OpenADx – xcelerate your Autonomous Driving development
Open Source has arrived in automotive

FEP – Functional Engineering Platform
launched to face the upcoming complexity in function development, considering all relevant aspects in simulation (MiL, SiL, HiL) and testing.
... and competition

OpenADx in action – Autonomy at 180 mph

https://www.indyautonomouschallenge.com/
https://cuicardeeporange.com/project/deep-orange-12/
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)
  - Standardized AI labeling
  - SiL standardization

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.

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OpenADx targets reference architecture and ... 

a wide ranging interoperable toolchain for PoV* and commercial applications

GOALS

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

*PoV – privately owned vehicle
OpenADx: Leading to holistic functional approaches

Use Case: Leverage OpenADx to develop end-to-end solutions (with the community)
OpenADx – Big Picture – Draft

Leveraging open collaboration and open source to accelerate development of Automated Driving

10/26/2021
OpenADx – Big Picture – Draft

Function

AD Functions (e.g., TJP)

Functional Elements

Perceive
Think
Act
Locate

Middleware

ROS Middleware (rmw)
Eclipse icoryx
Eclipse Cyclone DDS

Operating System

“HW in the cloud”

Hardware
(open architecture, e.g., RISC-V)
OpenADx lays the foundation for safety and standardization

Eclipse Automotive Working Groups

- Measurement data
- Urban Traffic Simulation
- Simulation
- Public funded projects (e.g., Simulation)
- Exchange platform for timing/performance simulation
- Design efficiency
- Automotive platform

OpenADx

- ASAM
  - Standardization
- GENIVI
  - open, Linux-based in-vehicle infotainment (IVI) platform
- FMI Standard
- Modelica

Cooperation?
OpenADx: hosted projects

Projects

ECLIPSE CLOE
Eclipse CLOE provides simulation middleware and simulation-engine bindings for connecting simulation engines to the "software under test".

VIEW PROJECT

ECLIPSE OPENMCX
Eclipse OpenMCX provides a co-simulation middleware to run simulations combining physical, control and environment models.

VIEW PROJECT

ECLIPSE APP4MC
Eclipse APP4MC is a platform for engineering embedded multi- and many-core software systems. The platform enables the creation and management of complex tool chains including simulation and validation.

VIEW PROJECT

ECLIPSE ICEORYX
Eclipse Iceoryx is a middleware with a zero-copy shared memory approach which is optimized for the huge data inter-process-communication.

VIEW PROJECT

ECLIPSE CYCLONE DDS
Eclipse Cyclone DDS is a performant and robust open-source DDS. Cyclone DDS is a project of OpenADx and Eclipse IoT. Eclipse Iceoryx is built into Eclipse Cyclone DDS.

VIEW PROJECT

ECLIPSE ZENOH
Eclipse Zenoh provides V2V, V2X, cloud connect for Autoware.Auto, ROS 2 and DDS including Eclipse Cyclone DDS.

VIEW PROJECT
OpenADx – THE Portal for Autonomous Driving

- OpenADx targets realization of open solutions
- Eclipse-based open projects

- The OpenADx AD Portal is focused primarily on Autonomous Driving:
  - Toolchain proposals
  - Cookbooks
  - HowTos
  - ...

- But non-proprietary solutions and initiatives can come from anywhere

https://openadx.eclipse.org/
OpenADx – Outlook

Eclipse OpenADx Working Group

PROGRAM PLAN 2021

OpenADx – Development Workplace

OpenADx – Demonstrator

Share your solution!

What else? ... let us know!
Useful Links

- **OpenADx**
  - Website: [https://openadx.eclipse.org/](https://openadx.eclipse.org/)
  - Wiki: [https://wiki.eclipse.org/OpenADx](https://wiki.eclipse.org/OpenADx)
  - Mailing List: [https://accounts.eclipse.org/mailing-list/openadx](https://accounts.eclipse.org/mailing-list/openadx)
  - OpenADx in Blogs: [https://blog.bosch-si.com/developer/5-things-you-should-know-about-openadx](https://blog.bosch-si.com/developer/5-things-you-should-know-about-openadx)
  - Eclipse iceoryx
    - [https://github.com/eclipse-iceoryx/iceoryx](https://github.com/eclipse-iceoryx/iceoryx)
    - [https://projects.eclipse.org/projects/technology.iceoryx](https://projects.eclipse.org/projects/technology.iceoryx)
  - Eclipse Cloe:
    - [https://github.com/eclipse/cloe](https://github.com/eclipse/cloe)
    - [https://projects.eclipse.org/projects/automotive.cloe](https://projects.eclipse.org/projects/automotive.cloe)
  - Eclipse OpenMCX: [https://projects.eclipse.org/projects/automotive.openmcx](https://projects.eclipse.org/projects/automotive.openmcx)
  - Eclipse APP4MC: [https://www.eclipse.org/app4mc/](https://www.eclipse.org/app4mc/)
  - Eclipse Cyclone DDS: [https://projects.eclipse.org/projects/iot.cyclonedds](https://projects.eclipse.org/projects/iot.cyclonedds)
  - Eclipse Kuksa: [https://www.eclipse.org/kuksa/](https://www.eclipse.org/kuksa/)
  - Panorama: [https://panorama-research.org/](https://panorama-research.org/)
  - openMDM: [https://www.openmdm.org/](https://www.openmdm.org/)
  - openPASS: [https://wiki.eclipse.org/OpenPASS-WG](https://wiki.eclipse.org/OpenPASS-WG)
  - openMobility: [https://openmobility.eclipse.org/](https://openmobility.eclipse.org/)
Thank you!

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Find out more and join us
https://openadx.eclipse.org/
https://wiki.eclipse.org/OpenADx