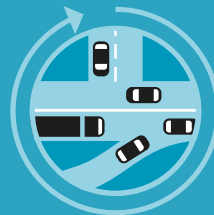


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FINAL EVENT



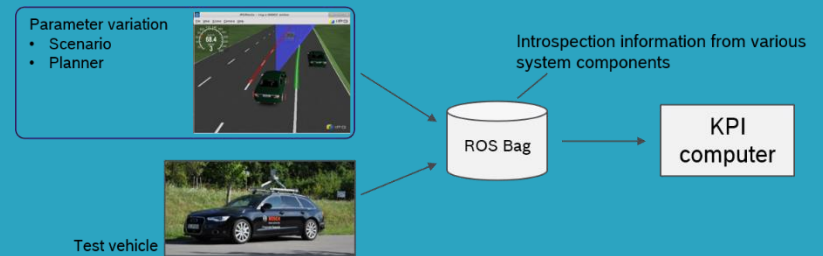
Common Evaluation Framework  
for Simulation and Vehicle Integration

# AGENDA

Software-in-the-loop Simulation Framework

Evaluation Framework

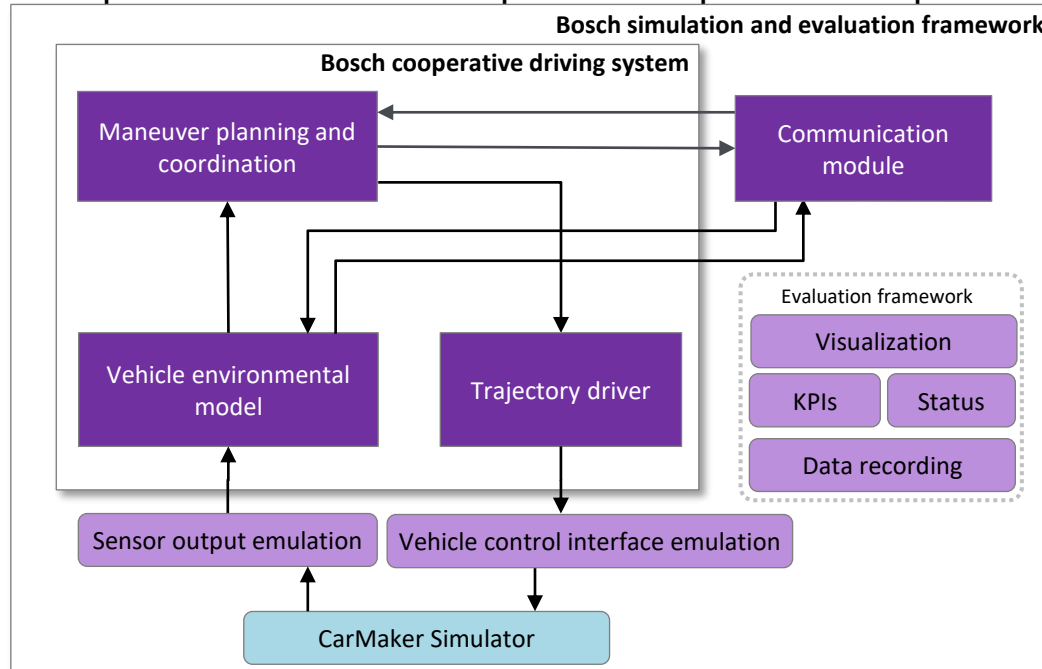
Gaining insights from evaluation



# Software-in-the-loop Simulation Framework

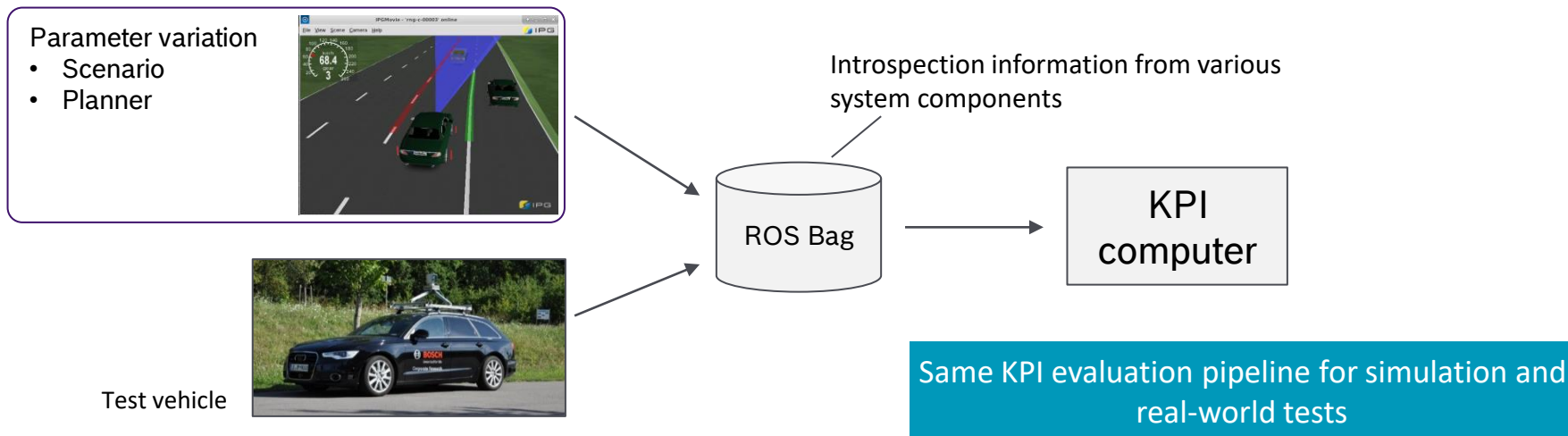
## Functional Architecture

- Software-in-the-loop simulation for development and parameter optimization



# Evaluation Framework Overview

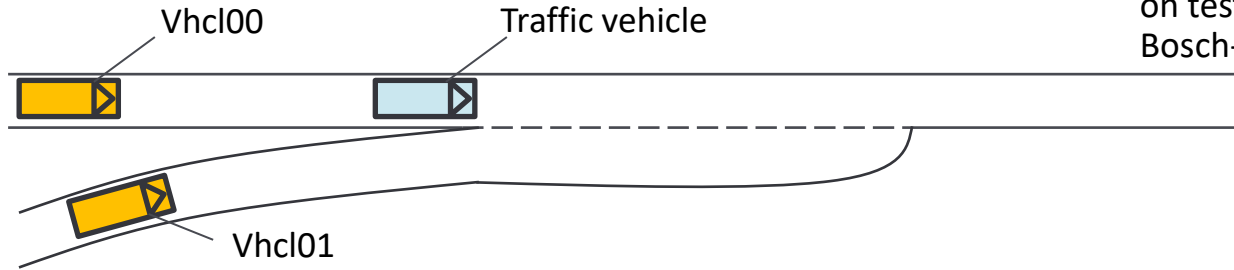
- Custom evaluation framework for KPI computation and parameter optimization



# Gaining insights from evaluation

## Our Learnings from Simulations and Vehicle Tests

- Our use case: F1 – Cooperative Merging

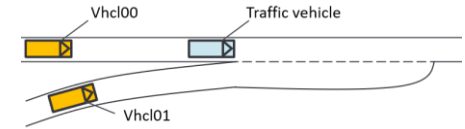


- Same topology in simulation and on test track generated from Bosch-internal AV planning map

- Outtakes today
  - Effects of planning horizon
  - Tuning the willingness to cooperate
  - Simulation vs real world

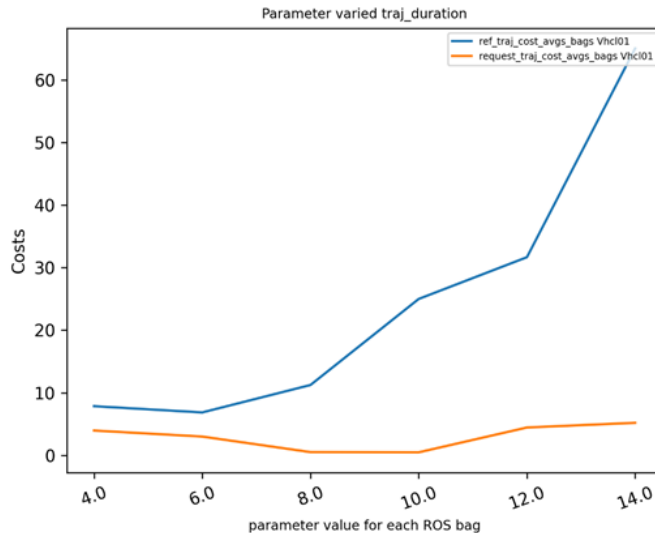
# Gaining insights from evaluation

## Effects of Planning Horizon



- Lead question: How to select the minimum required planning horizon?

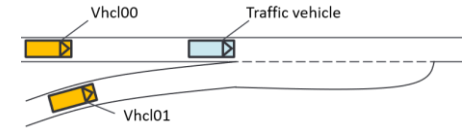
Total Average(ref\_traj\_cost and request\_traj\_cost) w.r.t each bagfile



- Longer planning horizon incurs higher gap between reference and requested trajectories
- Gap is used to tweak the willingness to cooperate

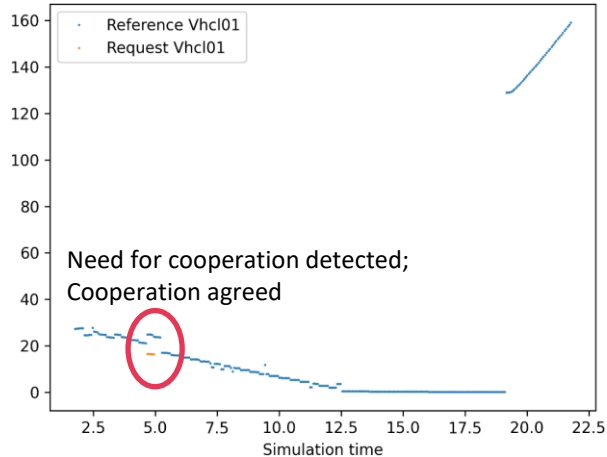
# Gaining insights from evaluation

## Tuning Willingness to Cooperate



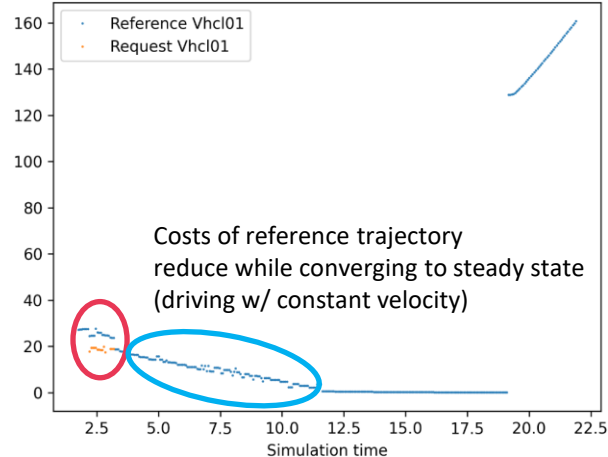
- Lead question: What is the effect of cooperation cost parameter (0.0: absolutely no cooperation, 1.0: always allow other's maneuvers)
- Higher cooperation cost parameter results in
  - Earlier cooperation
  - Lower gap between reference and request trajectory

Cooperation cost parameter 0.7



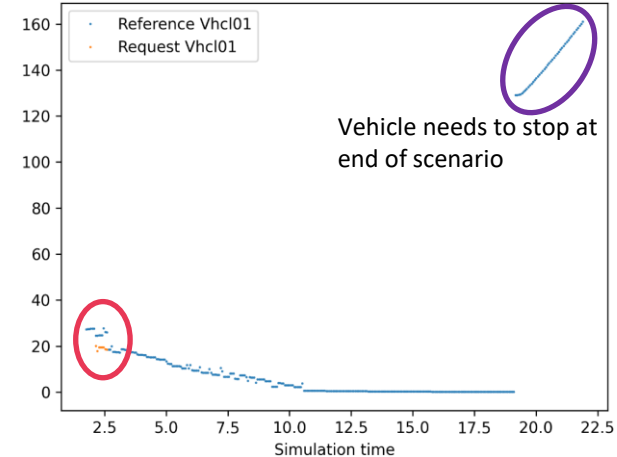
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Cooperation cost parameter 0.8



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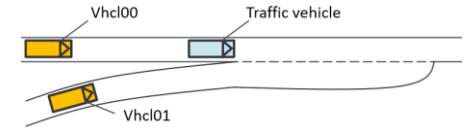
Cooperation cost parameter 0.95



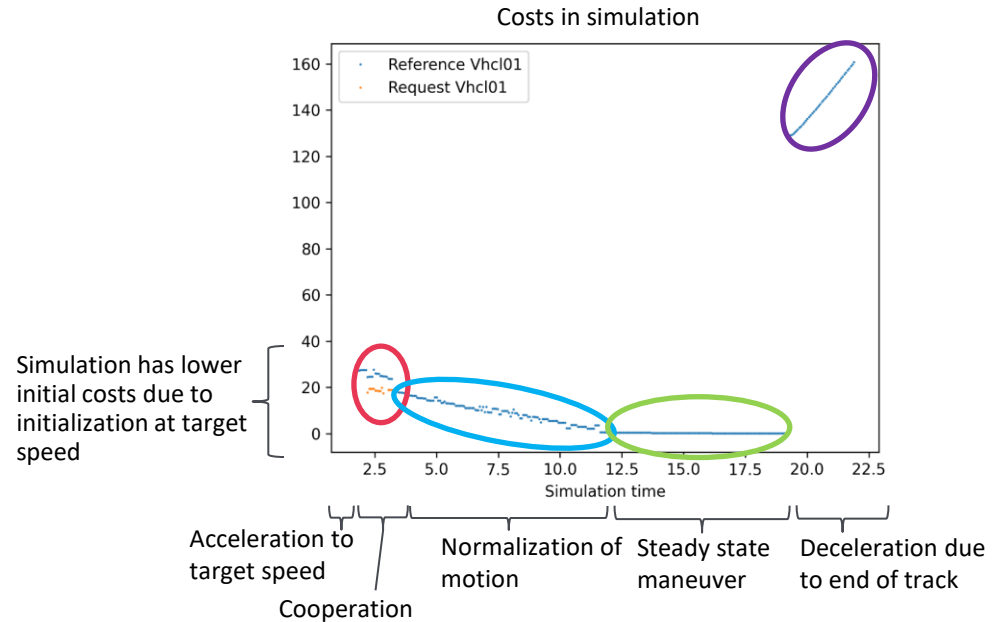
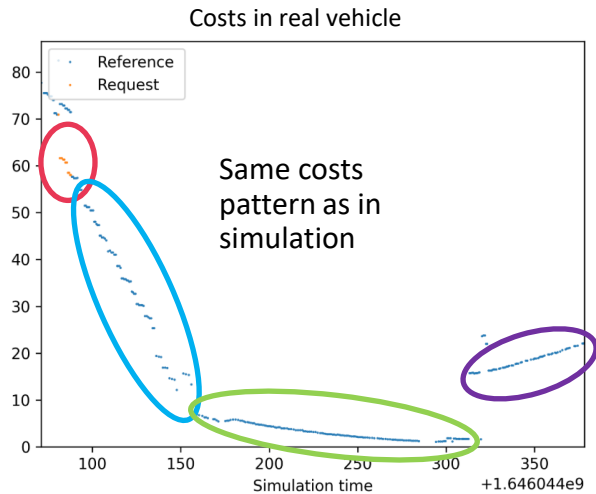
7

# Gaining insights from evaluation

## Simulation vs Real World



- Lead question: Do simulation results carry over into real world?
  - TL;DR: They do



# THANK YOU

Maxim Dolgov

Robert Bosch GmbH

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Images: IMAGinE, Unsplash

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