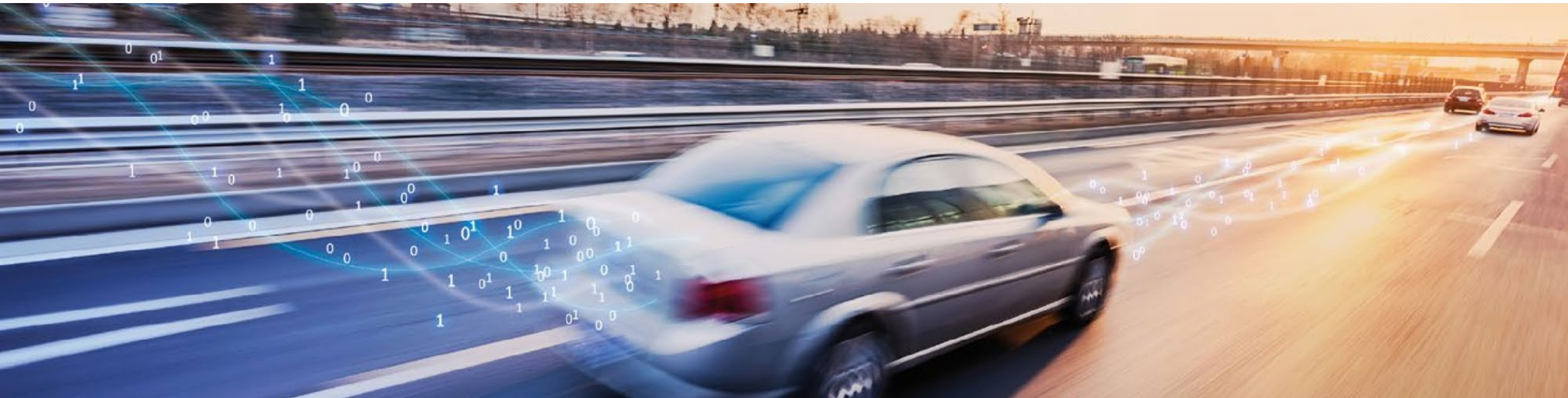# IDEA: Standardization of Scenario Labeling & Object Labels

**Nicco Dillmann**
Global Technology Manager
ASAM e.V.

**Ben Engel**
Global Technology Manager
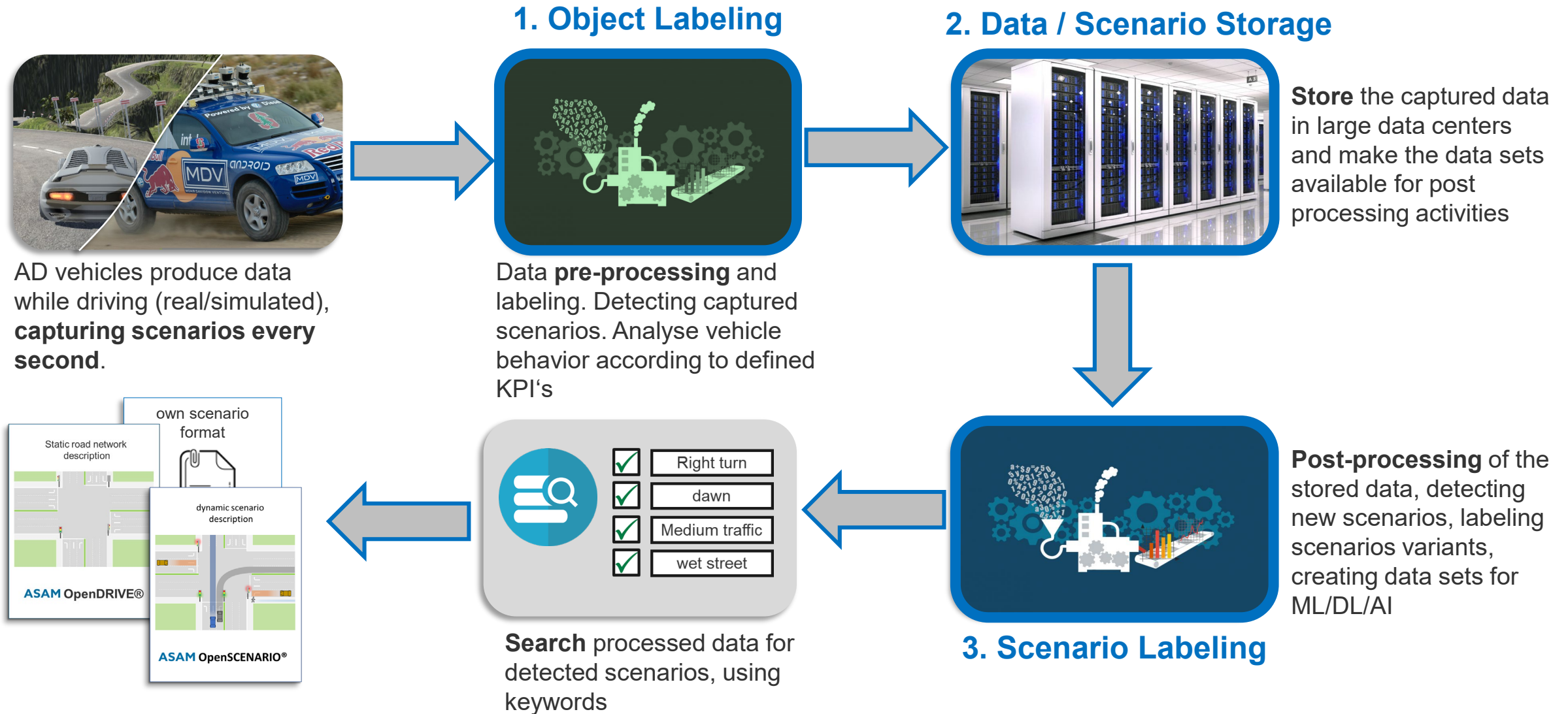ASAM e.V.

**ASAM** Association for Standardization of Automation and Measuring Systems

# Focus of the Ideation

- Development of ADAS and highly automated driving systems

ASAM

# Recorded Data from AD Vehicles

# Life of the recorded data

**1. Object Labeling**

**2. Data / Scenario Storage**



AD vehicles produce data while driving (real/simulated), **capturing scenarios every second**.

Data **pre-processing** and labeling. Detecting captured scenarios. Analyse vehicle behavior according to defined KPI's

**Store** the captured data in large data centers and make the data sets available for post processing activities

own scenario format

Static road network description

**ASAM OpenDRIVE®**

dynamic scenario description

**ASAM OpenSCENARIO®**

| ✓ | Right turn |
| ✓ | dawn |
| ✓ | Medium traffic |
| ✓ | wet street |

**Search** processed data for detected scenarios, using keywords

**3. Scenario Labeling**

**Post-processing** of the stored data, detecting new scenarios, labeling scenarios variants, creating data sets for ML/DL/AI

◆ ASAM

# Find Scenarios by keyword



| | |
|---|---|
| ✓ | left turn |
| ✓ | noon |
| ✓ | Tram |



| | |
|---|---|
| ✓ | straight |
| ✓ | afternoon |
| ✓ | Low traffic |
| ✓ | shadow |
| ✓ | One-way St. |



| | |
|---|---|
| ✓ | left turn |
| ✓ | noon |
| ✓ | tractor |
| ✓ | dry street |



| | |
|---|---|
| ✓ | Right turn |
| ✓ | morning |
| ✓ | bicylce |
| ✓ | cobble street |

ASAM

# IDEA: Standardize the storage of processed scenario data…
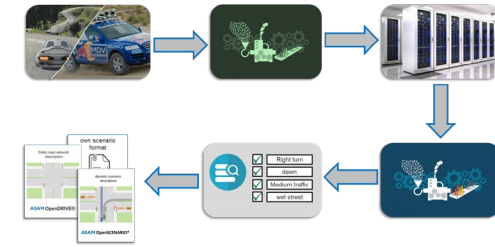
- Millions if not billions of miles of driving data are being collected yearly by companies around the world

- In future, we will be generating this volume in much shorter periods of time virtually

- This data is necessary for further validation and testing of AD systems

- OpenSCENARIO will provide a high level description of such data or situations but will not include the results

- These datasets often contain different fields as well as proprietary encoded data

- How do we encourage the sharing and exchange of these massive datasets to allow for ease of validation?


→ We propose to standardize a subset of these attributes to ensure an easily extendable base for dataset exchange
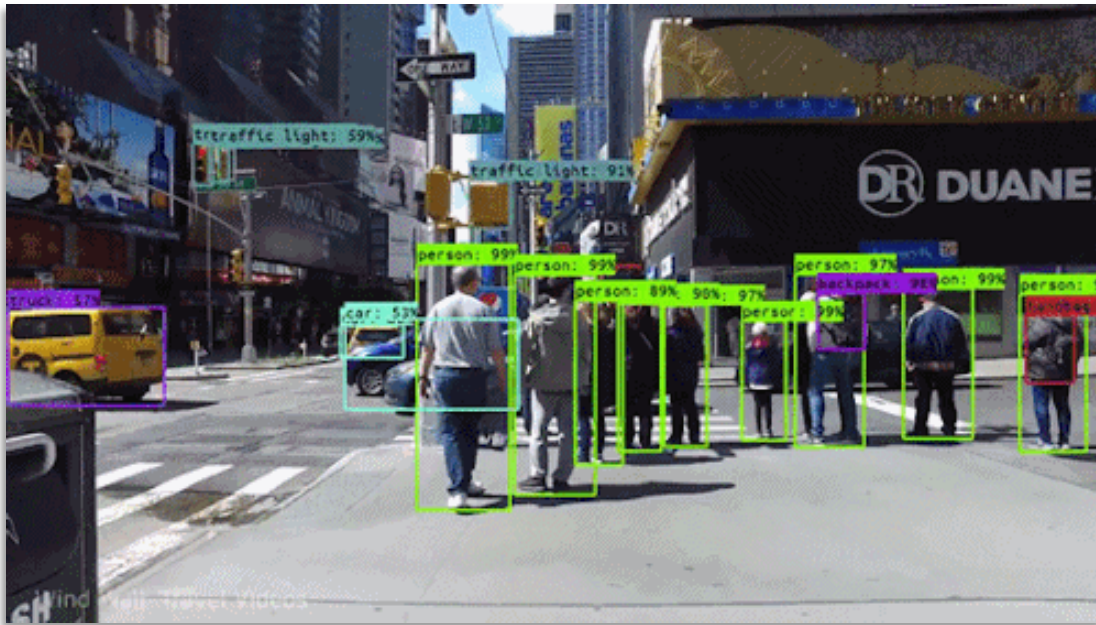
**Next Steps:**
- Interest check via discussions with OpenX members…
- Set up an initial workshop towards the end of 2019
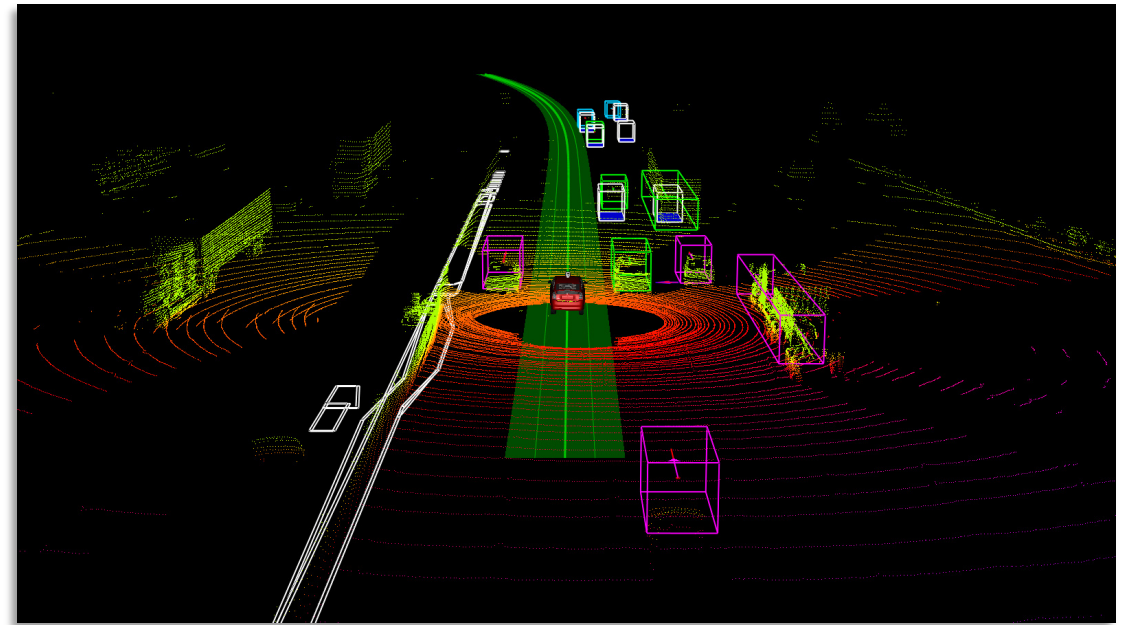
ASAM

# OpenLABEL

Why standardaizing data labeling can be useful

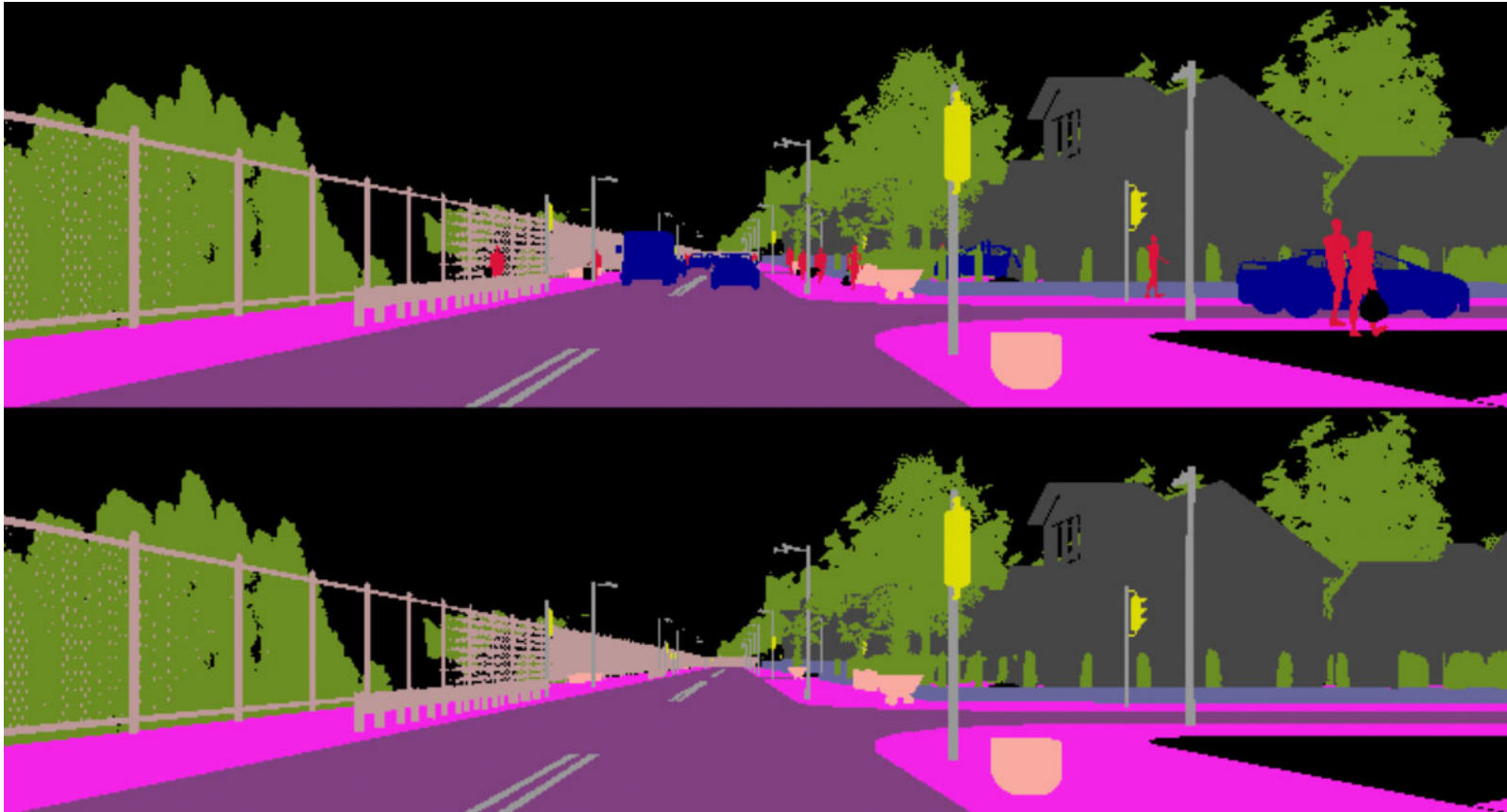# Example: Camera and Lidar Object detection and Classification

Camera: Object detection and classification

Lidar: Object detection



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# Example: Semantic Segmentations

# IDEA: Standardize the data labeling

- Exchangeable Datasets can enhance the learning process of algorithms in the industry and can accelerate the definitions of new relevant scenarios for validation and homologation purposes.

- Make Data sets searchable

- Standardized labeled vehicle data can improve the analysis capabilities of independent parties for recorded data

- Make Labeled Datasets exchangeable:
  - Public Datasets are becoming more common
    - https://waymo.com/open/
    - https://bdd-data.berkeley.edu/
    - http://apolloscape.auto/
    - https://blog.cambridgespark.com/50-free-machine-learning-datasets-self-driving-cars-d37be5a96b28

- Data produced by simulations can be labeled and matched to real vehicle data and vice versa
- Labels should be synchronized with OpenDRIVE and OpenSCENARIO Elements

Static road network description

dynamic scenario description

ASAM OpenDRIVE®

ASAM OpenSCENARIO®

ASAM
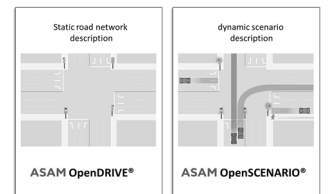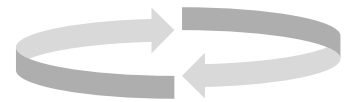
# Possible Targets and Next Steps

Possible Targets:
- Option 1: Label Description Language
- Option 2: Standardize Meta Data files for the data labeling = Format description
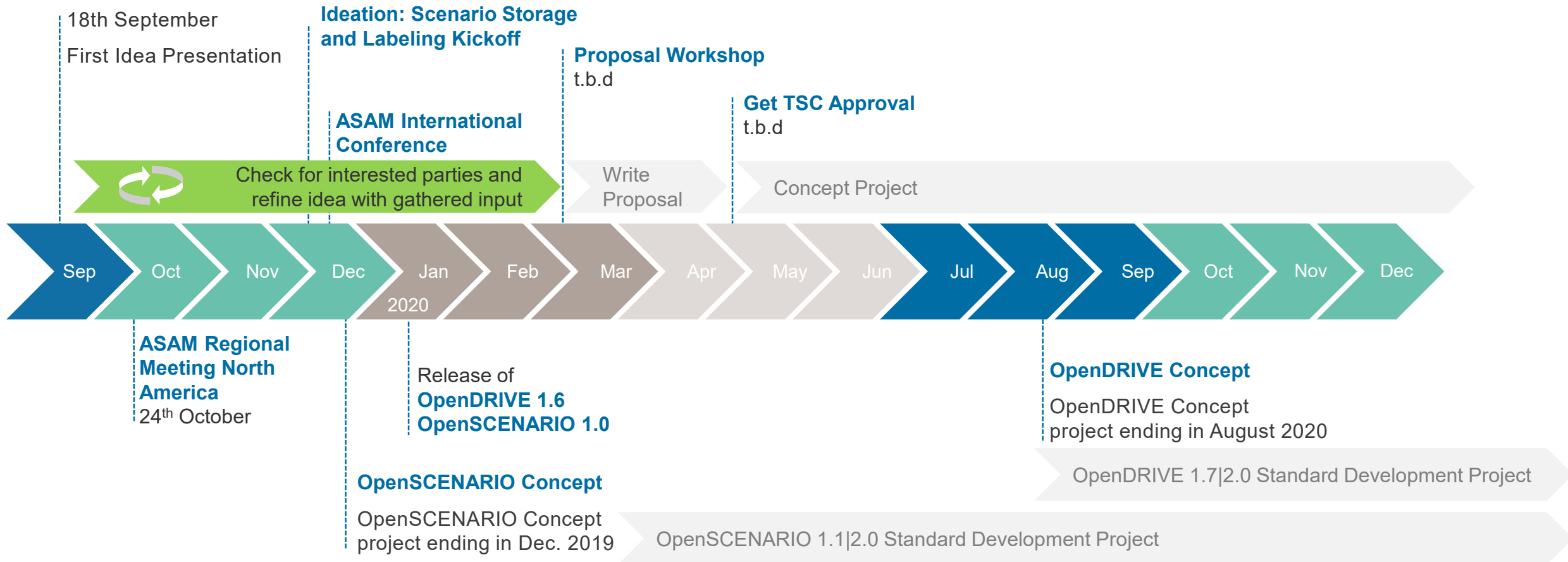- Option 3: ???

Possible next steps:
- Find interested Parties to contribute
- Ideation Project
- Concept Project
- …

# Timeline

# Timeline

**CG:Sim @ASAM**

18th September

First Idea Presentation

**Ideation: Scenario Storage and Labeling Kickoff**

**Proposal Workshop**
t.b.d

**Get TSC Approval**
t.b.d

**ASAM International Conference**

Check for interested parties and refine idea with gathered input

Write Proposal

Concept Project

| Sep | Oct | Nov | Dec | Jan 2020 | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |

**ASAM Regional Meeting North America**
24th October

Release of
**OpenDRIVE 1.6**
**OpenSCENARIO 1.0**

**OpenDRIVE Concept**

OpenDRIVE Concept project ending in August 2020

OpenDRIVE 1.7|2.0 Standard Development Project

**OpenSCENARIO Concept**

OpenSCENARIO Concept project ending in Dec. 2019

OpenSCENARIO 1.1|2.0 Standard Development Project

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# Thank you for your attention.

Nicco Dillmann
Global Technology Manager

ASAM e.V.
Email:     nicco.dillmann@asam.net
Phone:     +49 160 9921 8048
Adress:    Altlaufstraße 40, 85635 Hoehenkirchen

Ben Engel
Global Technology Manager

ASAM e.V.
Email:     Benjamin.engel@asam.net
Phone:     +49 1516 1645 936
Adress:    Altlaufstraße 40, 85635 Hoehenkirchen

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