Software defined Vehicle

Eclipse Velocitas

SDV Contribution Day 2022
June 30th
ZF Forum Friedrichshafen

Who am I?

Andy Riexinger
Bosch Engineering GmbH

- Senior Software Architect for Software defined Vehicle
- Co-Project Lead Eclipse Velocitas

- ~25 years at Bosch
- ~15 years experience in embedded software development

- Interest in creating business with and pushing Open Source

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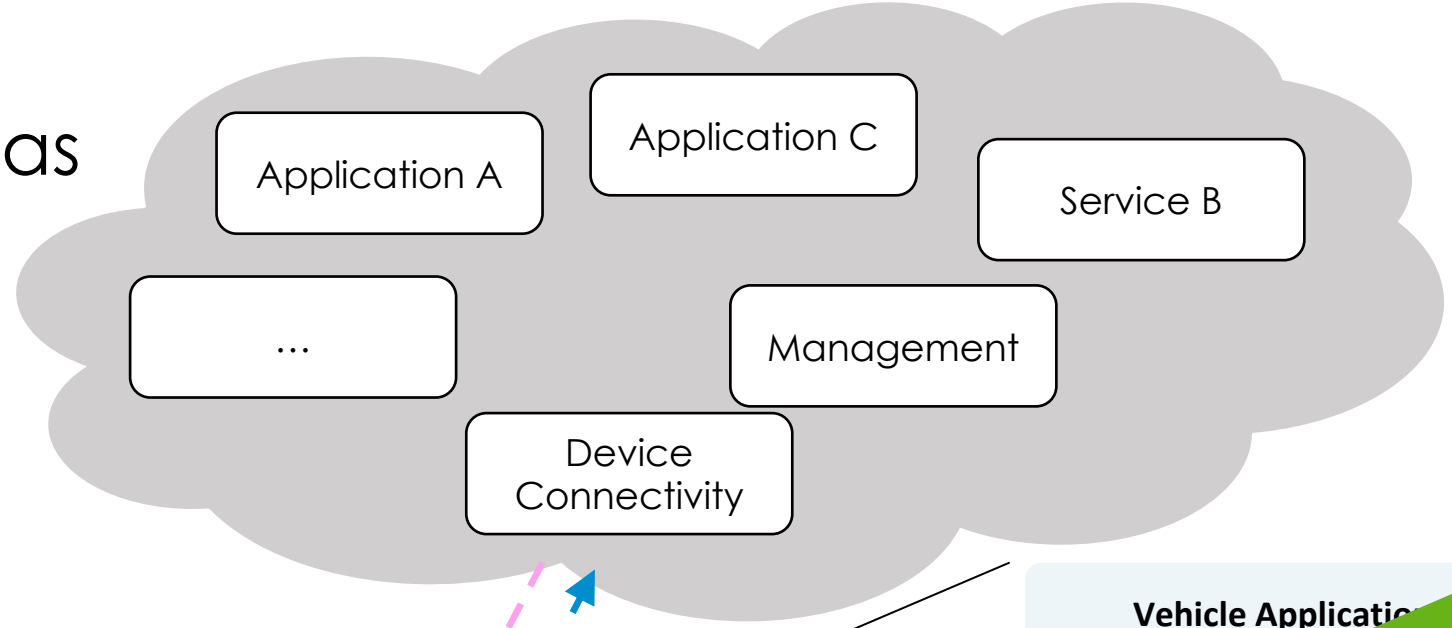
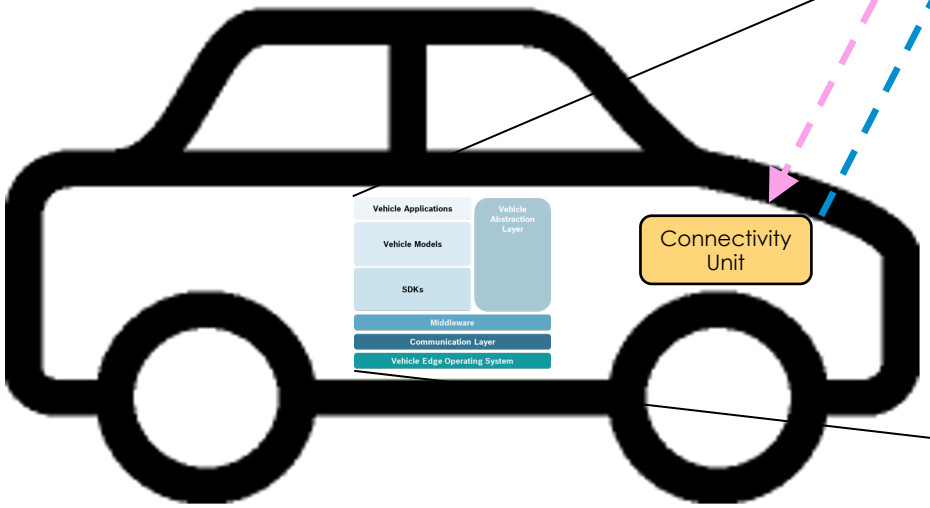
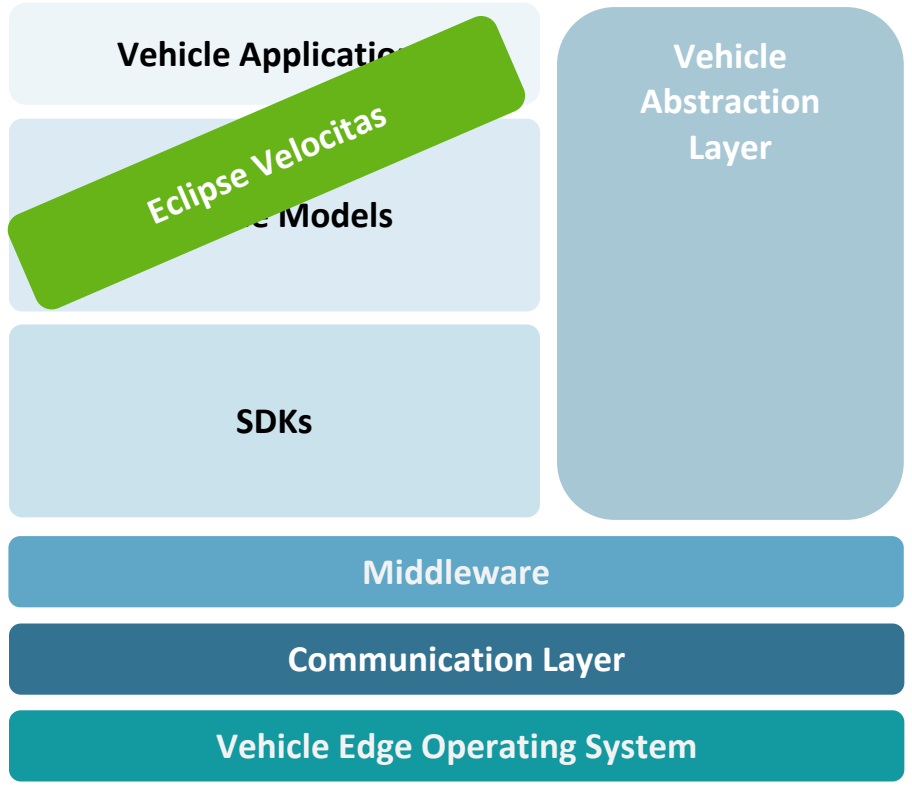


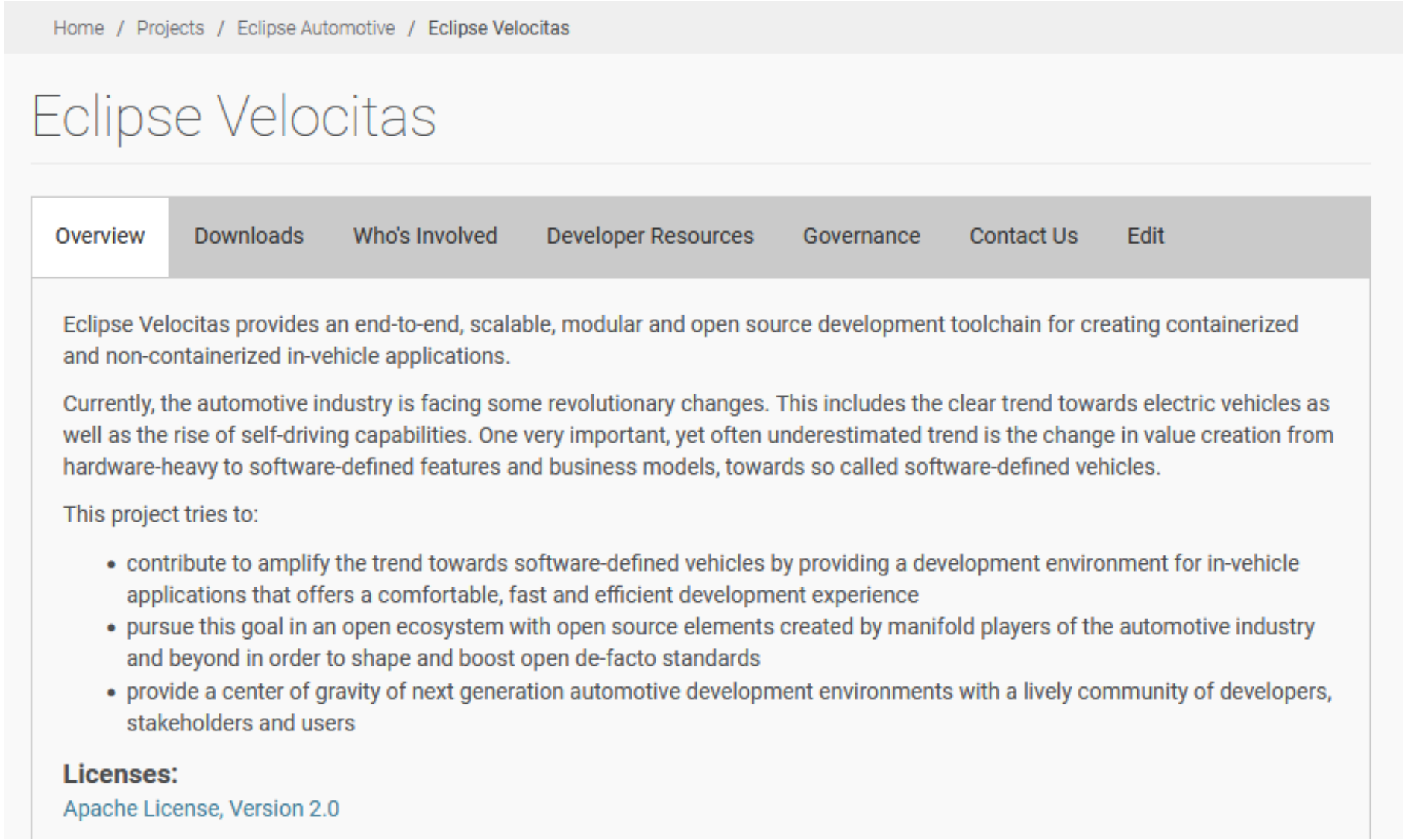
Software defined Vehicle





Eclipse Velocitas

https://projects.eclipse.org/projects/automotive.velocitas



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Eclipse Velocitas

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Eclipse Velocitas provides an end-to-end, scalable, modular and open source development toolchain for creating containerized and non-containerized in-vehicle applications.

Currently, the automotive industry is facing some revolutionary changes. This includes the clear trend towards electric vehicles as well as the rise of self-driving capabilities. One very important, yet often underestimated trend is the change in value creation from hardware-heavy to software-defined features and business models, towards so called software-defined vehicles.

This project tries to:

- contribute to amplify the trend towards software-defined vehicles by providing a development environment for in-vehicle applications that offers a comfortable, fast and efficient development experience
- pursue this goal in an open ecosystem with open source elements created by manifold players of the automotive industry and beyond in order to shape and boost open de-facto standards
- provide a center of gravity of next generation automotive development environments with a lively community of developers, stakeholders and users

Licenses:

Apache License, Version 2.0

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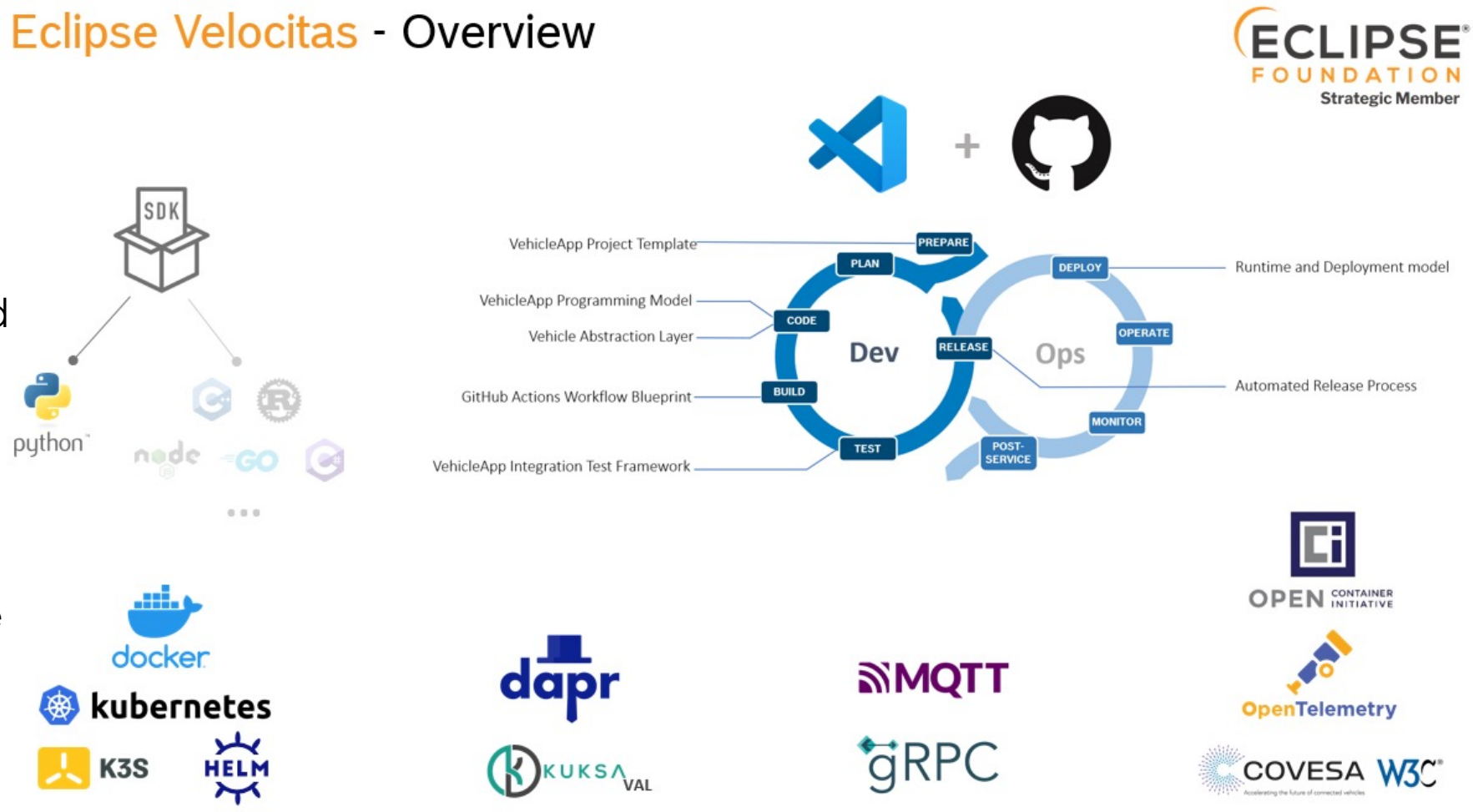
Goal

- Eclipse Velocitas builds an end-to-end, scalable and modular development toolchain for creating containerized in-vehicle applications (*Vehicle Apps*)
- Eclipse Velocitas offers a comfortable, fast and efficient development experience to increase the velocity (-> Velocitas: Latin for velocity) of a development team



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Offering

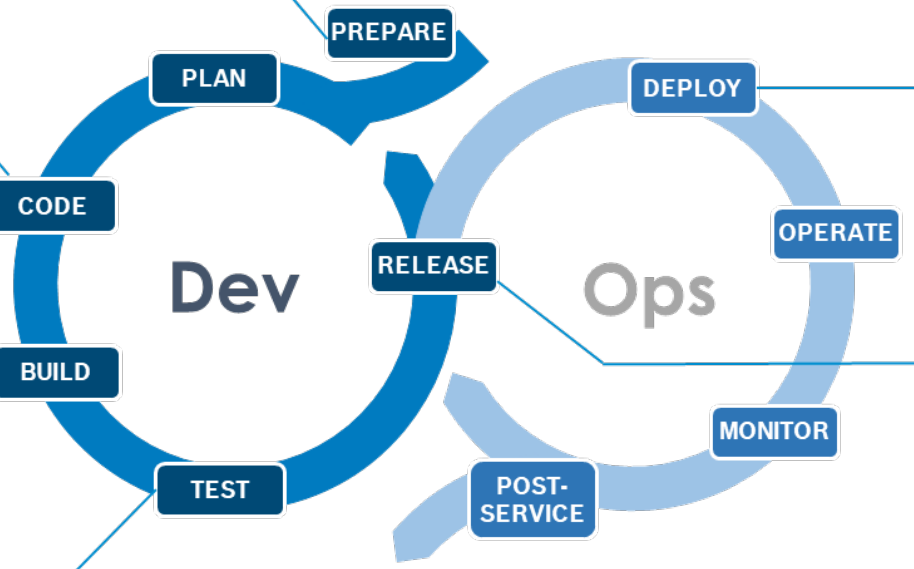
Vehicle App Project Template
Quick Vehicle App project setup using our GitHub template including GitHub workflows and development environment

Vehicle App Programming Model
Simplify coding and debugging of Vehicle Apps that accessing vehicle data points and modifying vehicle functions using the provided SDK

Vehicle Abstraction Layer
Abstracts vehicle make and model specific properties and capabilities to a common representation. This allows Vehicle Apps to be portable across different vehicle architectures

GitHub Actions Workflow Blueprint
Providing ready-to-use GitHub workflows to check the Vehicle App, build images for multi architectures, scan it, execute integration tests and release the Vehicle App

Vehicle App Integration Tests
To ensure that a newly created Vehicle App will run together with the runtime services



Runtime and Deployment model
Running and deploying Vehicle App as OCI-compliant container to increase the flexibility to support different programming languages and runtimes which accelerates innovation and development.

Automated Release Process
Providing a release workflow to generate release artifacts and documentation out of the CI workflow results and push it to a container registry to be used by a deployment system

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Initial Contribution

- Python SDK and template repository containing:
  - Sample in-vehicle application implementation to allow easy ramp-up of developers into the software defined vehicle ecosystem development model
  - Integration of vehicle model into developer IDE to directly interface with APIs and data
  - Visual Studio Code dev container to simplify the developer workspace setup for in-vehicle application development
  - Out of the box GitHub workflow implementations and required GitHub actions to
    - Build a container
    - Test the in-vehicle application (component, integration and vulnerability)
    - Document and visualize the overall test results
    - Publish the build image

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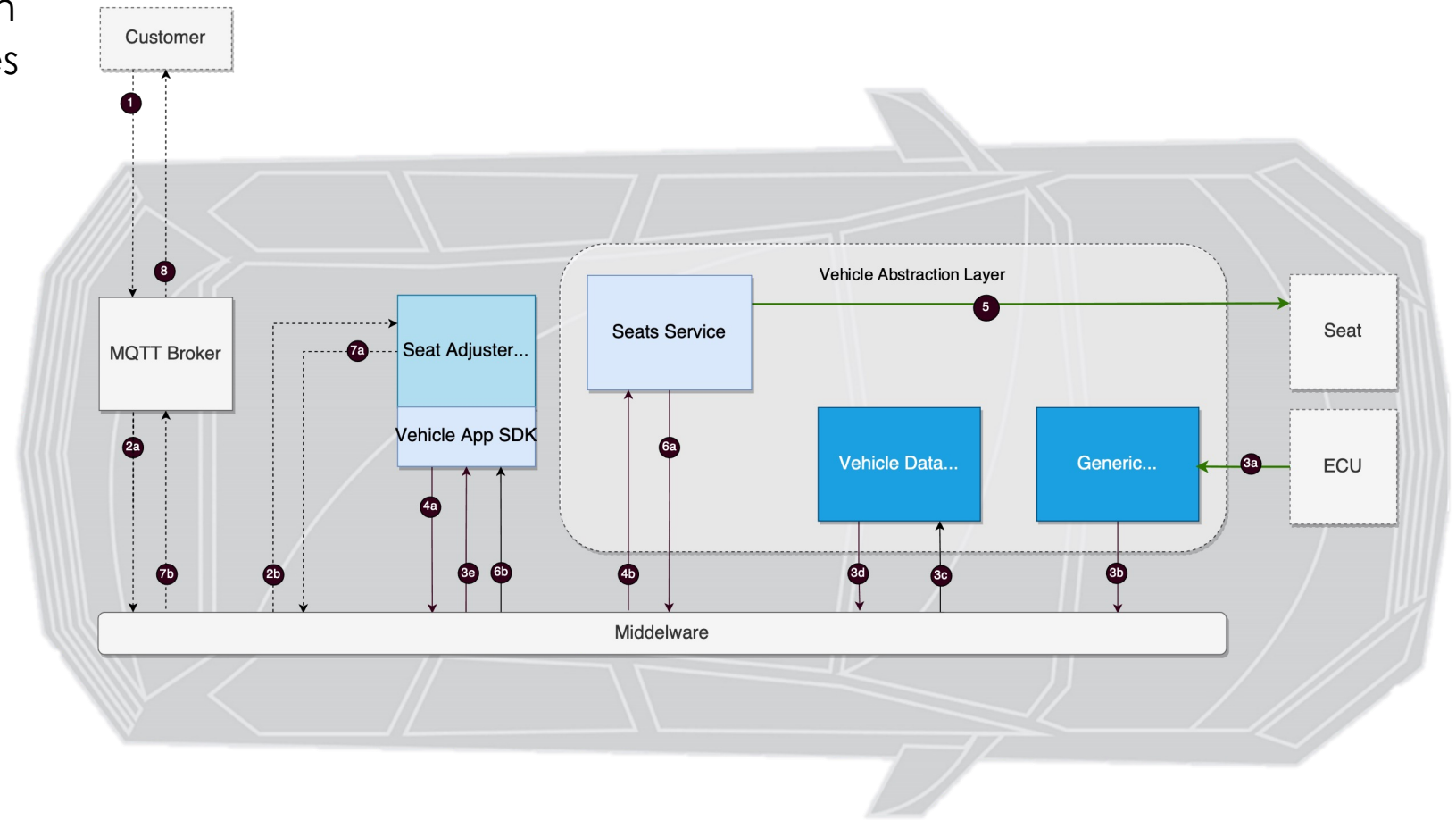
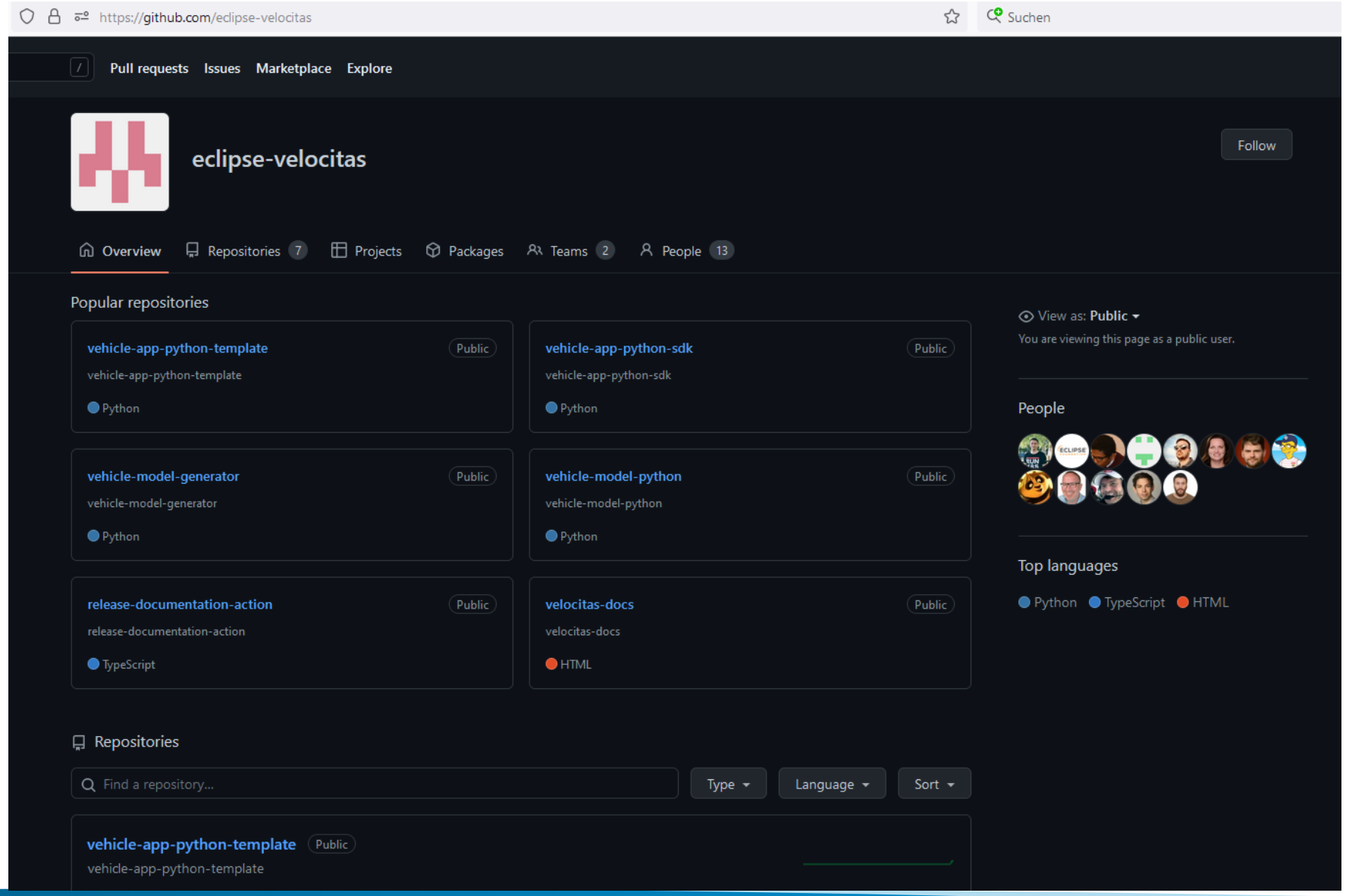
An included Example for easy start – Seat Adjustment

1. Request - change the seat position
2. Seat Adjuster Vehicle App receives request
3. Seat Adjuster Vehicle App gets current vehicle speed
4. Seat Adjuster Vehicle App triggers seat adjustment with support of Vehicle App SDK
5. Seat Service moves the seat to the new position
6. Seat Service returns OK or an error code
7. Seat Adjuster Vehicle App returns a success message otherwise an error message
8. Success or error message will be returned to Requester



Eclipse Velocitas – now available on GitHub!

https://github.com/eclipse-velocitas



Summary

- **Eclipse Velocitas**
  - Provides a development toolchain for creating in-vehicle applications (*Vehicle Apps*)
  - Increases the velocity of a development team
  - Increases quality through openness
  - Will be essential to the success of development activities

The future of mobility will be software defined!

Let's put all projects together and build the future vehicle.

I invite you!

Useful Links

- Software defined Vehicle (SDV)
  - Website: https://sdv.eclipse.org/
  - SDV related Projects: https://sdv.eclipse.org/projects/

  - Eclipse Leda: https://projects.eclipse.org/projects/automotive.leda
  - Eclipse Velocitas: https://projects.eclipse.org/projects/automotive.velocitas
  - Eclipse Velocitas Source Repos: https://github.com/eclipse-velocitas
    - Documentation: https://github.com/eclipse-velocitas/velocitas-docs
    - Vehicle App Development using Python: https://github.com/eclipse-velocitas/vehicle-app-python-template
    - Vehicle App Python SDK: https://github.com/eclipse-velocitas/vehicle-app-python-sdk
    - Velocitas Vehicle Model for Python: https://github.com/eclipse-velocitas/vehicle-model-python
    - Velocitas Vehicle Model Generator: https://github.com/eclipse-velocitas/vehicle-model-generator
    - Release Documentation Render Action: https://github.com/eclipse-velocitas/release-documentation-action
    - License Check GitHub Action: https://github.com/eclipse-velocitas/license-check

  - Vehicle Signal Specification: https://github.com/COVESA/vehicle_signal_specification

Thank you!

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Find out more and join us

https://sdv.eclipse.org/