OpenADx – **x**celerate your **A**utonomous **D**riving development

SUMO User Conference 2020
October 26th – 28th, 2020

Andreas Riexinger | Robert Bosch GmbH
Product Manager Automated Driving

Who am I?

Andy Riexinger

Robert Bosch GmbH

Chassis System Control – Automated Driving

› Product Manager Automated Driving

› ~23 years at Bosch

› ~15 years experience in embedded software development

› Pushing Open Source development and business within Robert Bosch GmbH

› Interest in creating business with Open Source

Open Source has arrived in automotive

The OpenADx community provides a platform which …

… leverages open source to increase efficiency and create standards

Reason Why

AD requires a multifaceted process incorporating a variety of software tools

But none of these tools were ever designed to work together

This costs the industry time and money

We are mitigating this problem by creating the leading automated driving ecosystem ➤ *OpenADx*

RB launched OpenADx at BCW 2018 …
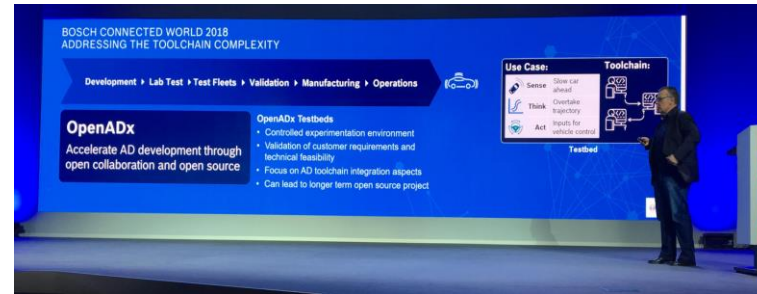
… and established an Eclipse hosted community

▶ 30 entities

▶ 60+ active contributors

▶ Initial projects:
  – Cloe (simulation kit for testing AD software components)
  – Iceoryx (true-zero-copy shared memory approach)

Targets ◉

▶ Accelerate time to market

▶ Share costs

▶ Free up resources to focus on customers

Approach ⚙

▶ Define Industry-wide AD toolchain

▶ Ensure high interoperability

▶ Provide easy access

▶ Establish basis for reference arch.

OpenADx targets reference architecture and …

a wide ranging interoperable toolchain for PoV* and commercial applications
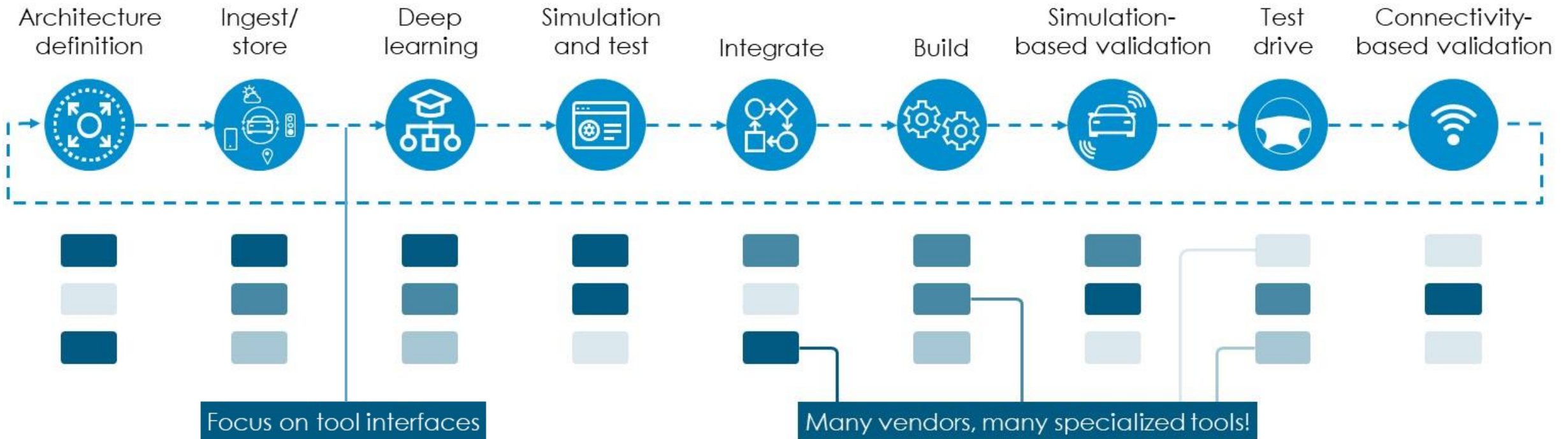

Architecture definition | Ingest/ store | Deep learning | Simulation and test | Integrate | Build | Simulation-based validation | Test drive | Connectivity-based validation

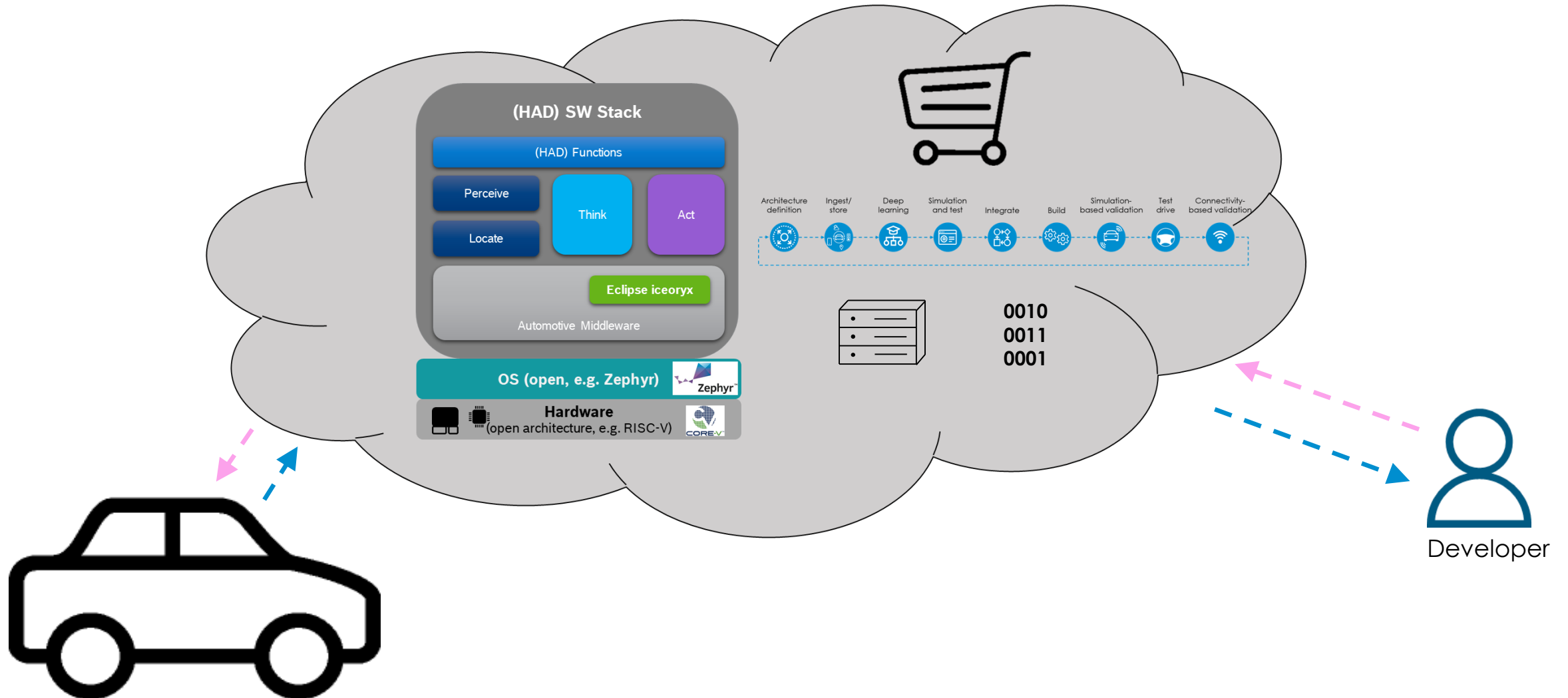Focus on tool interfaces

Many vendors, many specialized tools!

GOALS

› Industry-wide accepted definition of the AD toolchain
› Tool interface standardization
› Ensure efficient implementation and interoperability
› Foundation for reference architecture

Make a complex tool landscape more accessible for enterprise users

*PoV – privately owned veicle

OpenADx: Leading to holistic functional approaches

Use Case: Leverage OpenADx to develop end-to-end solutions (with the community)

(HAD) SW Stack

(HAD) Functions

Perceive

Think

Act

Locate

Eclipse iceoryx

Automotive Middleware

OS (open, e.g. Zephyr)

Hardware
(open architecture, e.g. RISC-V)

Architecture definition · Ingest/store · Deep learning · Simulation and test · Integrate · Build · Simulation-based validation · Test drive · Connectivity-based validation

0010
0011
0001

Developer

OpenADx lays the foundation for safety and standardization

Measurement data

Verifiable AI

Urban Traffic Simulation

Simulation

...

...

FMI Standard

Automotive platform

Design efficiency

Public funded projects

e.g. Simulation

Exchange-platform for timing / performance simulation
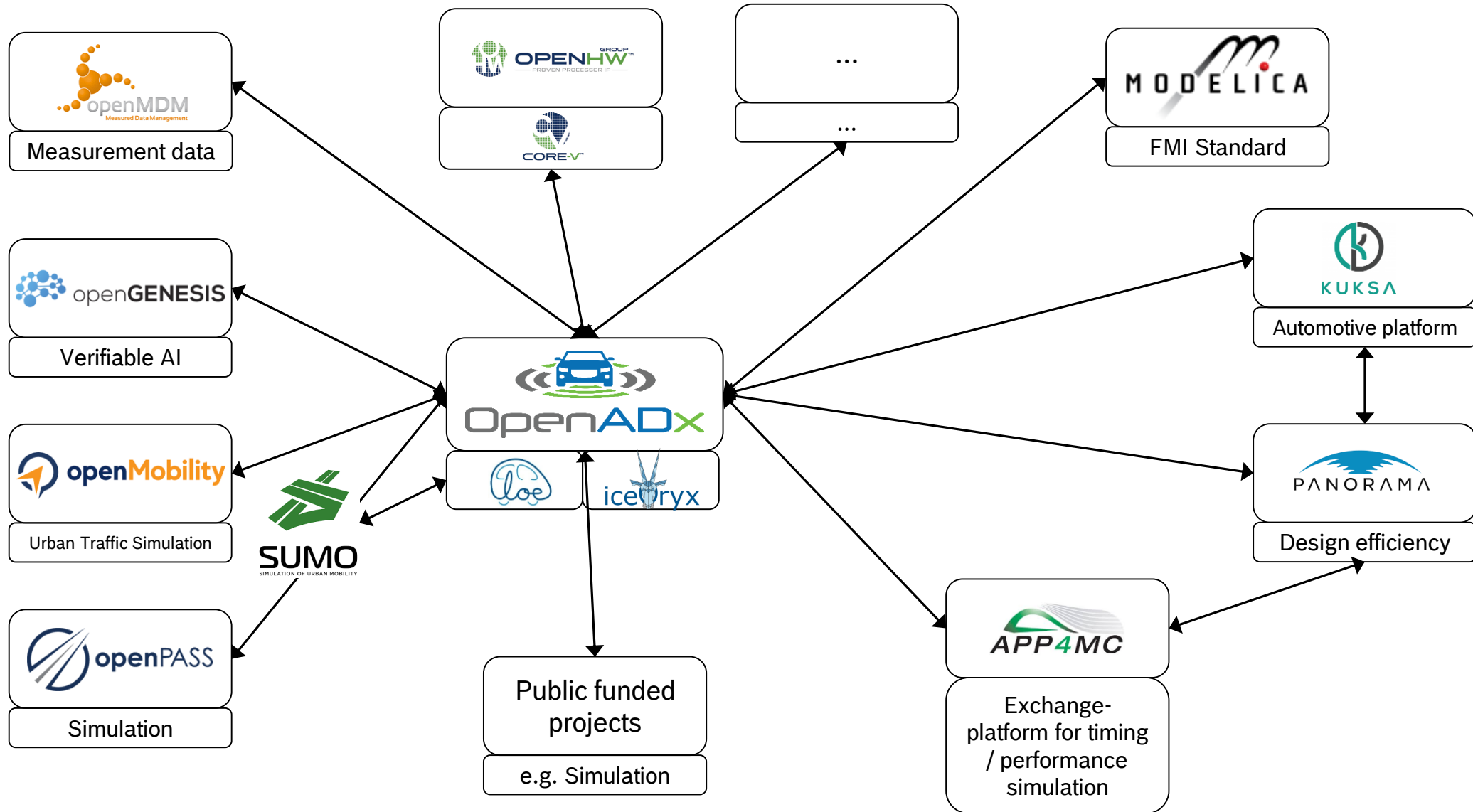
OpenADx: e.g. two major initiatives to address requirements for simulation and data transfer in real time (Cloe and iceoryx)

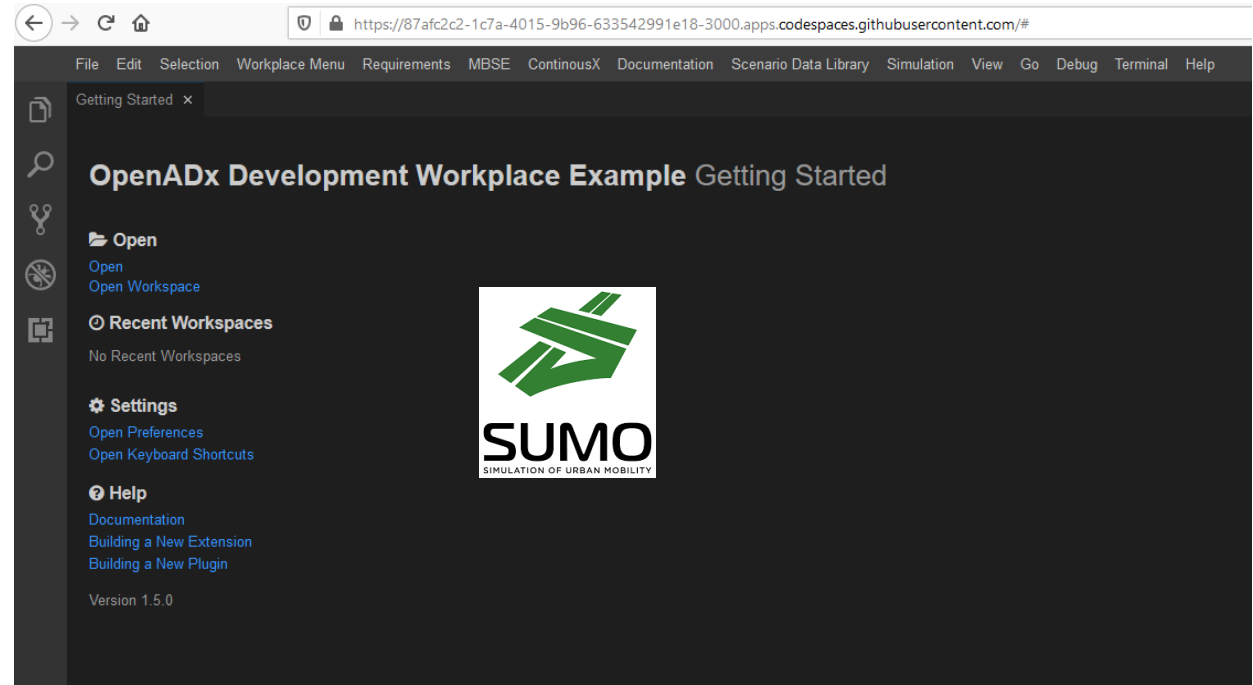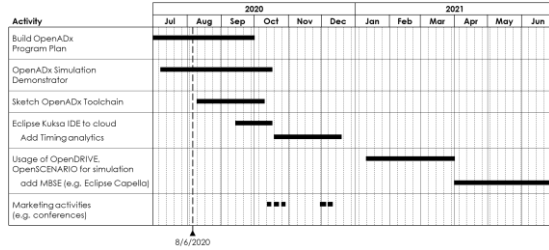Architecture definition → Ingest/store → Deep learning → Simulation and test → Integrate → Build → Simulation-based validation → Test drive → Connectivity-based validation

Proprietary
Open Source
IP

Simulation Engine

Simulator Binding

Eclipse Cloe
(closed loop simulation environment)

User Interface

Controller Binding

AD SW
(under test)

Function

Functional Elements

Eclipse iceoryx

Automotive Middleware

https://projects.eclipse.org/projects/technology.cloe

https://projects.eclipse.org/projects/technology.iceoryx

OpenADx – some projects and ideas

Development Workplace

Program Plan

Demonstrator

OpenADx Development Workplace Example Getting Started
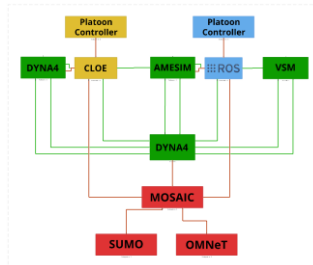
What else?
… let us know!

Links

› OpenADx
  › Whitepaper: https://openadx.eclipse.org/resources/OpenADx-Manifesto-v07-2020.pdf
  › Website: https://openadx.eclipse.org/
  › Wiki: https://wiki.eclipse.org/OpenADx
  › Mailing List: https://accounts.eclipse.org/mailing-list/openadx
  › OpenADx in Blogs: https://blog.bosch-si.com/developer/5-things-you-should-know-about-openadx
  › Eclipse iceoryx
    – https://github.com/eclipse/iceoryx
    – https://projects.eclipse.org/projects/technology.iceoryx
  › Eclipse Cloe: https://projects.eclipse.org/projects/technology.cloe
  › Eclipse APP4MC: https://www.eclipse.org/app4mc/
  › Eclipse Kuksa: https://www.eclipse.org/kuksa/
  › Panorama: https://panorama-research.org/
› openMDM: https://www.openmdm.org/
› openPASS: https://wiki.eclipse.org/OpenPASS-WG
› openMobility: https://openmobility.eclipse.org/
› openGENESIS: https://wiki.eclipse.org/OpenGENESIS_WG

White Papers

OpenADx Manifesto
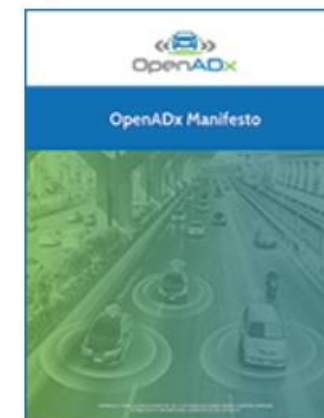
DOWNLOAD

Thank you!

Andreas Riexinger

andreas.riexinger@de.bosch.com

https://wiki.eclipse.org/OpenADx

Find out more and join us

https://openadx.eclipse.org/

https://wiki.eclipse.org/OpenADx