VOLVO

OpenSCENARIO usage example

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Volvo Cars

Agenda

- Basic simulation use cases
- Controllers
- Advanced use case: Driver model interaction
- Q&A

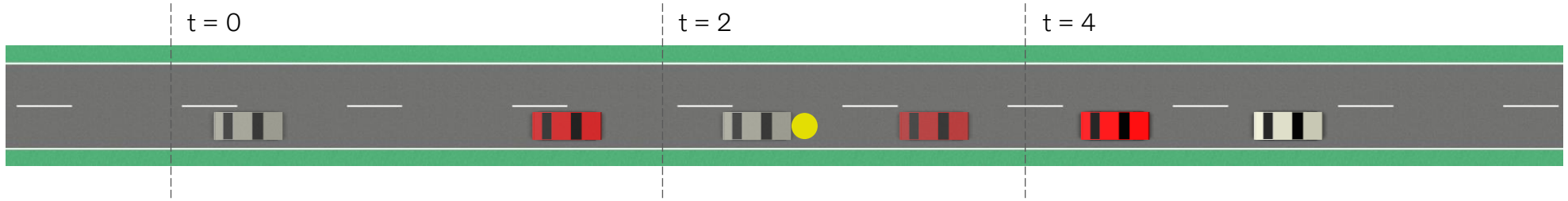
All examples run in esmini, an open source OpenSCENARIO player

https://github.com/esmini/esmini

Basic simulation use cases

1. Open loop – all behavior defined by the scenario alone
   - No feedback from driver or active system
   - Useful for generating synthetic sensor data
   - Also OK for testing correct triggering of functionality
   - Example:

Forward collision warning



Basic simulation use cases

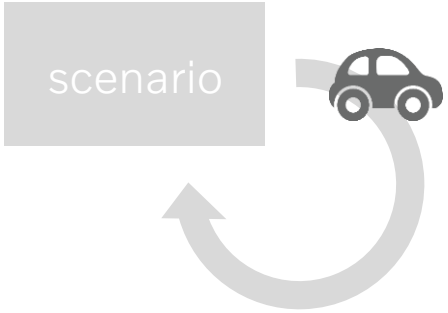
2. Closed loop – behavior affected by external control

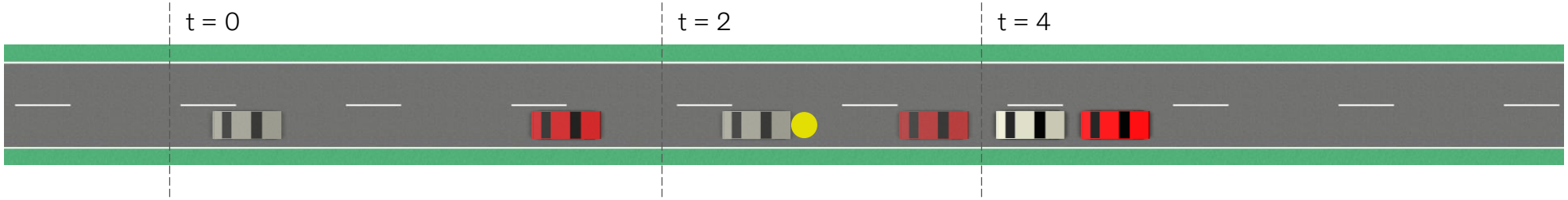
- Feedback from driver or active system

  (driver can be a real human or a driver model)

- Example: Emergency Brake

  (active system in the loop)





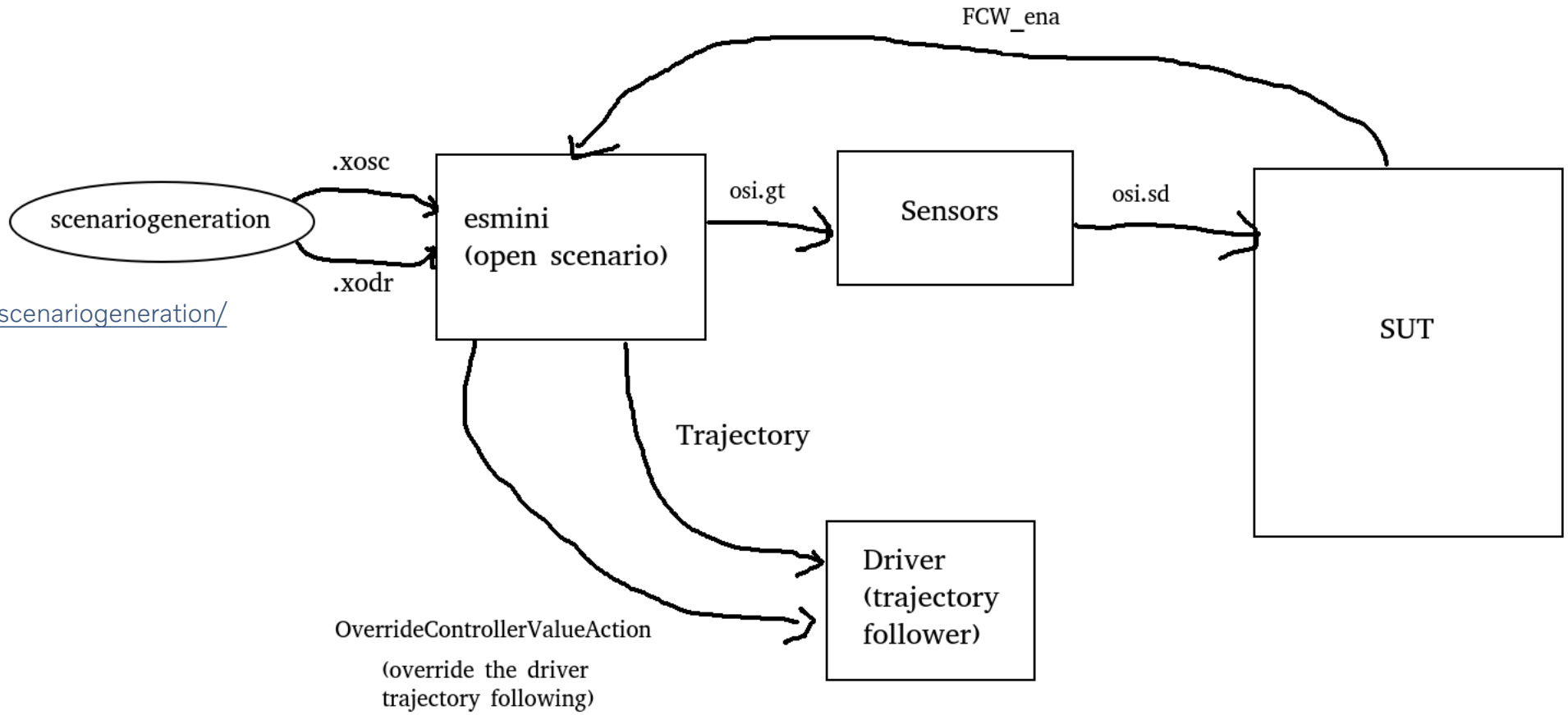
Controllers

- The concept provides a way to hand over control of entities
- esmini has a few built-in controllers, e.g:
  - ExternalControl (report state via API or UDP)
  - InteractiveDriver (use keyboard arrow keys)
- Scenarios can be adaptive using relative actions and conditions
- Simple example:

  Cut-in with and without interactive controller

the lane change and brake actions are triggered based on Time Headway

Simulation flow



https://pypi.org/project/scenariogeneration/

EuroNCAP scenario example

8.2.3 Car-to-Car Rear stationary

The CCRs scenario is a combination of speed and overlap with 5km/h incremental steps in speed and 25% in overlap within the ranges as shown in the tables below.

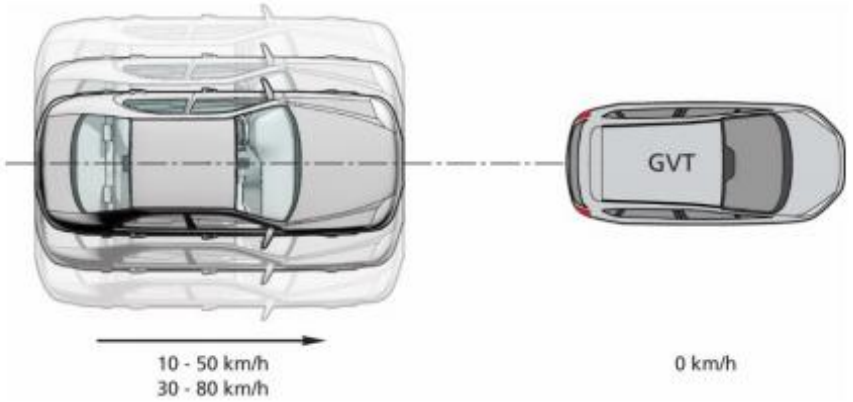


Figure 8-1: CCRs scenario

	AEB + FCW combined		AEB only	FCW only
	AEB	FCW		
AEB CCRs	10-50 km/h -50%-50%	30-80 km/h -50%-50%	10-80 km/h -50%-50%	30-80 km/h -50%-50%

ESS tests will only be allowed for the -50% overlap situation (in case of LHD).

https://cdn.euroncap.com/media/62794/euro-ncap-aeb-c2c-test-protocol-v303.pdf

THANKS

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