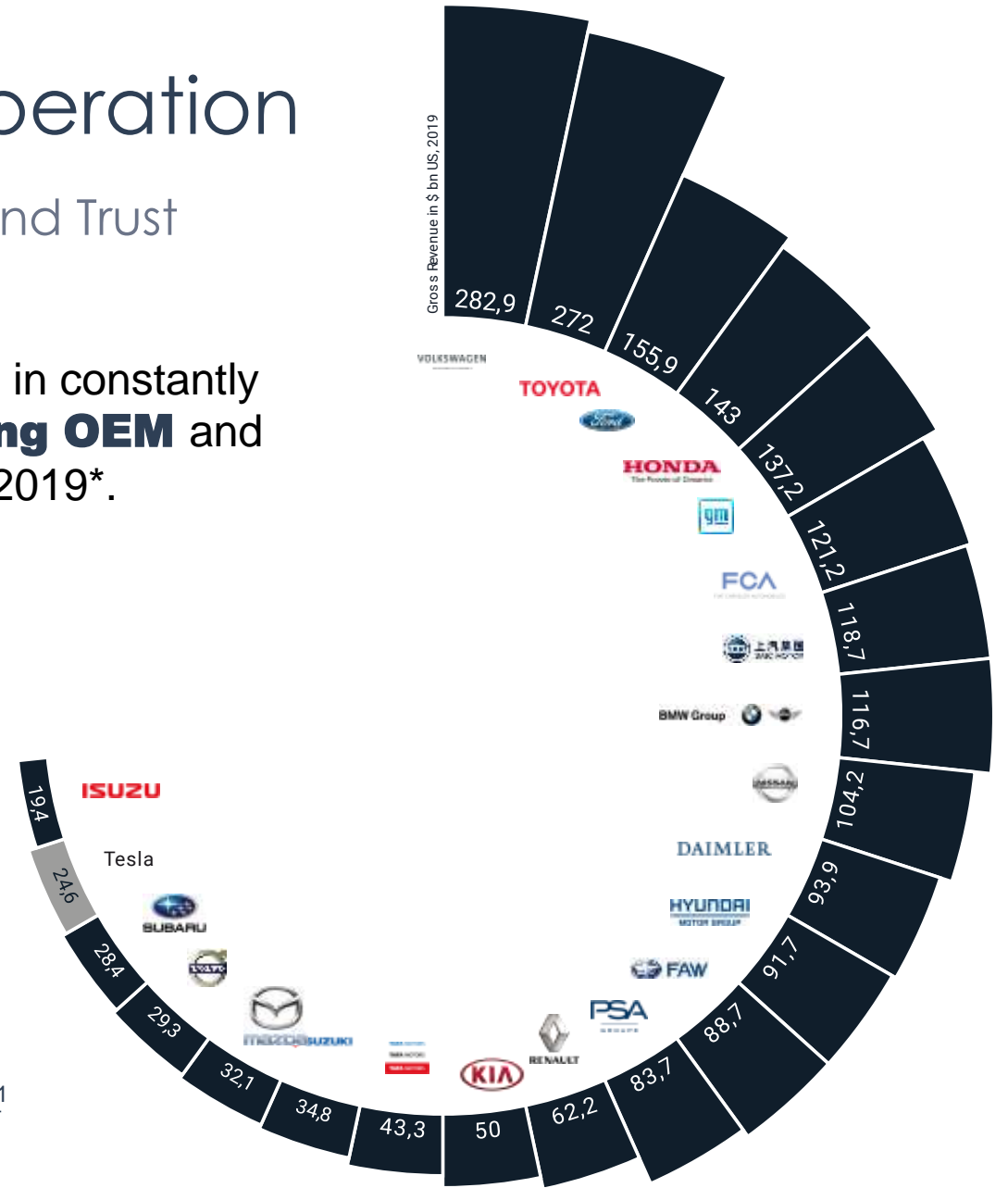
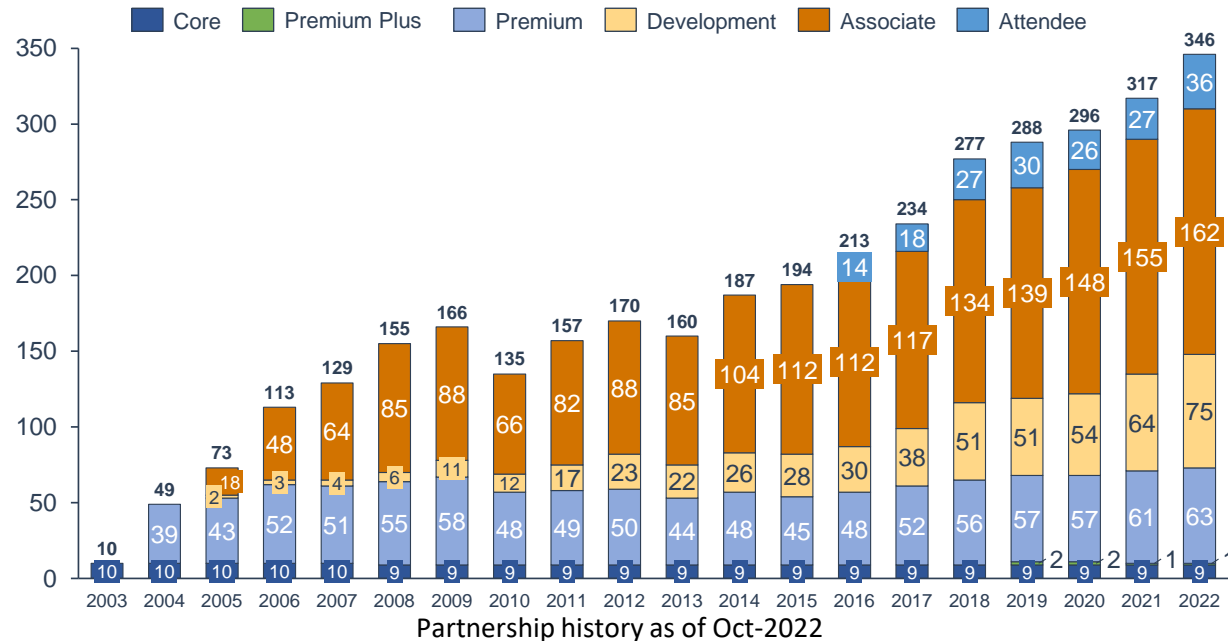
Porto



AUTOSAR Development Cooperation

A Global Community based on Responsibility and Trust

31 international automotive OEM are AUTOSAR partners in constantly growing community. **21** are **under the 22 top-selling OEM** and covering **over 80%** of the **total market revenue** in 2019*.



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



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.

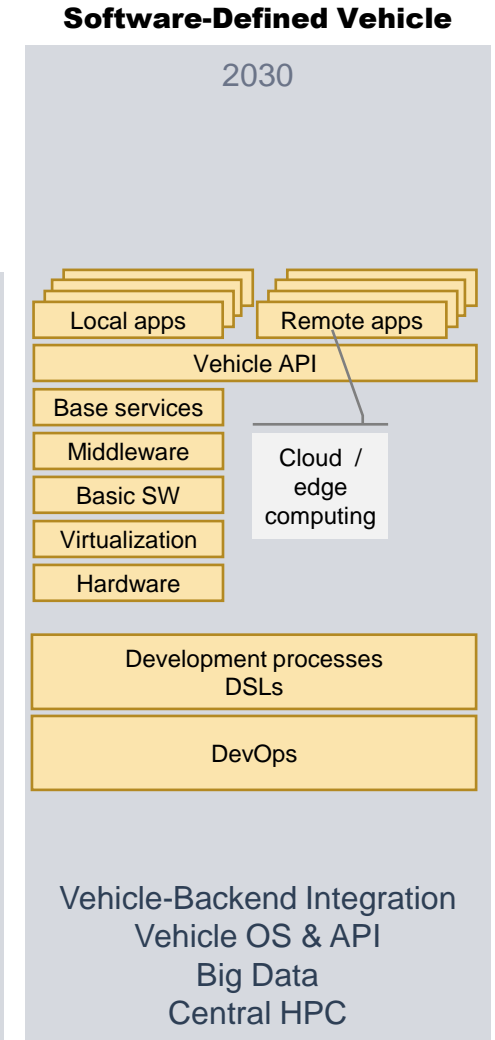
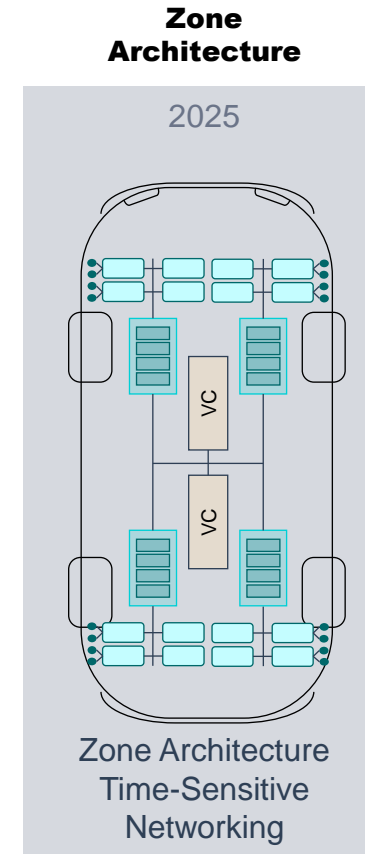
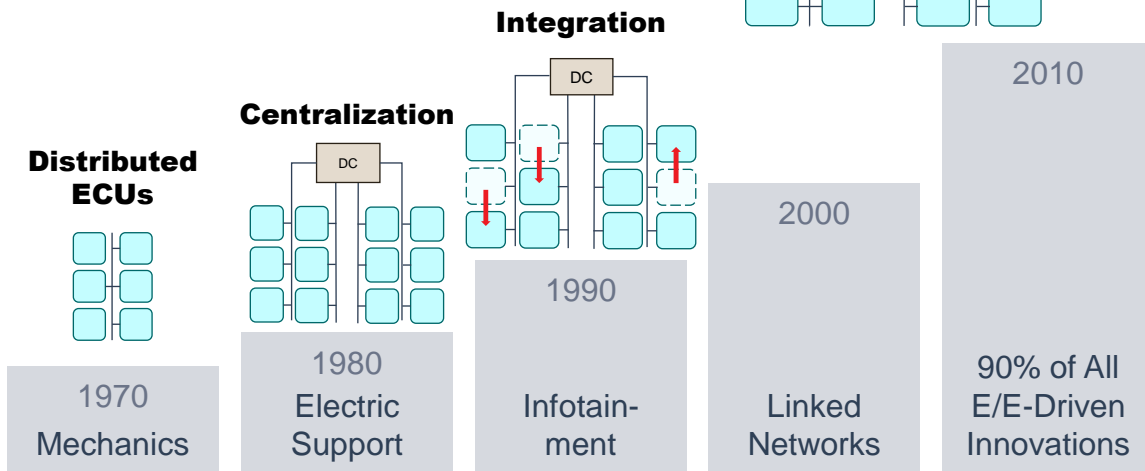
„If a company develops alone it will be one proprietary solution, if it is shared and used by several partners it becomes technology, and with broad standardization it becomes state of the art and alleviates certification.“

Günter Reichart, AUTOSAR Spokesperson



Driving changes in E/E architecture

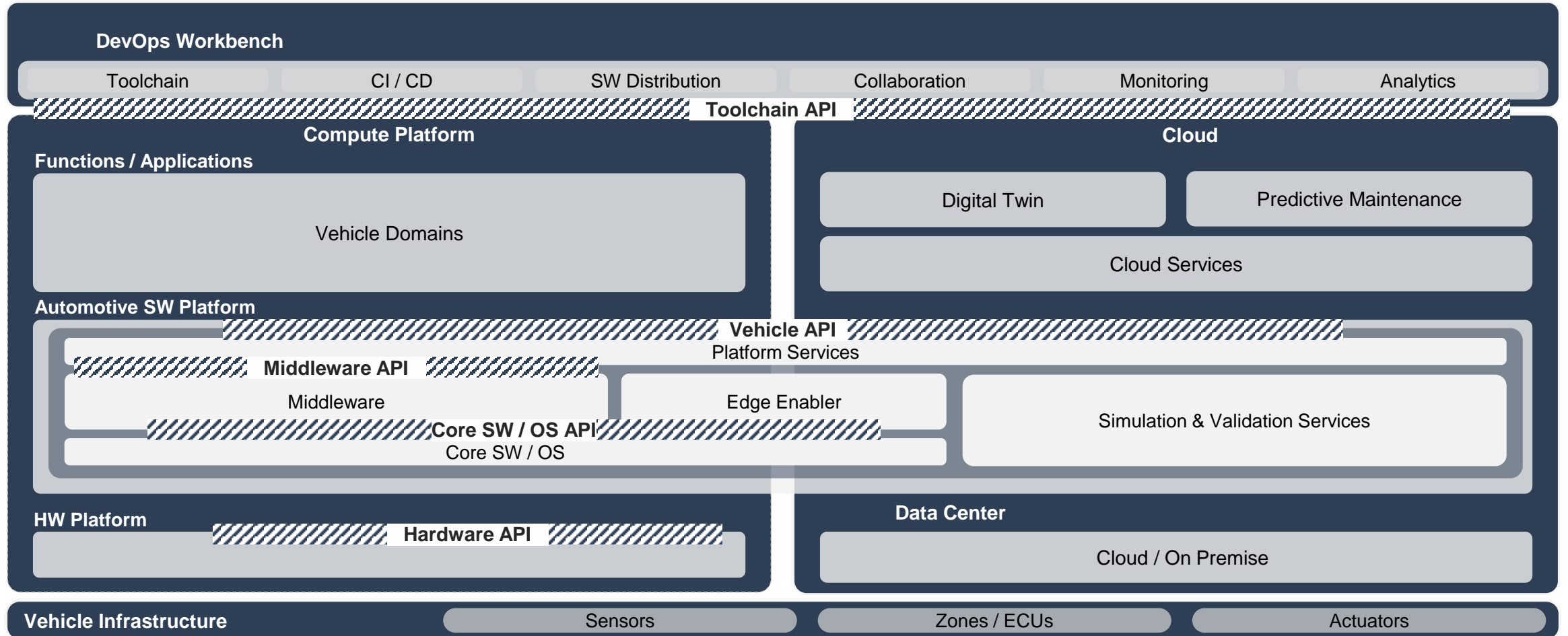
-  Domain/Vehicle Controller
-  Deeply Embedded ECUs
-  Obsolete ECUs
-  Part of Software Defined Vehicle eco-system
-  Integration Process
-  Intelligent Actuators/Sensors



Complexity increase

Software Defined Vehicle

A View to Major Building Blocks*



*Example view without being complete

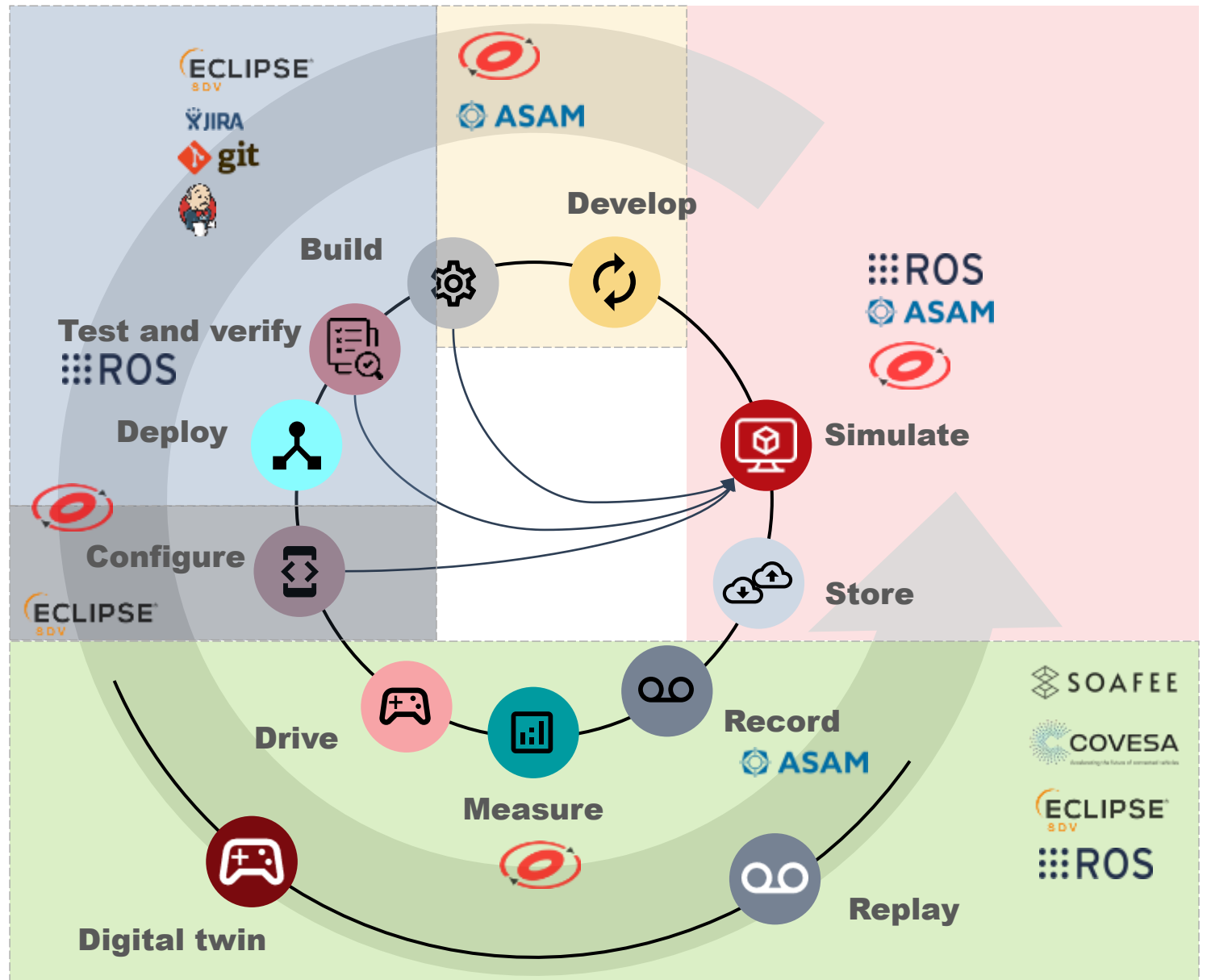
Big Picture

(main players only)

ADAS
Development Cycle



Each organization must find its role, position and interfaces in this development cycle.



Automotive Development Ecosystem (1/2)

Trusted Collaboration on Software Defined Vehicle*

AUTOSAR

Objective: Develop and establish standardized SW framework and open E/E system architecture for intelligent mobility

ASAM

Objective: Open Standards from Pegasus, Service Oriented Vehicle Diagnostics

Khronos

Objective: open standards for 3D graphics, Virtual and Augmented Reality, Parallel Computing, Machine Learning, and Vision Processing

SOAFEE

Objective: Cloud-native architecture enhanced for mixed-criticality automotive applications; building on technologies which define standard boot and security requirements for Arm architecture

Eclipse SDV

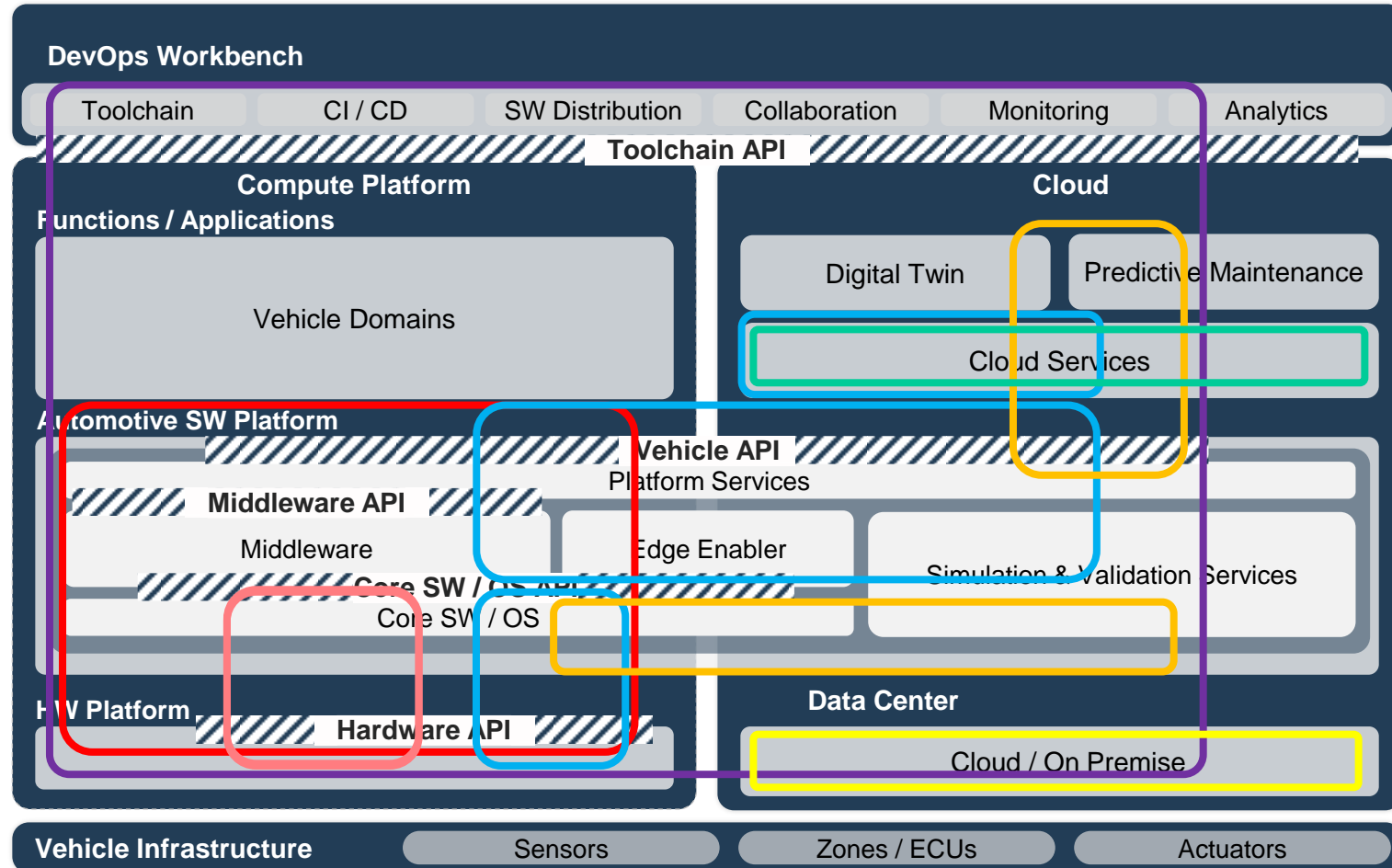
Objective: Open technology platform for the SW defined vehicle of the future; focused on accelerating innovation of automotive-grade in-car software stacks using open source and open specifications

Gaia-X, Catena-X

Goal: Gaia-X European data infrastructure for Hyperscaler
Catena-X tracability in supply chain

Cloud Native Computing Foundation (CNCF)

Objective: CNCF is the open source, vendor-neutral hub of cloud native computing, hosting projects like Kubernetes and Prometheus to make cloud native universal and sustainable.



*Example view without being complete



Automotive Development Ecosystem (2/2)

Trusted Collaboration on Software Defined Vehicle*

COVESA (former GENIVI)

Objective: Connected vehicle systems including in-vehicle, at-edge and in-cloud services, interfaces and data exchange.
Extension of W3C Common Vehicle Interface Initiative (CVII)

AUTOSAR & COVESA Collaboration

Objective:

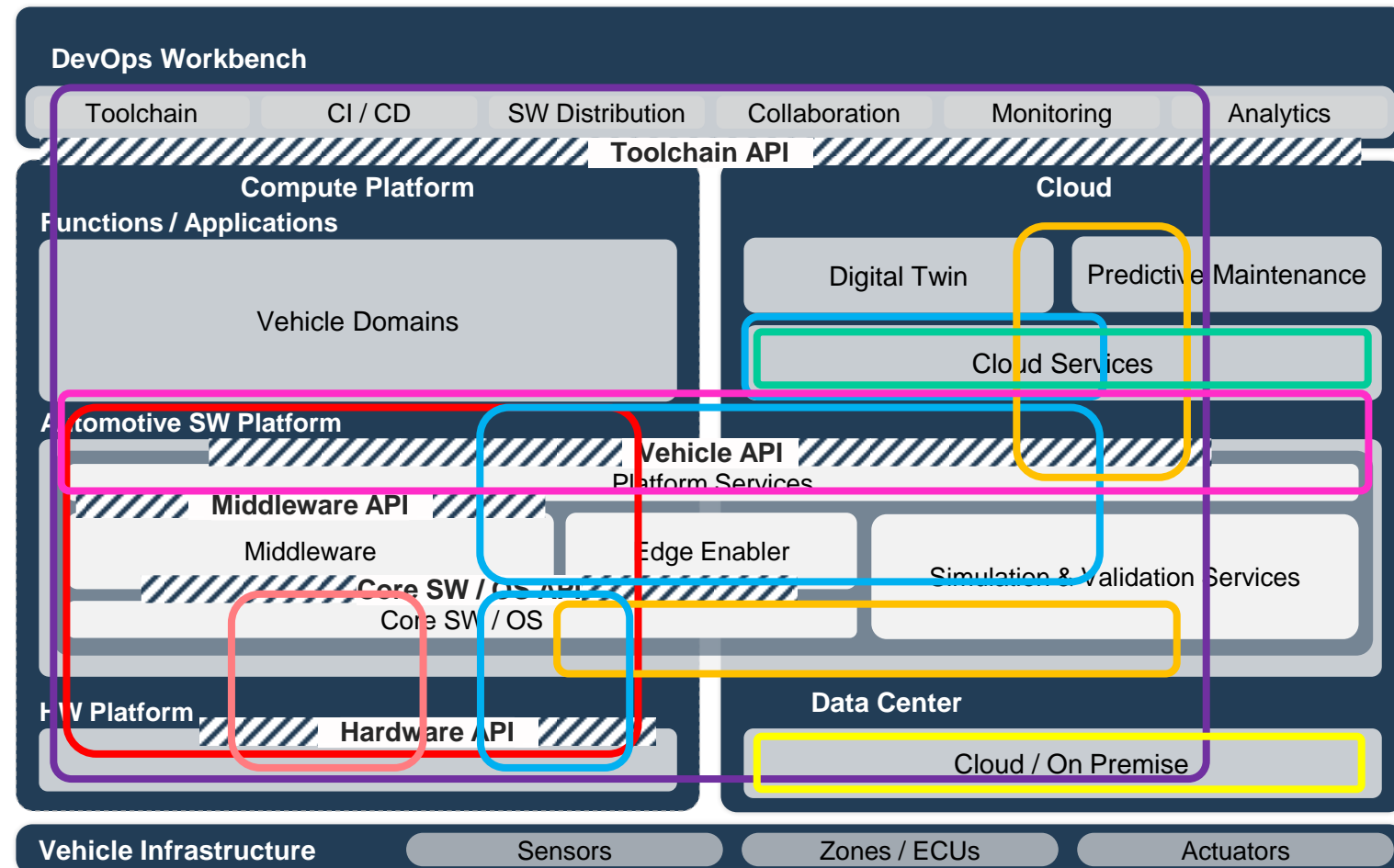
Exchange of vehicle data, described by COVESA's Vehicle Signal Specification (VSS), between the cloud and AUTOSAR's platforms for in-vehicle communication.

- COVESA will focus on vehicle data and services as well as cloud interaction
- AUTOSAR will offer an open interface for the overall system architecture and the in-vehicle network

The collaboration will start with a **Vehicle API** concept being discussed by both organizations.

A joint proof of concept demonstration showing

- a seamless integration of communication
- exchange of data
- access of services between cloud and in-vehicle ECUs.



*Example view without being complete

Outputs – Intended Specifications

Component/Topic	Details/Expectations
Vehicle API Core Specification	<p>A document specifying a transport agnostic API, level of detail similar to VISS Core spec.</p> <p>Expected to be more lightweight than VISS.</p>
Vehicle API Transport Specification MQTT	<p>A document specifying how to use Vehicle API using MQTT.</p> <p>The level of detail similar to VISS Transport spec.</p>
Network adapter interface of the External Connection Handler, including its behavior	<p>A document specifying the interface for the network adapter(s) and how the ECH is managing the adapters.</p>
Vehicle API Data Mapper and VSS Binding Configuration Specification	<p>A document specifying behavior of the data mapper and configuration contents..</p>

Outputs – Intended Implementations

Component/Topic	Details/Expectations
Linux VSS Application and Vehicle API Client/Binder Reference Implementation	Necessary components for Linux to be able to communicate read/write/subscribe requests towards AUTOSAR using the Vehicle API MQTT transport layer
ECH MQTT Network Adapter	To be used by Vehicle API MQTT client (ref. above)
AUTOSAR External Connection Handler (ECH) Reference Implementation	Full support of Vehicle API
Vehicle API mapping tool chain Reference Implementation	Results in the generation of Data Mapper based on configuration that describes the mapping between selected VSS signals and selected real/simulated sensors/actuators.
Simulator/Emulator	A component that can be installed in Linux and simulates the Vehicle API Southbound interface for the selected transport protocol.

AUTOSAR Opening Strategy

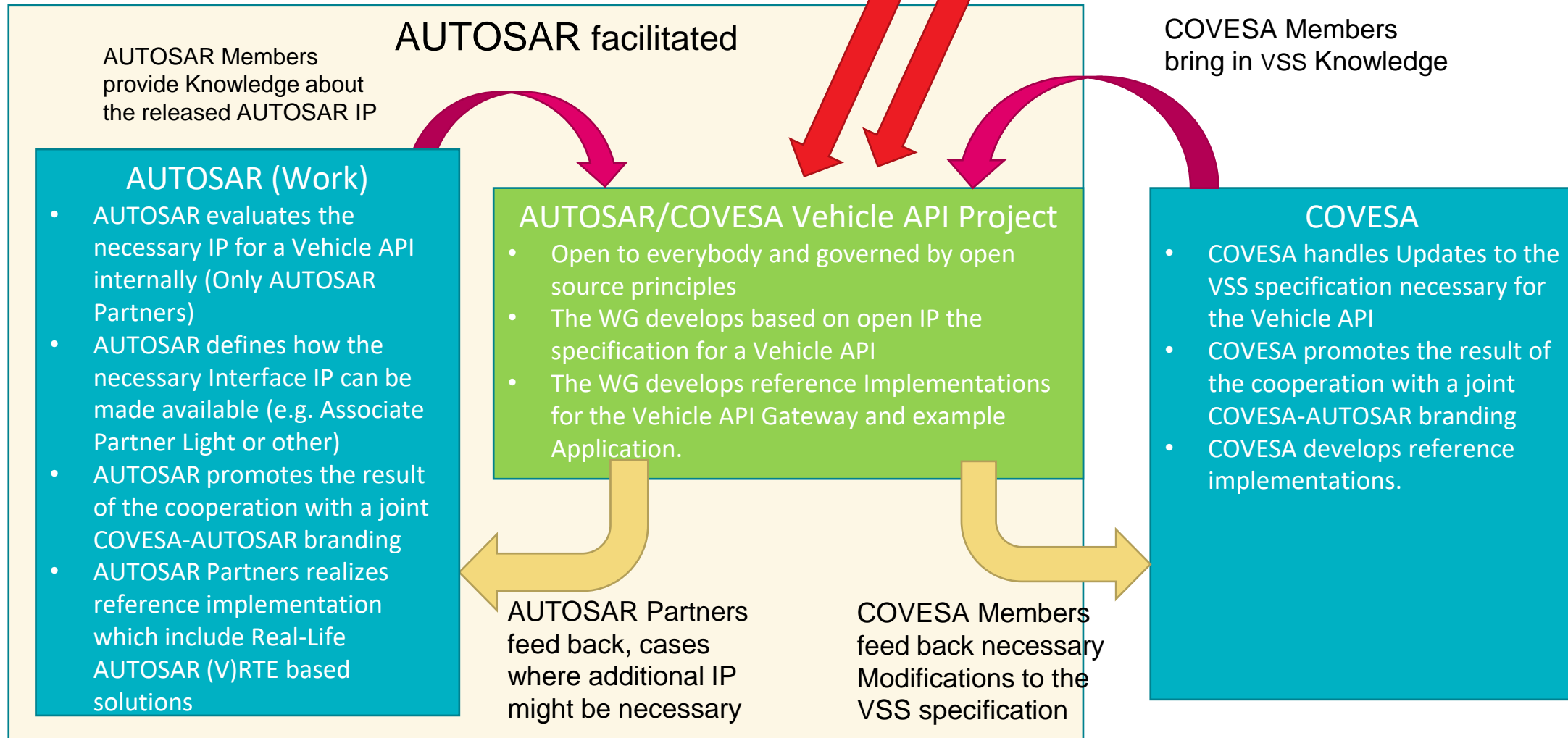
Compatibility & Interoperability – State of Planning

Recent decisions in AUTOSAR supporting the collaboration:

- AUTOSAR can start new development in dedicated open projects governed by Open Source best practices like:
 - Open project charter document
 - Open project specific licenses (e.g MPL v. 2 and Creative Commons CC-BY-SA 4.0)
 - state of the art CLA enables AUTOSAR Partners, COVESA Partners and non AUTOSAR and COVESA Partners to contribute
- New membership “Associate Partner Light” decided that is a membership with no partnership fee and allows exploitation of **specific AUTOSAR specification only**
 - Main purpose is to make the bus protocols more accessible
 - Further IP could be made available based on AUTOSAR decisions in this contract framework

Working Model **Draft**

3rd Parties may contribute/Adopt



Intended Outputs overview(draft assessment)

Outputs – Intended Specifications



Component/Topic	Details/Expectations
Vehicle API Core Specification	A document specifying a transport agnostic API, level of detail similar to VISS Core spec. Expected to be more lightweight than VISS.
Vehicle API Transport Specification MQTT	A document specifying how to use Vehicle API using MQTT. The level of detail similar to VISS Transport spec.
Network adapter Interface of the External Connection Handler, including its behavior	A document specifying the interface for the network adapter(s) and how the ECH is managing the adapters.
Vehicle API Data Mapper and VSS Binding Configuration Specification	A document specifying behavior of the data mapper and configuration contents..

AUTOSAR™

COVESA All Members Meeting 2023 25/04/2023



Work on Output can be started in Open Project



Work on Output needs further legal clarification in AUTOSAR

Outputs – Intended Implementations



Component/Topic	Details/Expectations
Linux VSS Application and Vehicle API Client/Binder Reference Implementation	Necessary components for Linux to be able to communicate read/write/subscribe requests towards AUTOSAR using the Vehicle API MQTT transport layer
ECH MQTT Network Adapter	To be used by Vehicle API MQTT client (ref. above)
AUTOSAR External Connection Handler (ECH) Reference Implementation	Full support of Vehicle API
Vehicle API mapping tool chain Reference Implementation	Results in the generation of Data Mapper based on configuration that describes the mapping between selected VSS signals and selected real/simulated sensors/actuators.
Simulator/Emulator	A component that can be installed in Linux and simulates the Vehicle API Southbound interface for the selected transport protocol.

AUTOSAR™

COVESA All Members Meeting 2023 25/04/2023 10

AUTOSAR™

AUTOSAR Opening Strategy

Derived Applications

- **Mobility infrastructure**
- **Agricultural machinery**
- **Maritime Shipping**
- **Railway**

Derived Applications

- **Urban Mobility**
- **Industrial Automation**
- **Building Automation**
- **Household appliance**
- **Medical technology**

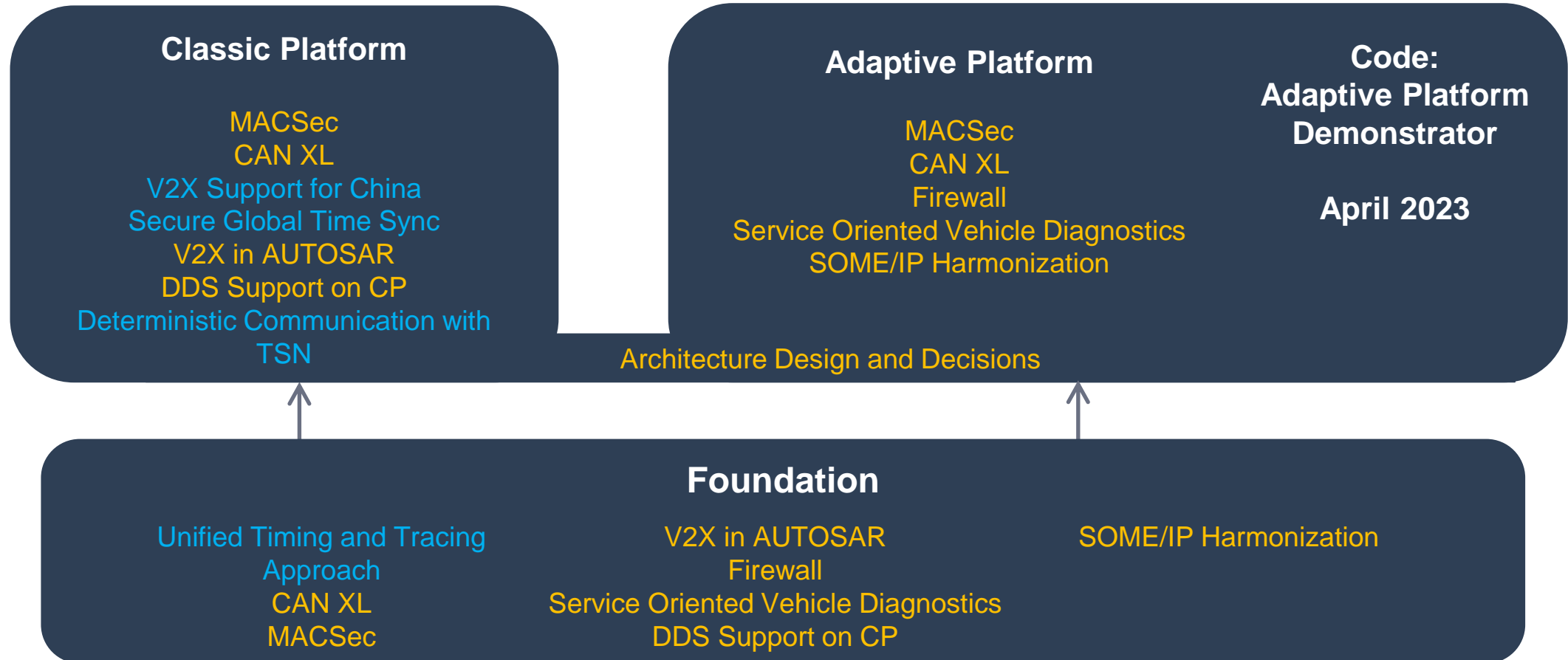


AUTOSAR Outlook

AUTOSAR Release R22-11 – Overview

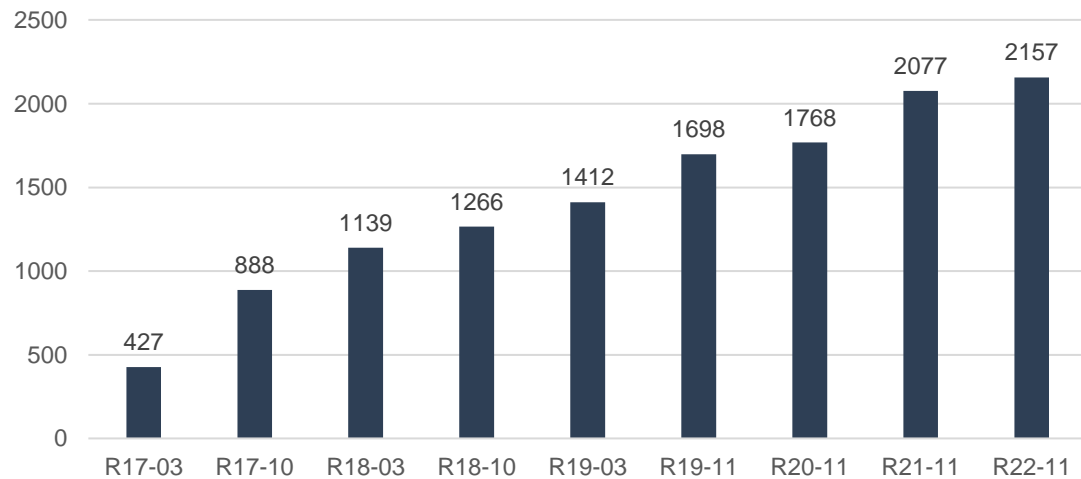
Single-Platform Concepts

Cross-Platform Concepts

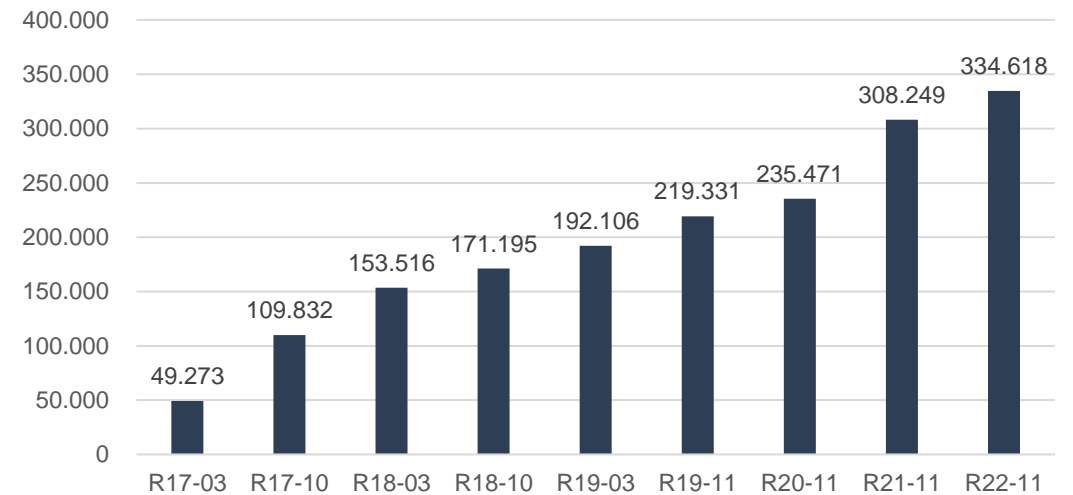


Adaptive Platform Demonstrator: State of the Code

C/C++ Files



C/C++ LoC



The COVESA/AUTOSAR Collaboration

- ✓ All legal prerequisites are defined for starting a joint Open Project on Vehicle API
- ✓ Strong strategic interest from both organizations to collaborate

Next Steps:

- Legal documents have to be finalized and signed
- Update the Charter Document for the joint Open Project Vehicle API
- Jointly work on the intended Output

AUTOSAR

ANNIVERSARY 2003-2023

Thank you!

