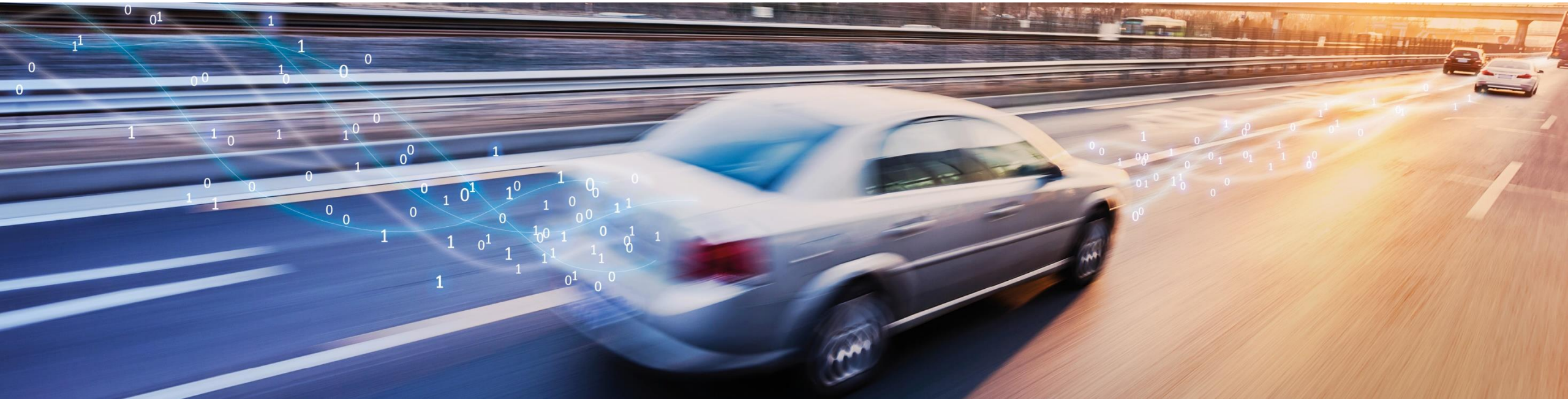
ASAM SCDL

Release Presentation

Release Date: Nov 09, 2021



ASAM
Association for Standardization of
Automation and Measuring Systems

Agenda for today’s conference

1. Motivation
2. Solution
3. About ASAM SCDL
4. Standardized - Use-case, Domain and Technology -
5. Deliverables of standards
6. Related standards

Motivation

Starting point for motivation

- In order to support safety development of ISO 26262, a unified description method was needed.
- There are two reasons for that:

Motivation

First reason

- ISO 26262 requires semi-formal notations for Safety Requirements specification especially for higher ASIL : C & D with ++. (e.g. Part8-6)

Table 1 — Specifying safety requirements Methods

Ref. ISO 26262-8:2018

Methods		ASIL			
		A	B	C	D
1a	Informal notations for requirements specification	++	++	+	+
1b	**Semi-formal notations for requirements specification**	**+**	**+**	**++**	**++**
1c	Formal notations for requirements specification	+	+	+	+

“++” indicates that the method is highly recommended

“+” indicates that the method is recommended

Motivation

First reason

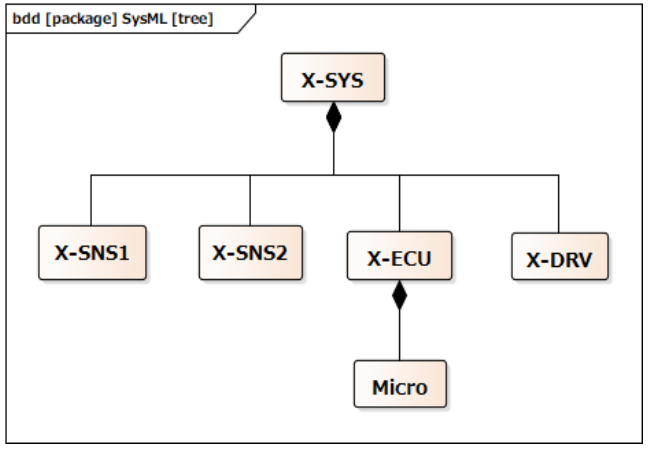
- What is semi-formal notation in the context of the ISO 26262 standard?

Method	syntax	semantics	Example of description technique
Informal notation [3.80]	Definition can be incomplete	Definition can be incomplete	Natural Language;
Semi-formal notation [3.149]	**Completely defined**	**Definition can be incomplete**	**Structured And Design Technique(SADT); Unified Modeling Language (UML); System Modeling Language (SysML);**
Formal notation [3.63]	Completely defined	Completely defined	Z notation (Zed); NuSMV (symbolic model checker); Prototype Verification System (PVS); Vienna Development Method (VDM).

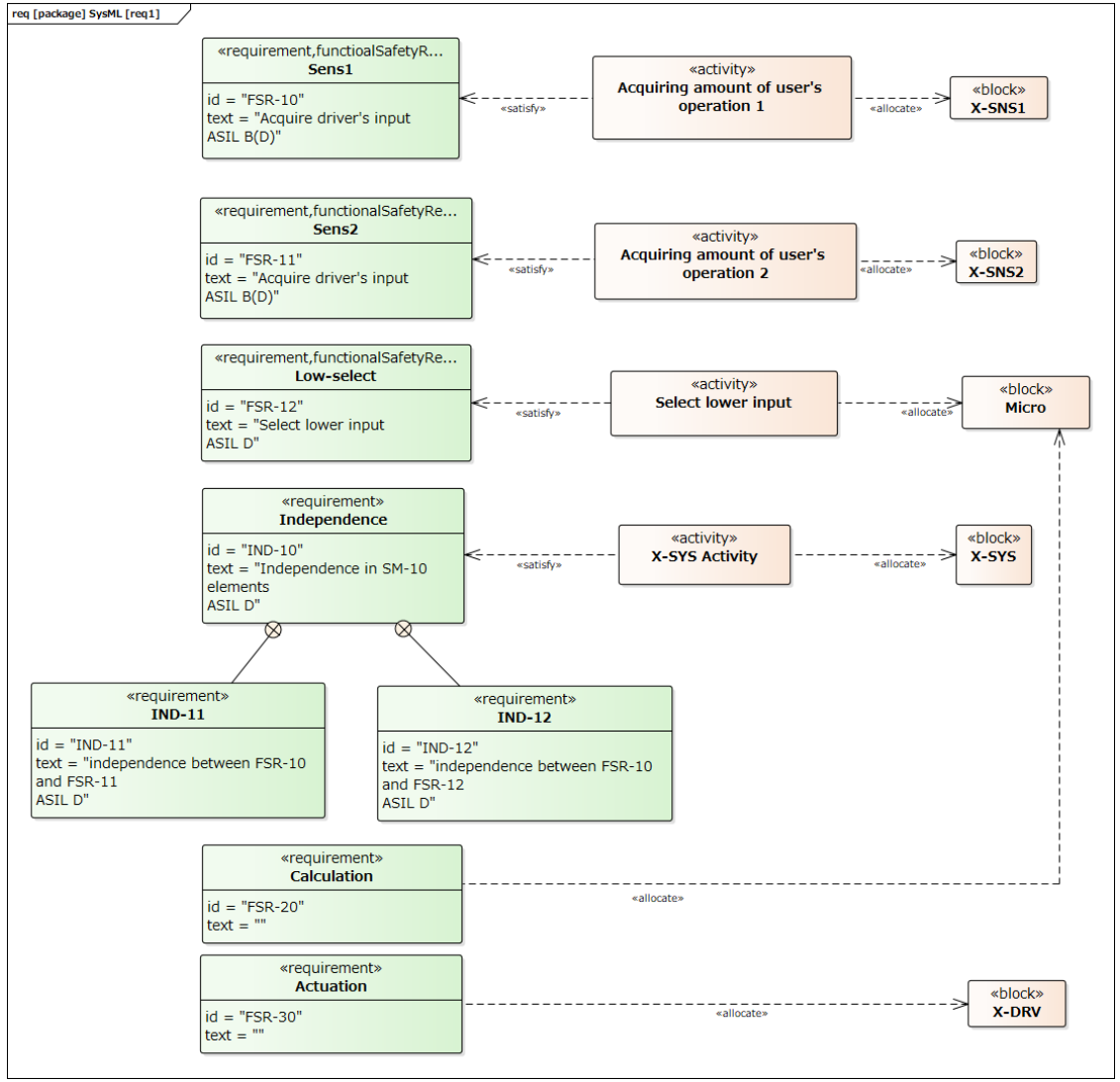
Motivation

Second reason

- Safety architecture expressed using **SysML**
  - Safety architecture is complicated.
  - Expertise knowledge of SysML is needed.
  - Different people may have different diagrams.



Structure diagram



Requirement diagram

A safety architecture example of redundant input sensor

Solution

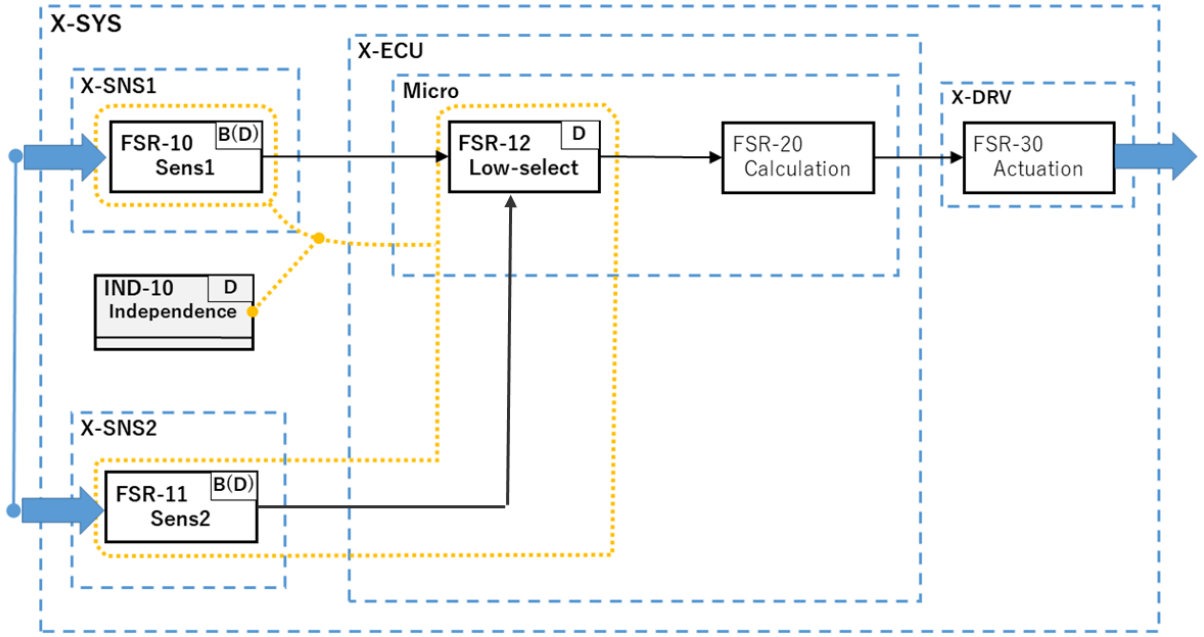
Overcome the issues

- ASAM SCDL provides semi-formal notation for safety developments.
- Especially, focusing on:
  - Semi-formal notation is available to everyone.
  - Intuitive and easy to understand;
  - Shareable and reviewable; and
  - Available as evidence.

About ASAM SCDL

Modeling language

- Notation for safety architecture, based on ISO 26262 standard.
- Symbol and its meaning:
  - How the required functionality related to the other functionalities; and
  - How the required functionality is related to elements.
- Description criteria is semi-formal notation method to avoid ambitus description.

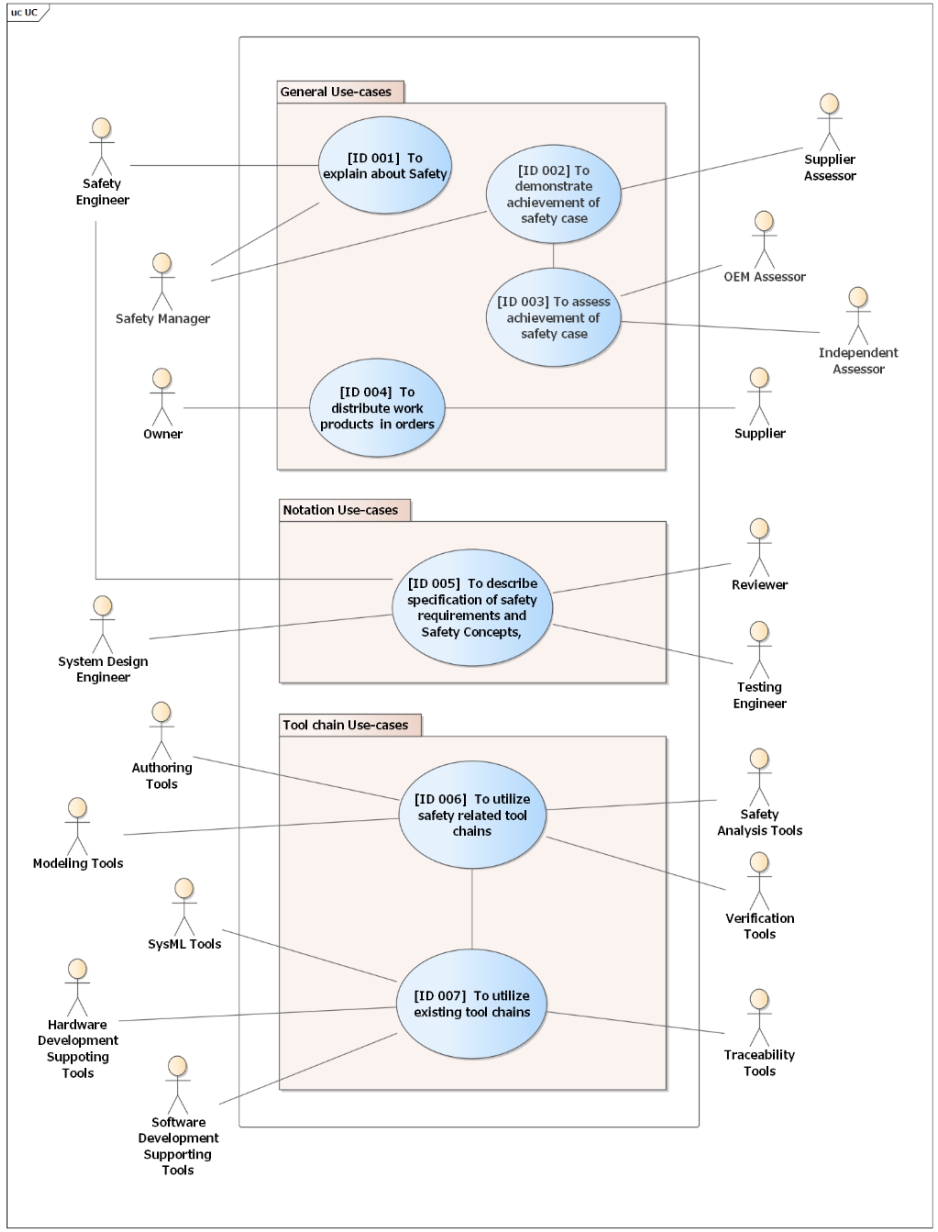


Standardized

Use-case

- Safety architecture is created by:
  - Safety Engineer; and
  - Related engineer such as System, Software, Hardware.

- Safety architecture is exchanged between:
  - Safety Engineer and Assessor;
  - System Designer and Software/Hardware engineer;
  - Tool chain: Designing tools and testing tools.



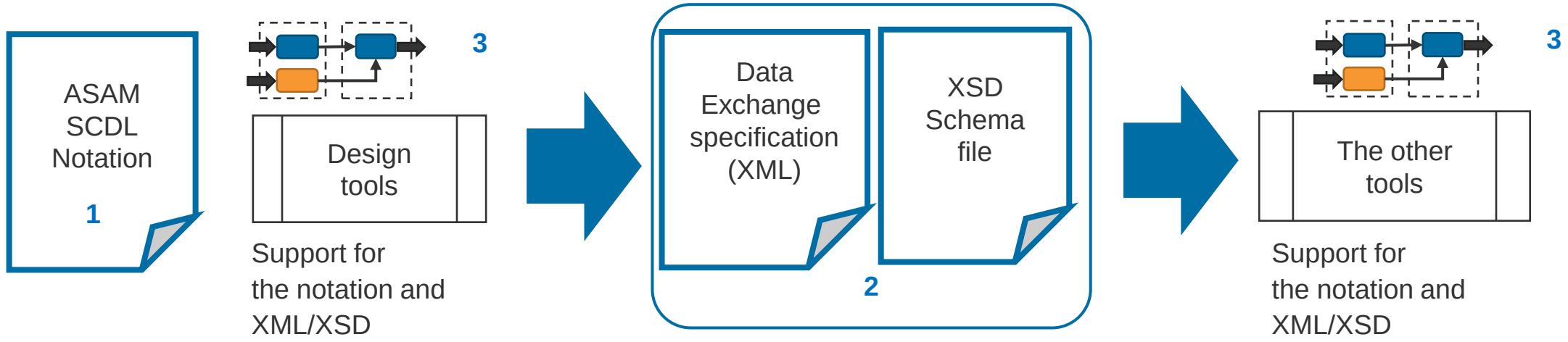
Standardized

Domain and Technology

1. Notation of symbols and diagrams
2. Data exchange format
3. Design tools and the other tools can support the notation and the Data Exchange specification.

Technology:

- The Data Exchange specification is defined by XML technology.
- XSD schema is used for the implementation.



Deliverables of standards

Specification documents

- **ASAM SCDL Notation Specification Version 1.6.0**: Part 1 of 3
  - Strict rule of the symbols in SCDL are defined.
  - User can describe safety architecture based on the specification.
  - It is useful to understand described safety architecture figured by SCDL.

- **ASAM SCDL Practical examples Version 1.6.0**: Part 2 of 3
  - The document show figured safety architecture with simple system.
  - It is useful to understand how to figure the architecture by SCDL.

- **ASAM SCDL Data Exchange Specification Version 1.6.0**: Part 3 of 3
  - Machine-readable format for SCDL is defined.
  - It is implemented by XML technology.
  - **XSD schema file** is also delivered.

➢ About Version 1.6.0

From the original SCDL version 1.5, ASAM SCDL will be transformed to ASAM and released as an ASAM international standard.

Related standards

- ASAM SCDL is intended to support ISO 26262:2018 standard.

  - Part 3 Clause 7: Functional safety concept;
  - Part 4 Clause 6: Technical safety concept;
  - Part 5 Clause 6: Specification of hardware safety requirements;
  - Part 5 Clause 7: Hardware design;
  - Part 6 Clause 6: Specification of software safety requirements;
  - Part 6 Clause 7: Software architectural design;
  - Part 8 Clause 6: Specification and management of safety requirements;
  - Part 9 Clause 5: Requirements decomposition with respect to ASIL tailoring;
  - Part 9 Clause 6: Criteria for coexistence of elements;
  - Part 9 Clause 7: Analysis of dependent failures; and
  - Part 9 Clause 8: Safety analyses.