

OpenADx – xcelerate your Autonomous Driving development

Dr. Lars Geyer-Blaumeiser (Bosch Software Innovations GmbH)

Who am I (we)?

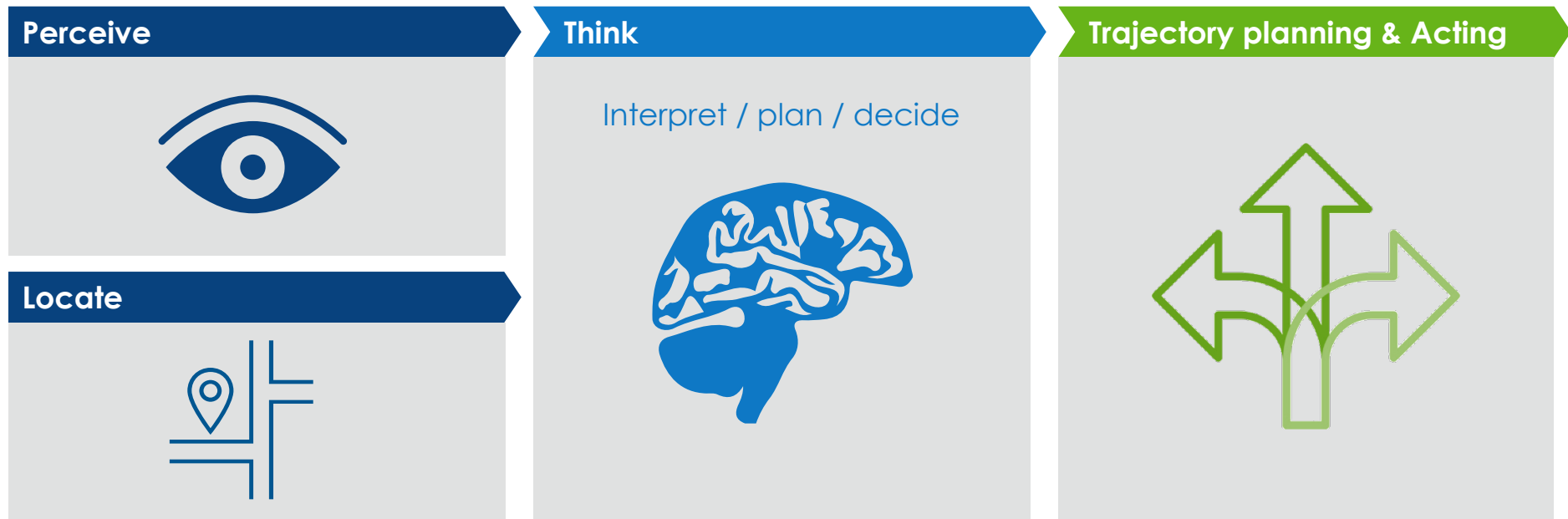


Dr. Lars Geyer-Blaumeiser
Bosch Software Innovations GmbH
Customer Success Services – Open Source

- › Passionate Software Developer
- › Working in the Eclipse Foundation Eco-system for 10 years
- › Pushing Open Source development and business within Robert Bosch GmbH
- › Interest:
 - Creating business with Open Source
 - Combining DevOps/Agile with Open Source
- › Open Source Service Organization
 - › Management Processes and Infrastructure
 - › Strategy and Ecosystem Building
 - › Project Setup/Management
 - › Development

Autonomous Driving

The car has to mirror a driver's abilities to see, evaluate and act

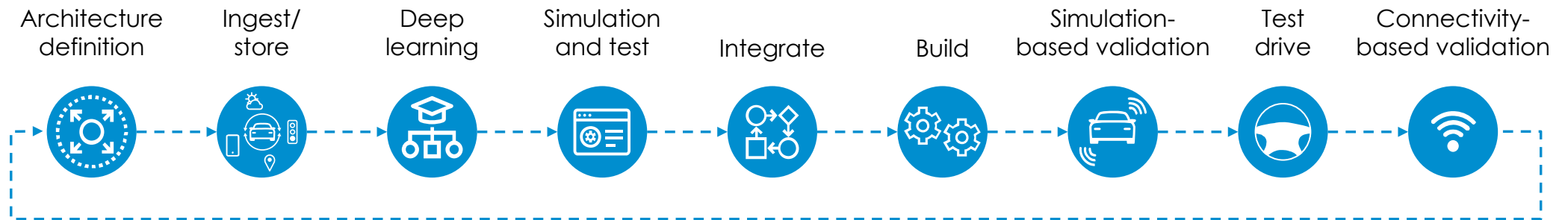


Autonomous driving is a complex challenge

- › AD requires a multifaceted development process incorporating a variety of software tools
- › But none of these tools were ever designed to work together
- › This costs the industry all time and money
- › We lessen this problem by creating the leading automated driving ecosystem ➤ **OpenADx**
- › We leverage open collaboration and open source to
 - Accelerate time to market
 - Increase efficiency
 - Focus on customers

OpenADx

Focus: AD Toolchain

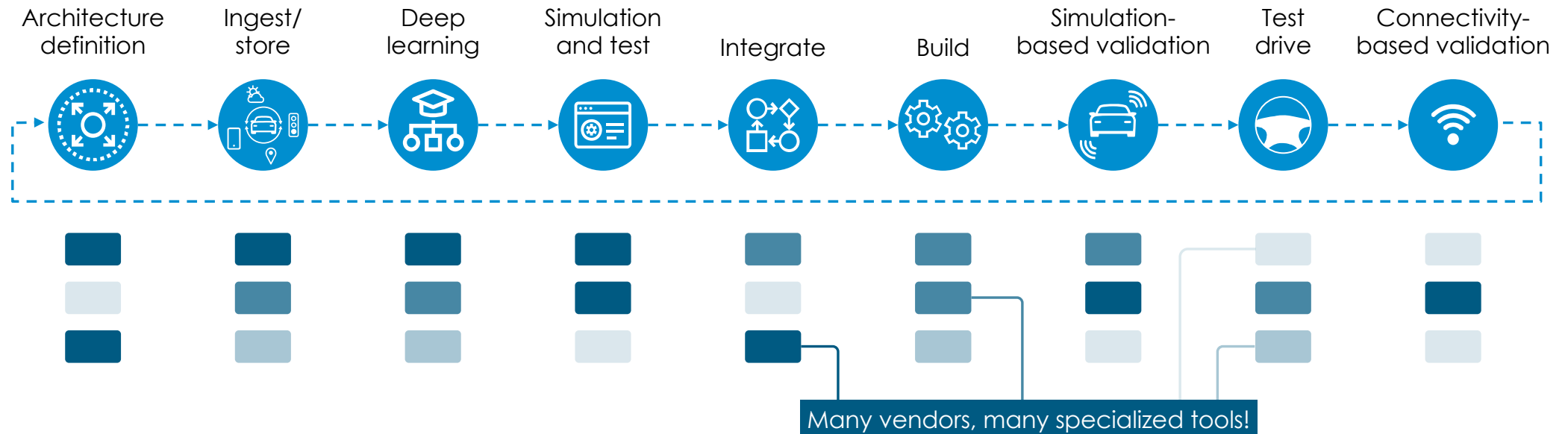


GOAL

- › Industry-wide accepted definition of the AD toolchain
- › Foundation for reference architecture
- › Key to ensure efficient implementation and interoperability

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Tool Landscape



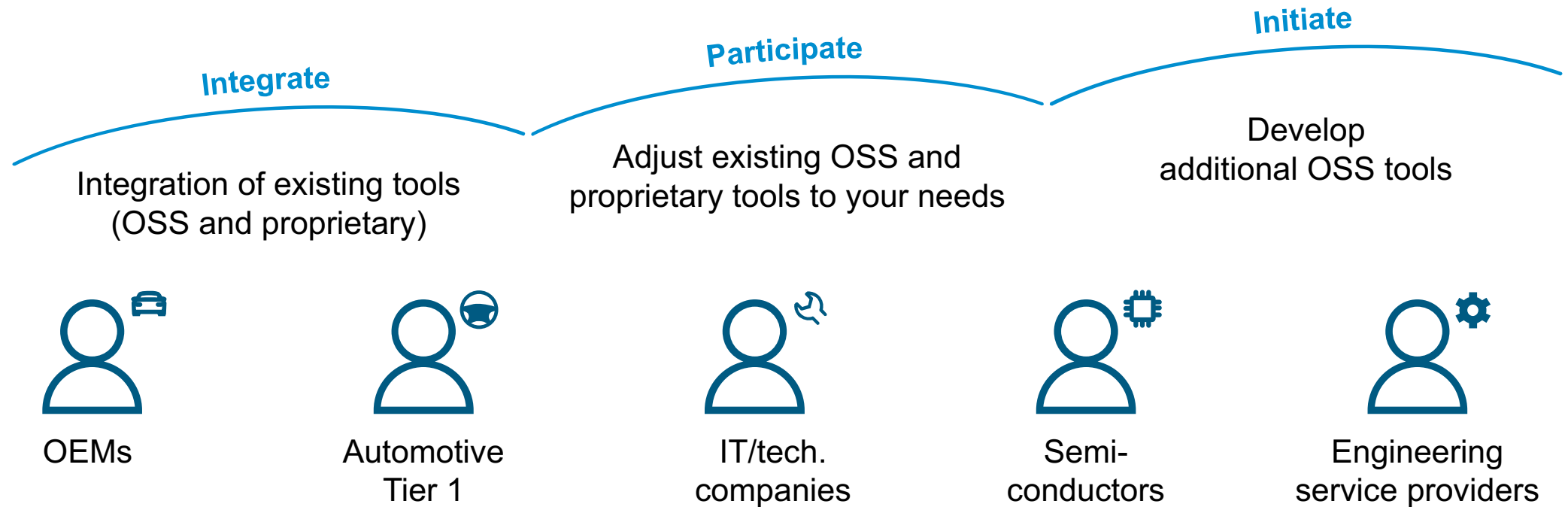
GOAL

- › Ensure transparency and make complex tool landscape more easily accessible for enterprise users

OpenADx

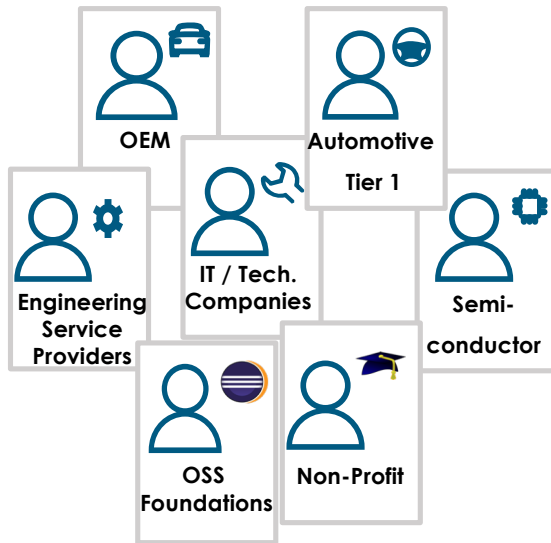
Beneficial for OEMs, Tier1s and technology providers

The AD tool chain: Seamless integration and increased development efficiency



OpenADx

Identify target partners to initiate ecosystem



Current Partners: Bosch, Microsoft, itemis, German Aerospace Center (DLR), Dassault Systemes (3DS), MathWorks, Elektrobit, Renesas, CEA, ZF Friedrichshafen, Tesis Dynaware, Eclipse Foundation

Common open activities to establish cooperation



Open source activities by ecosystem partners



- ROS2
- RVIZ2
- ROSBAG for ROS2

Microsoft AirSim Simulator Platform

OpenADx

From testbed to open source and standardization

Testbeds

- › Validation of solution blueprint, often combination of exiting products/technologies
- › Small, loosely coupled ecosystem of partners who play well together
- › Usually strong Go-To-Market focus (example: IIC Track & Trace, first customer in <12 months)

Open Source Project

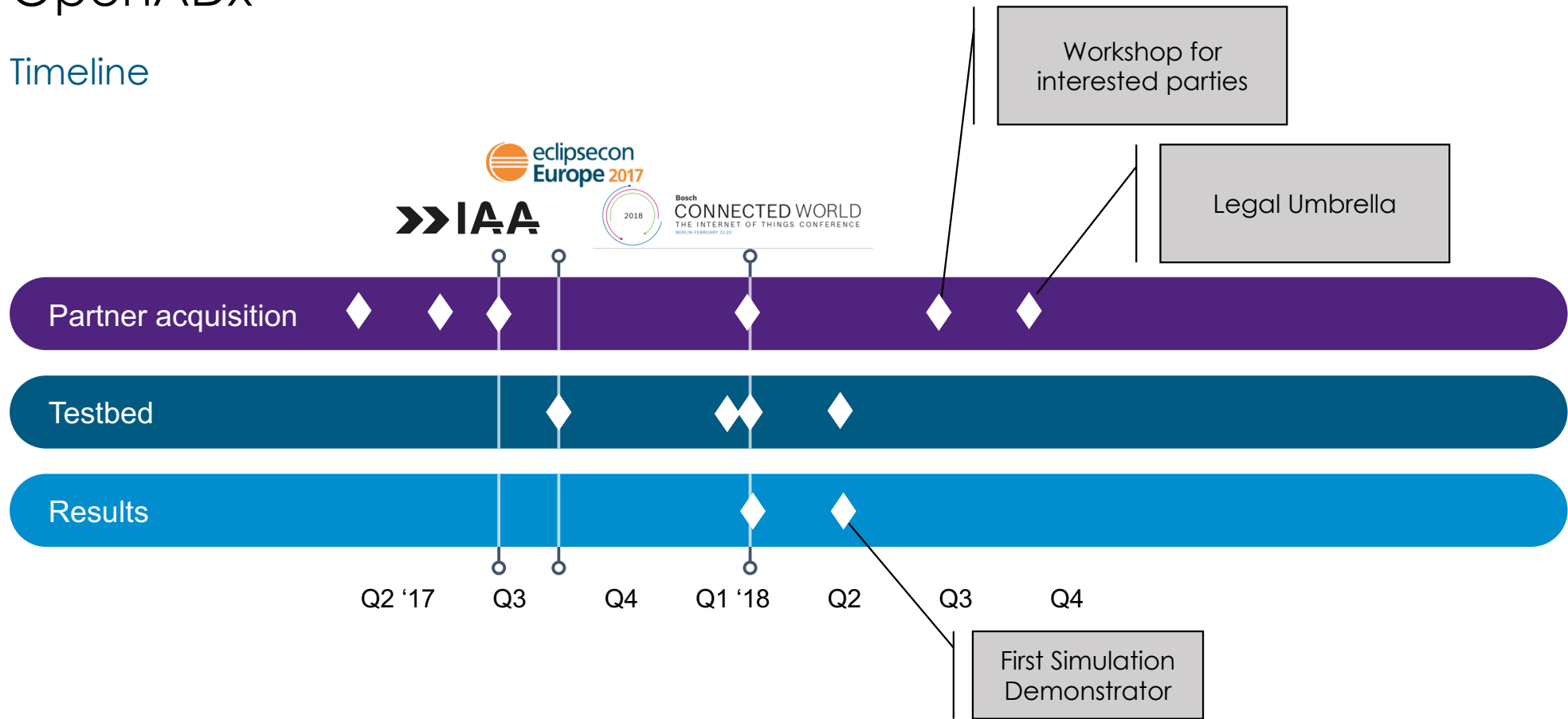
- › Result of testbed (in addition to market validation) can be a joint open source project
- › Sometimes new solutions
- › Sometimes the “glue” required to tie together existing (closed source) solutions

Standardization

- › Often focusing on the APIs developed in the OSS project
- › Usually slower moving

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Timeline



Eclipse Foundation as community host

- › Currently legal setup is not fixed, partners work loosely coupled in workshops to realize testbeds
 - › Eclipse Foundation as supporter (Wiki, Eclipse Labs)
- › But collaboration of companies requires a legal body
 - › E.g., imprint of website, hosting of open source activities and open source management processes
- › Eclipse Foundation provides exactly this:
 - › Industrial Working Groups
 - › Open source contribution management/legal support
 - › Eclipse Public License
 - › Experience in ecosystem setup and management
 - › Good representation in Europe and the US to support cross continental collaboration

OpenADx and other initiatives

Embracing not Competing

Open
Environment

Integrative

Focus on
Organisational
Needs

State of Partnership

- › Initiated by Microsoft and Bosch
- › Interested parties from many domains like automotive, IT, tool vendors, technology providers, governmental organizations
- › Officially listed parties are: AVL, Bosch, CEA, Dassault Systemes (3DS), Elektrobit, German Aerospace Center (DLR), IPG Automotive GmbH, itemis, MathWorks, Microsoft, Renesas,, Tesis DYNAware GmbH, Vattenfall AB, ZF Friedrichshafen
- › Participation of additional companies in workshops
- › Ongoing talks with companies and organizations about collaborations
 - › Especially in the area ROS
- › Creation of first demonstrators along the way

OpenADx as a Portal to Autonomous Driving

- › OpenADx embraces open solutions
- › The OpenADx AD Portal
 - › Internet portal to share information about Autonomous Driving
 - Toolchain proposals
 - Cookbooks
 - HowTos
- › OpenADx targets to realize open solutions
 - › Eclipse based open projects
- › But: OpenADx integrates exciting solutions from anywhere
 - › Any quality solution be it commercial or open independent of the license will be considered
 - › Described in toolchain proposals and cookbooks for anyone to use as is or adapted as needed



#DEVELOPER #MOBILITY

Bosch ConnectedWorld 2018

Autonomous driving accelerator “OpenADx” launched

FEB 21, 2018 0

Today at the Bosch ConnectedWorld conference in Berlin, a new open source autonomous driving accelerator was introduced. OpenADx focuses on the software development toolchain for autonomous driving, an enabling component in the landscape of highly autonomous driving.

Software Innovations @bosch

Just launched at #BCW18: The #AutonomousDriving accelerator #OpenADx aims to create a toolchain specification that is accepted industry-wide bit.ly/2ono3eF



BOSCH CONNECTED WORLD 2018 ADDRESSING THE TOOLCHAIN COMPLEXITY

Development ▶ Lab Test ▶ Test Fleets ▶ Validation ▶ Manufacturing ▶ Operations

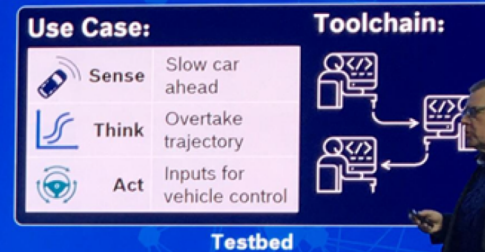


OpenADx

Accelerate AD development through open collaboration and open source

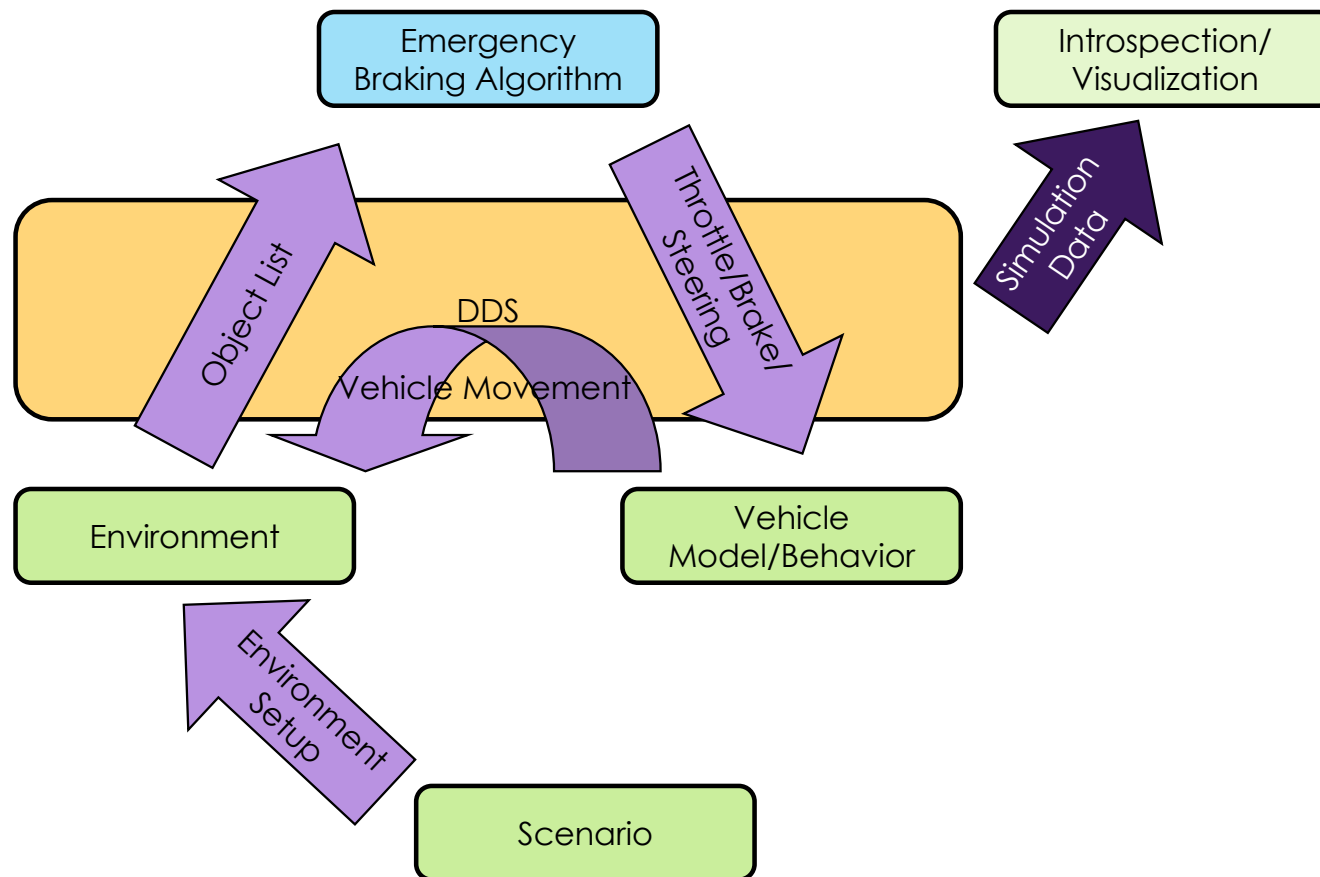
OpenADx Testbeds

- Controlled experimentation environment
- Validation of customer requirements and technical feasibility
- Focus on AD toolchain integration aspects
- Can lead to longer term open source project



OpenADx launched at BCW18

Testbed Simulation Demonstrator



- › Messages and Data Structures reused
- › ROS
- › Open Simulation Interface mapped to DDS

- › Partners:
 - › AVL
 - › Bosch
 - › Dassault Systemes
 - › Elektrobit
 - › MathWorks
 - › Microsoft
 - › Renesas
 - › Tesis Dynaware
 - › University of Oulu

Testbed Massive Data Ingest

- › Problem: Ingest and manage petabytes of data
- › Current solution idea: Provide an Apache Hadoop based data structure for data storage
 - › Enable big data solutions on top of Hadoop to be usable with the data
- › Current focus: Get the data from the different formats available into Hadoop using open solutions
- › Issues:
 - › Driven by Bosch only, so interested companies are invited to join forces here
 - › Area is polluted with IP protected data format standards

Publicly Funded Activities

- › Goal: Realize results of publicly funded activities as Open Source to promote common solutions
 - › Standardization often done in standard bodies which require membership to use the IP
 - › Blocks open solutions and prevents integration of such solutions with open industry solutions
 - › Excludes companies who do not participate for whatever reason
- › Transform the way of cooperation from IP protected closed initiatives to open eco-systems
- › Example: VDA Leitinitiative
 - › OpenADx works to become the implementation body for solutions
- › Example: European Funded Research Project Appstacle
 - › Eclipse Kuxa as good example of an open approach to make public money funded solutions available for the public

Summary and Outlook

- › OpenADx is an industry wide initiative to accelerate the development of Automated Driving
- › Currently the ecosystem build up is the primary focus
- › Collaboration is done in the form of testbeds as prototypes for potential open source projects
- › This year will show some initial results in the form of demonstrators built out of testbeds

We invite you!

- › Website: <https://wiki.eclipse.org/OpenADx>
- › Mailing List: <https://accounts.eclipse.org/mailling-list/openadx>
- › OpenADx in Blogs: <https://blog.bosch-si.com/developer/5-things-you-should-know-about-openadx>

Thank you!

<https://wiki.eclipse.org/OpenADx>