ASAM OpenSCENARIO ®

ASAM Technical Seminar 2024

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17th April, 2024
Munich, Germany

ASAM Association for Standardization of Automation and Measuring Systems

OpenSCENARIO – where do we stand

- The project spent the end of last year defining a proposal for the overall OpenSCENARIO roadmap

- The proposal includes statements on:
  - Roadmap overall
  - Alignment between 1 & 2
  - Differentiation between 1 & 2
  - Naming the two versions

- All statements were approved in formal voting

Naming

- Process:

1. OpenSCENARIO project group individuals were given 2 weeks to submit proposals for names for one or both standards.
   Result: 20 – 30 names

2. OpenSCENARIO project group met early October @ ASAM and voted on the top 3 for each standard
   Result: 3 names per standard – overall consensus to keep the OpenSCENARIO prefix for both standards

3. A formal project vote was initiated to decide the final choice for each standard
   Result: 1 name for each standard

4. This final choice was submitted to the ASAM TSC for confirmation

OpenSCENARIO 1.x → OpenSCENARIO XML

OpenSCENARIO 2.x → OpenSCENARIO DSL

Scenario definitions as defined by ISO 34501

- **Scenario**
  sequence of *scenes* (3.6) usually including the *automated driving system(s) (ADS)* (3.1)/*subject vehicle(s)* (3.3), and its/their interactions in the process of performing the *dynamic driving task (DDT)* (3.27)
  Note 1 to entry: The definition is an editorial rework of the definition in ISO 21448. The intended meaning of both definitions is the same.

- **Test scenario**
  scenario (3.4) intended for testing and assessment of *automated driving system(s) (ADS)* (3.1)/*subject vehicle(s)* (3.3)
  Note 1 to entry: A test scenario may include additional items for the purpose of assessing the ADS performance or behaviour in addition to the scenario content, which include, but are not limited to, sampling *events* (3.13), flagging *system under test(s) (SUT)* (3.2) error check(s), relevant *operational design domain (ODD)* (3.26) data, success criteria, HMI event that may trigger *action(s)* (3.15)

OpenSCENARIO Differentiation Statement

ASAM OpenSCENARIO®

OpenSCENARIO XML

- XML schema for describing scenarios with synchronized maneuvers of vehicles, pedestrians, and other traffic participants
- Supports specifying precise trajectories with capability to parameterize and vary their properties
- Structured format that can be validated, edited, imported, and exported by simulation tools and content editors
- Tuned to support trigger-action scenario descriptions
- Optimized for simple machine parsing and processing
- **Primary use case: predictable highly precise scenarios that may be used with external test specification for V&V**

OpenSCENARIO DSL

- Domain specific programming language for describing test scenarios of synchronized maneuvers of vehicles, pedestrians, other traffic participants and ADS function control
- Supports specifying scenario intent at a higher level of abstraction along with KPIs, checks, & coverage metrics
- Built-in abstract road descriptions
- Designed to enable exploration of scenario/functionality space to identify potential unknowns
- Optimized for composability to maximize scenario reuse
- Designed as V&V programming language
- Enables higher level of automated test generation at scale
- **Primary Use case: Large scale V&V**

The differentiation between the two standards is by their primary use cases. A primary use case describes the main use case for which the standard is intended and a key consideration behind many design decisions. The primary use case is not exclusive, the standards may be (and are) used for a wide variety of additional use cases, with overlap, but these are not specified here.

Alignment

- Continued alignment of the two standards is encouraged but is subject to project participant interests and is not required by ASAM. This will be driven by the market/members and is not part of the formal roadmap of ASAM OpenSCENARIO.

- The main motivators of current participants for future & continued alignment are:

  1. Joint use of the scenario standards with ASAM's other standards (e.g. ASAM OpenDRIVE, ASAM OSI). Sometimes both scenario standards are used in the same toolchain.

  2. Similar terminology and domain concepts ensure better shared understanding of the same concepts.

  3. Generation of scenario descriptions from one version to another (e.g. from abstract OpenSCENARIO 2 scenario descriptions to concrete OpenSCENARIO 1 descriptions)

  4. Alignment of domain models between versions makes it easier for implementers by saving on implementation time, e.g., of misaligned features

Alignment

Where will alignment be focused:

- Alignment should take place between standards on any topics where domain concepts are impacted. This means any new features or significant modifications to existing features as soon as any implications for domain concepts are identified.
- Core language development will not be subject to active alignment
- Domain model (entities, actions) changes in either version will be approached jointly, however complete alignment is not required
- Difference as of today: Alignment is neither migration nor conversion.

Alignment

How will alignment take place

- The project will make a 'best effort' to achieve joint consensus on direction of features or domain model concepts between the standards. Where deviations occur, these shall be documented.
- The final decision process is independent between the standards. No overall consensus is required. Voting is constrained to enrolled participants of the projects or subgroups for the respective standards.

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