

ASAM OpenDRIVE 1.9.0

Release Presentation

19 May 2026
ASAM



Association for Standardization of
Automation and Measuring Systems

Content of ASAM OpenDRIVE 1.9.0

Six sections

1. Introduction
2. New Features
3. Cross-Standard Harmonization
4. Backward Compatibility
5. Relation to Other Standards
6. Deliverables

Introduction

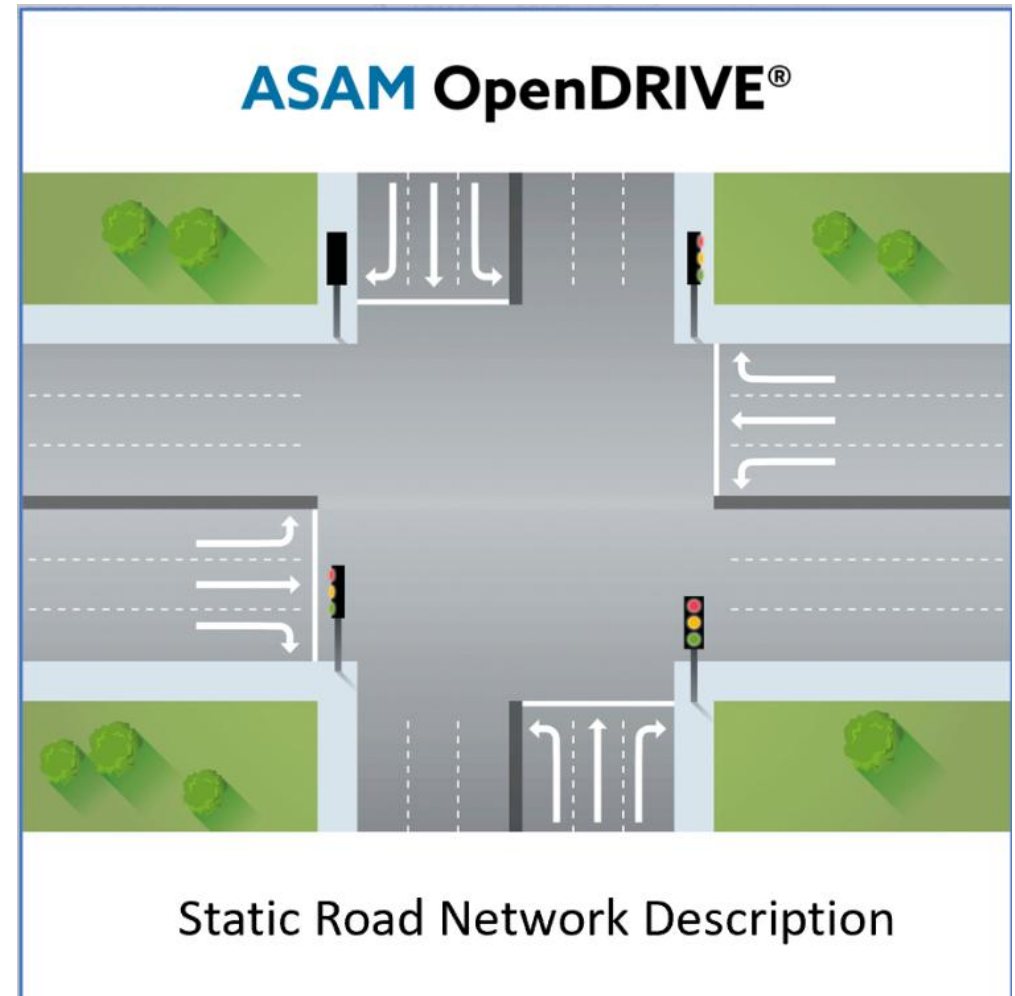
What ASAM OpenDRIVE is

ASAM OpenDRIVE specifies the modeling approach for static road networks for driving-simulation applications, using XML.

The primary task of ASAM OpenDRIVE is the road description including objects along the road.

The specification covers how to model roads, lanes, junctions, signals, and objects.

Dynamic content like cars and pedestrians is not covered by ASAM OpenDRIVE, see [ASAM OpenSCENARIO](#).



New content of ASAM OpenDRIVE 1.9.0

Eight themes — see Chapter 5 of the specification

- **Lane layers:** permanent + temporary road models
- **Roadworks and invalidation states:** new attributes for transient infrastructure
- **Advanced object modeling:** smooth outlines and continuous extrusion
- **Harmonized traffic participants:** vehicle / person / animal in semantics
- **Local XSD files now default:** namespace XSD deprecated
- **Improved OpenCRG integration:** global-mode offsets

New Content of OpenDRIVE 1.9.0

Lane layers: permanent and temporary

Most significant architectural change in 1.9.0: roads now support up to two lane layers

- Permanent: always present, defines material and base layout
- Temporary: typically, roadworks, higher priority for traffic guidance

Temporary layer inherits material properties from the permanent layer

Lane links can connect permanent ↔ temporary lanes for smooth transitions in and out of construction zones

Permanent lanes restricted by physical roadworks may be marked `@roadworks=true`



New Content of OpenDRIVE 1.9.0

Roadworks and invalidation states

- @roadworks=true on permanent lanes; clarified usage for restricted access
- @temporary on objects and signals; for transient installations such as mobile speed signs and cones
- @invalidated=true on signals and signal boards; for physically present but logically inactive infrastructure (covered or crossed-out signs)

Advantages:

- Precise modelling of construction-zone states without altering the underlying map
- Single source of truth for both normal and roadworks operating modes
- Closer match to digital-twin maps of real road segments under maintenance

New Content of OpenDRIVE 1.9.0

Smooth object outlines

Object outlines can now be modelled as smooth curves instead of polylines

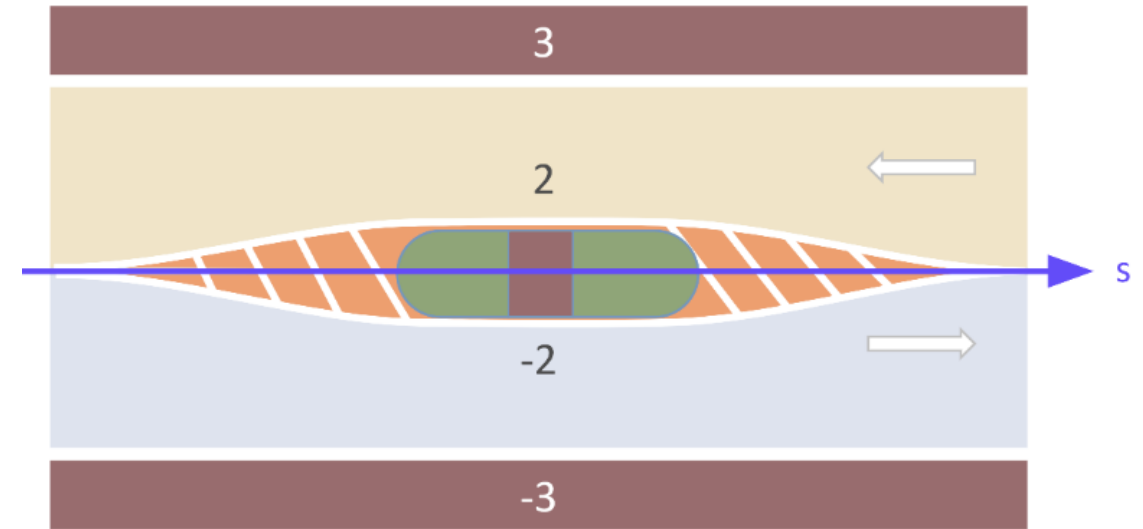
New `<cornerLocalCurve>` wrapper element with three child shapes:

- `<line>` straight segment
- `<arc>` constant curvature segment
- `<paramPoly3>` parametric cubic curve

Mutually exclusive with `<cornerRoad>` and `<cornerLocal>` within the same outline

Advantages:

- Higher geometric fidelity for curbs, traffic islands, and walls
- Smaller files for curved objects compared to dense polyline approximations
- Better sensor detection of curved object boundaries



New Content of OpenDRIVE 1.9

Object markings and terminology

Object markings (e.g. crosswalks, parking-box lines) can now be defined relative to the object's bounding volume or to specific outline points

Clearer distinction between road marks (on road surface) and object markings (on objects)

New chapter 13.8 'Object markings' replaces previous 'Object marking'

Terminology change: 'bounding box' is replaced by 'bounding volume' throughout the specification

Advantages:

- More precise placement of markings on irregularly-shaped objects
- Removes long-standing ambiguity between road and object markings

New Content of OpenDRIVE 1.9

Harmonized traffic participants

Signal semantics aligned with the ASAM Traffic Participant Specification

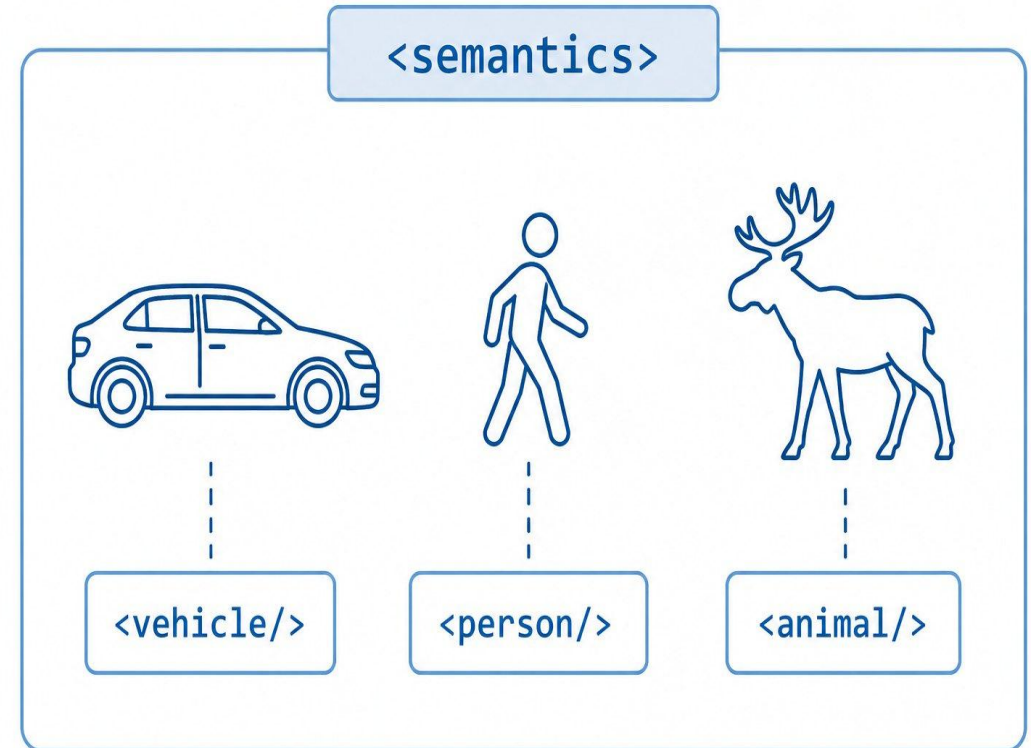
Three new elements inside `<semantics>`: `<vehicle>`, `<person>`, `<animal>`

Used with `<prohibited>`, `<supplementaryAllows>`, `<supplementaryProhibits>`

`<vehicle>` uses the new `e_vehicleCategory` enum (16 values: `car`, `van`, `bus`, `heavyTruck`, `motorcycle`, `bicycle`, `trailer`, `semiTractor`, `semiTrailer`, `train`, `tram`, `microMobilityDevice`, `standupScooter`, `workMachine`, `landVehicle`, `other`)

1.9.0 limitations: `<person>` is restricted to pedestrians; `<animal>` cannot specify the type

Custom groups can be defined via the existing `<signalRegulations>` mechanism



New Content of OpenDRIVE 1.9

Improved OpenCRG integration

OpenCRG global-mode references can now be transformed via the OpenDRIVE XML

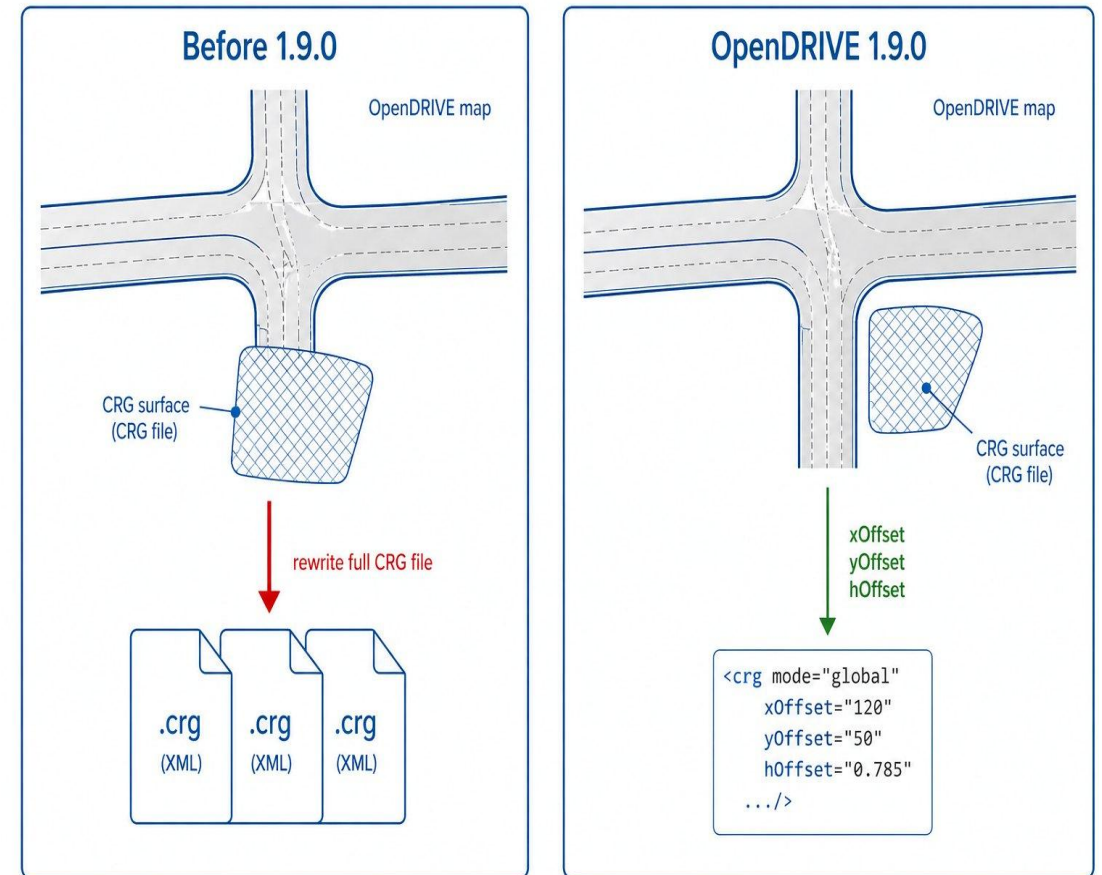
New attributes on <CRG> in @mode='global':

- @xOffset — translate CRG centre line in x
- @yOffset — translate CRG centre line in y
- @hOffset — heading rotation

@zOffset previously available; now joined by full xy-translation and h-rotation

Advantages:

- Reuse the same CRG file across multiple map placements without rewriting it
- Cleaner versioning of maps that share surface data
- Faster iteration during map authoring



New Content of OpenDRIVE 1.9

XSD packaging — local files now default

Previous releases shipped two XSD variants:

- one with a namespace
- one with local file references

In 1.9.0, the version with the namespace is deprecated

The local-files version is now the default and recommended schema bundle

Advantages:

- Simpler validator setup: no namespace and import gymnastics
- Single canonical schema reference for all tools going forward

Cross-Standard Harmonization in OpenDRIVE 1.9.0

OpenDRIVE-side changes designed for ASAM OpenX alignment

Traffic participant vocabulary harmonized with the ASAM Traffic Participant Specification

- Signal semantics adopt new <vehicle>, <person>, <animal> elements
- Direct quote from Chapter 14.8: 'The enum literals have been harmonized between ASAM OpenX standards'

Lane layers designed for forward integration with future scenario standards

- Note from Chapter 5.1: combining 1.9.0 lane-layer files with OpenSCENARIO XML 1.3.1 or earlier is not recommended

OpenCRG transformation attributes (xOffset, yOffset, hOffset) sharpen the OpenDRIVE↔OpenCRG handoff in global mode

Backward Compatibility

1.9.0 is backward-compatible with 1.8.1

- ASAM OpenDRIVE 1.9.0 is backward-compatible with ASAM OpenDRIVE 1.8.1.
- All additions in 1.9.0 are introduced on existing elements as opt-in attributes or new optional child elements.
- Existing 1.8.1 XML files validate against the 1.9.0 schema unchanged.
- Note: when authoring 1.9.0 files that use the new lane-layer feature, downstream consumers (e.g. scenario specifications) must understand layers — combining 1.9.0 lane-layer files with OpenSCENARIO XML 1.3.1 or earlier is not recommended.

Relation to Other Standards

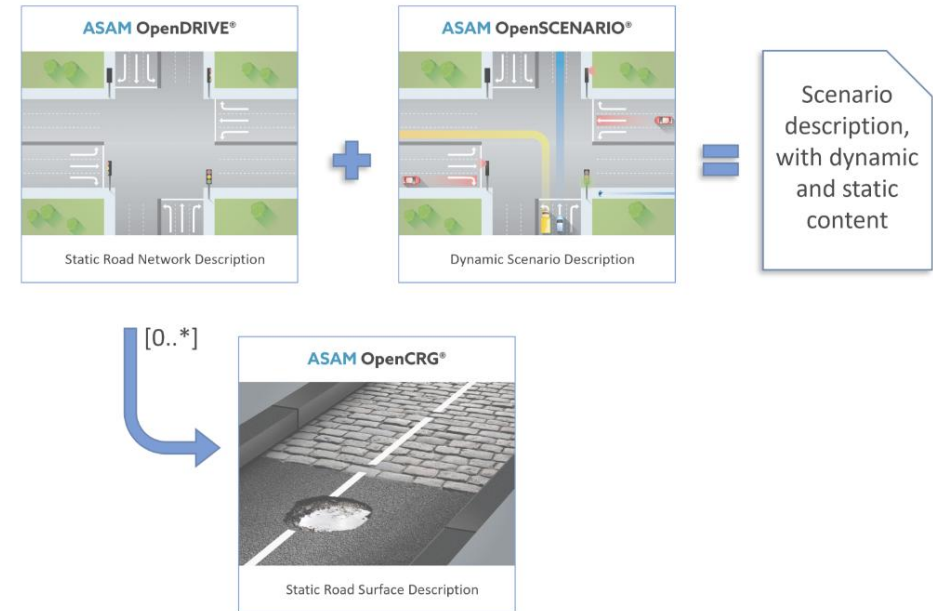
OpenDRIVE in the OpenX simulation toolchain

ASAM OpenDRIVE defines the storage format for the static description of road networks.

In combination with ASAM OpenCRG, detailed road-surface descriptions can be added to the road network.

To add dynamic content, ASAM OpenSCENARIO is needed.

1.9.0 specifically: harmonized traffic-participant signal semantics align OpenDRIVE with the wider ASAM OpenX family; new global-mode CRG offsets sharpen the OpenDRIVE↔OpenCRG handoff.



Deliverables

Documents and supplementary files

Documents:

- OpenDRIVE 1.9.0 Specification

Supplementary Files

- ASAM_OpenDRIVE_v1-9-0_Enterprise_Architect_UML_model.zip
- ASAM_OpenDRIVE_v1-9-0_xsd_schema_files.zip
- ASAM_OpenDRIVE_v1-9-0_examples_and_use-cases.zip

Thank you for your attention