ASAM Test Specification Study Group

Proposal Review

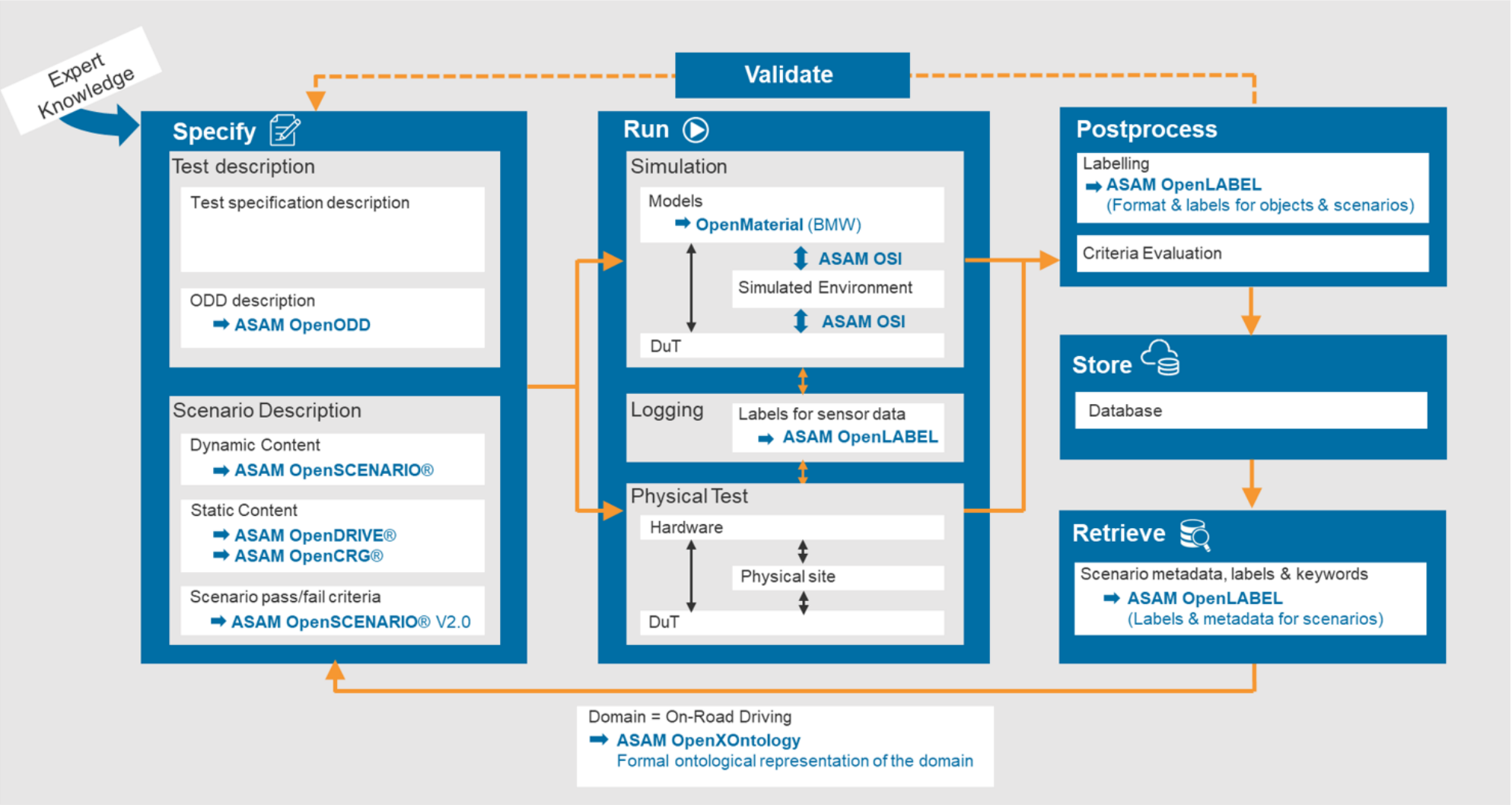
Ben Engel
ASAM e.V.

Nicco Dillmann
ASAM e.V.

17 November 2020
Virtual

ASAM
Association for Standardization of Automation and Measuring Systems

Motivation: Scenario Based Testing



Problem Statement

There is a decided lack of clarity in the AD industry on the interaction between a scenario and a test in scenario-based testing as well as how this relates to other established testing workflows, many that are independent of scenarios.

There are potential overlaps of information e.g. measurement/success criteria and scenario vs DUT parametrization, not to mention a diverse tool landscape.

This leads to confusion in the standardization landscape and directly hinders standard adoption and thus collaboration in the industry.

Goal

- For clear toolchains and a standardized exchange of scenario/test descriptions, clarity needs to be provided on:
  - What is a scenario? What is a test? What other terms are relevant in this landscape?
  - What is scenario-based testing from different perspectives or use cases?
  - What other types of testing are relevant to this domain?
  - How do scenarios interact with tests, test cases, test platforms, test automation, etc.?
  - Scenarios and tests are not always co-dependent, e.g. requirement-based testing or scenario space exploration. What implications does this have on scenario-based testing?
  - How does scenario-based testing fit into the established workflows and standards for testing?

Proposed Deliverables

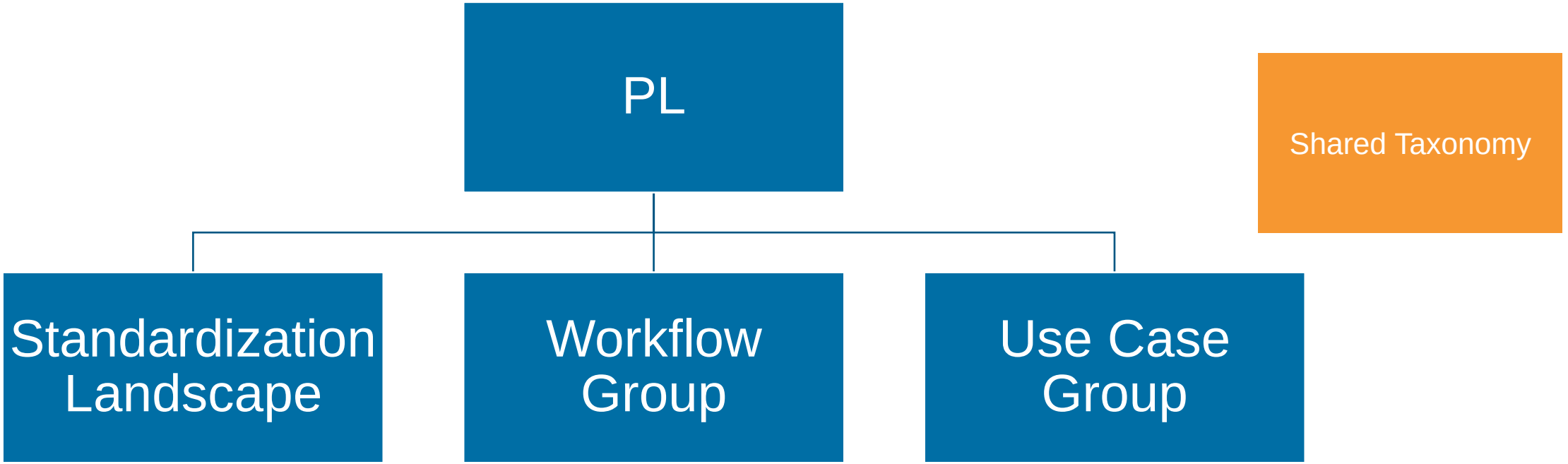
1. **Set of Terms and Definitions as deemed relevant by the group**

2. **Refined Set of Use Cases for Scenario-based Testing**
   Based on the use-cases identified in the OpenSCENARIO 2.0 Concept project, as well as use cases from the testing and test-automation domain, a refined set of use-cases covering the area of scenario-based testing will be derived and refined.

3. **Set of Reference Workflows for Scenario-based Testing**
   Documentation detailing a set of reference workflows for scenario-based testing, which will cover the use cases identified; as such the set will contain alternative workflows and will be based at an abstraction level that allows easy mapping to concrete workflows.

4. **Gap Analysis and Recommendations on Further Actions**
   Documentation detailing the gap analysis on missing parts in the standardization landscape to support the reference workflows, and derived recommendations on further standardization activities deemed necessary. This will include standard extension or new standardization projects, as well as the underlying requirements that should be met by those projects.

Proposed Project Structure



Workflow Group

Goal: Showcase the different workflows for different users for scenario-based testing to help the industry understand the differences & overlaps.

1. What test approaches are relevant for the development of automated driving features
   - Consider both open-loop & closed-loop testing approaches

2. What perspectives (users) are there of scenario-based testing?

3. Outline actors/user stories and/or use cases

4. Collect applied workflows / user journeys from the industry (company specific status quo)
   Consider all relevant testing approaches

Workflow Group

Goal: Showcase the different workflows for different users for scenario-based testing to help the industry understand the differences & overlaps.

5. Unify workflows to avoid duplicates, more than one possible solution expected (no reference architecture required or desired)

6. Map the workflows to the defined use cases and user stories

7. Identify overlaps and gaps in the workflows

8. Analyze how to handle the gaps (and overlaps) in cooperation with standardization landscape working group

Standardization Landscape Group

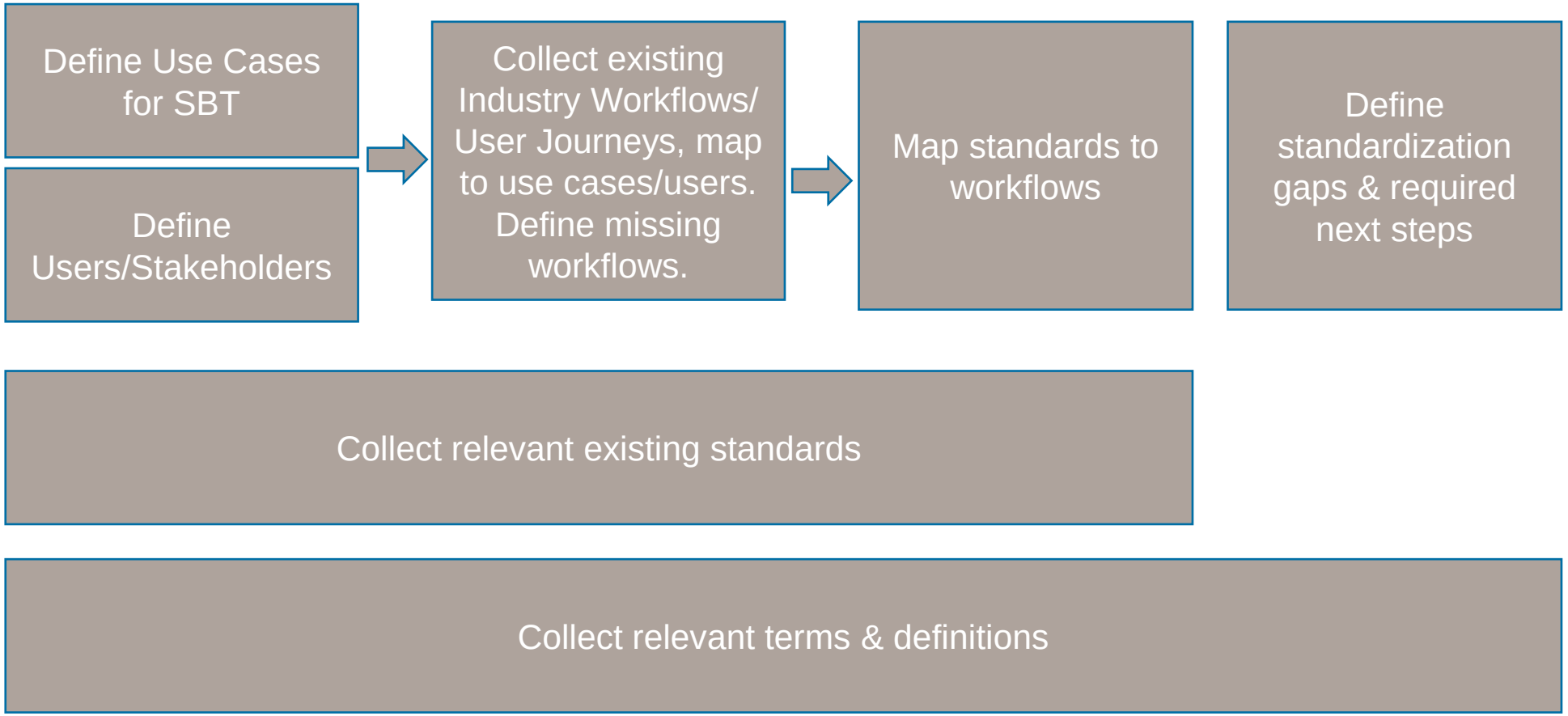
- Create an overview document to identify & analyze existing standards in the relevant testing domains
- Map these standards to the workflows and use cases defined by the Workflow Group
- Based on jointly identified gaps/overlaps, detail out any necessary next steps in an overview document:
  - Are new standards necessary? If so, detail the requirements.
  - Can existing standards be adapted? If so, how (high level)?
  - Who to approach (which organization/company?)?

Taxonomy

Goal: Document a shared understanding of relevant terms and definitions

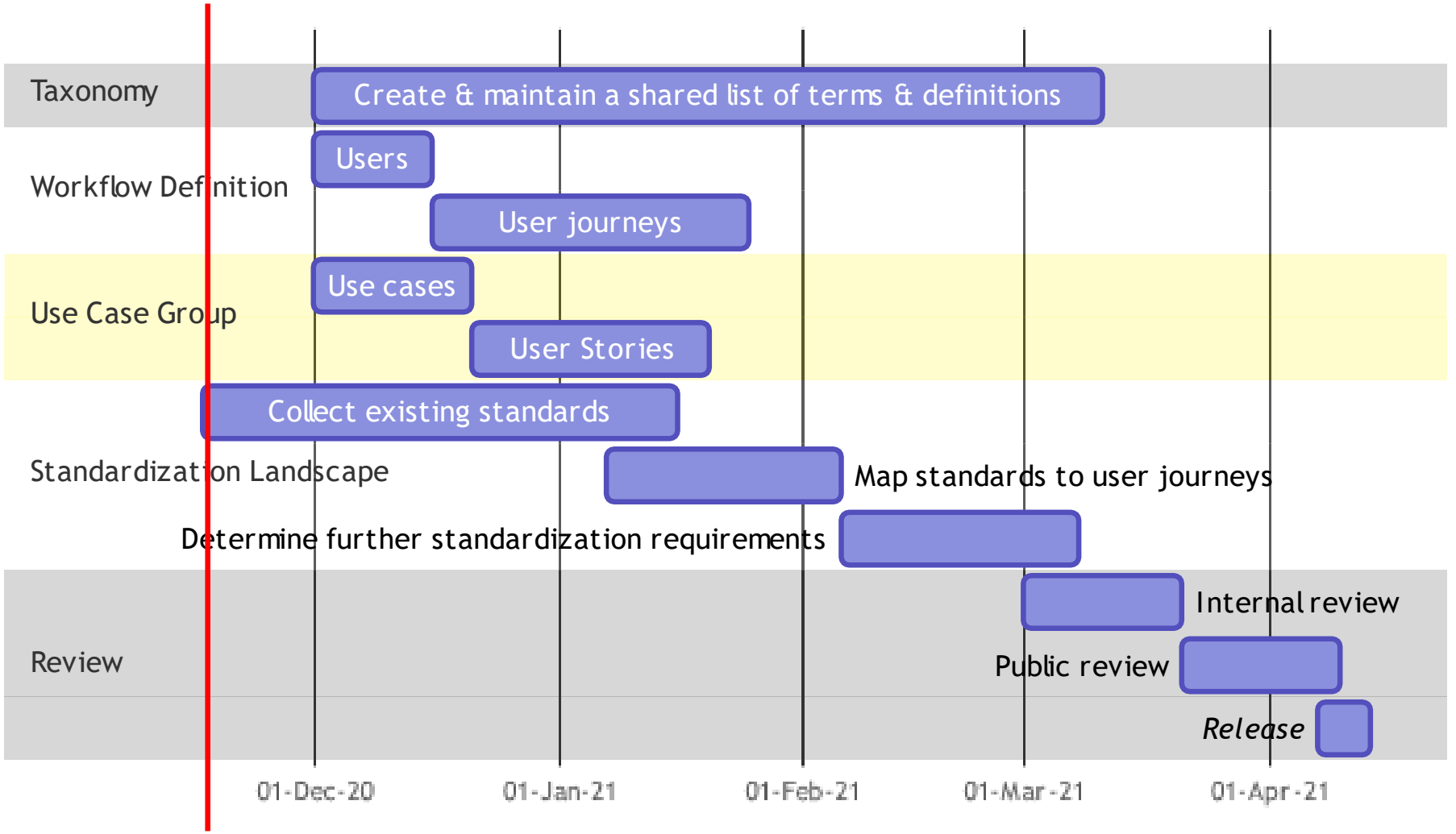
- Output > Glossary of terms and definitions
- Communicate a common definition for a certain term in the **context of the study group**
  (this can change down the road in alignment with the overall OpenX Domain and outside of ASAM)
- It is not necessary to come up with a single definition for a term, i.e. we can have a mapping of multiple terms
- Ideally to run in parallel to other project level activities

Proposed Working Mode



Proposed Timeline

Add clear step for workflow collection
Define a milestone to re-evaluate the scope for this study group



Some Open Points…

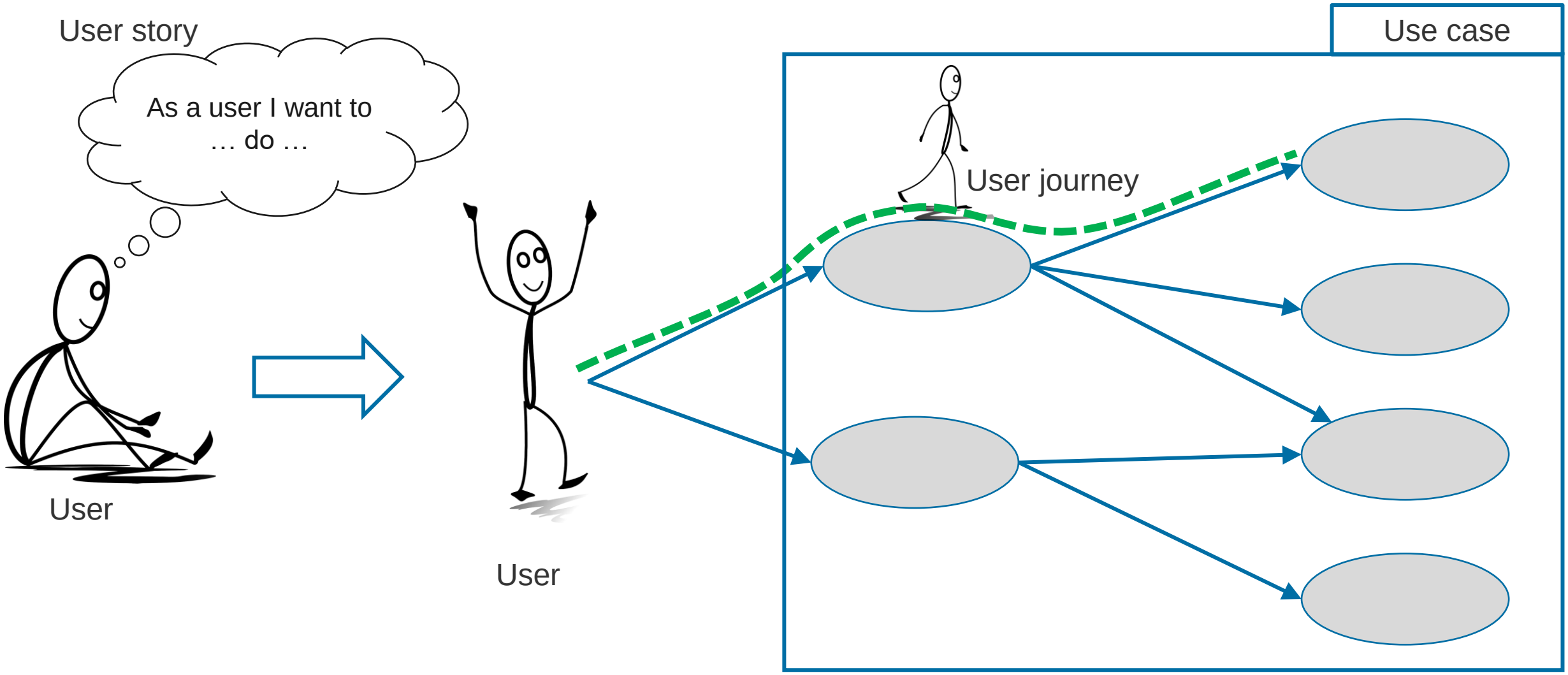
- Group structure – do we need to split up into sub-groups?
- Working mode:
  - Offline exchange via Microsoft Teams Group
  - Regular group meetings (weekly/bi-weekly)

- Roadmap discussion – Depends on commitments but:
  - When do we start?
  - High intensity & short runtime vs low n' slow

- Group Leads?/ Project Leads?

- Danger of scope: The project will not be limited to "just" scenario-based testing it will consider other types of testing & test platforms but from a perspective of relevance to SBT to ensure that the scope is not too great

What is a user, use case, user story and user journey?



Describing a User…

- Who are they?
  - Define the user's goals
  - Their motivations
  - Their current pain points
  - Their overall character
  - The main tasks they want to achieve

- See e.g. OpenXOntology

- Some user examples to get you started…

  - Auditor/regulator
  - AV/ADAS developers
  - Test engineer
  - Scenario designer
  - Requirements engineer
  - SOTIF safety engineer
  - Government agency
  - OEM
  - Tool developer

What is a Use Case

- Use cases in the context of ASAM standards describe the external behavior of the standardized system, i.e. the interaction of the system with a user or with another system.

UC 1: Use Case Name	
Relevant Users	User XX, User YY
Description	Write a brief description for the use-case.

Writing a Good User Story…

- What is it?
  - Describes requirements for software, a solution, a system
  - Written from the user's perspective
  - Explains reason for feature requirement
  - Basis for communication and further specification

- Format

  `As a <user role> I want to <do>/<have>/<use> something  because / in order to …`

  As an AV/ADAS developer company, I want to search, review and reuse scenarios built by other companies, because we rely on specialized external suppliers for scenario data for our development activities

- See e.g. OSC 2.0

Thanks to parson for these concise guidelines!

What is a Workflow or User Journey?

	No	Workstep	Subworkstep	Actor	Tool	Input data/format	output data/format	Output format example	standards used
User Journey	<Describe the journey, its purpose and goals, in 1-2 sentences. If applicable, link it to user stories>								
	1	<Describe the workstep, e.g. "Annotate recorded traffic data with labels.">		<Who is doing this step? Can be a human user (based on user stories from project proposals) or a machine/AI>	<Indicate the tool or category of tool that is used, e.g. scenario database>	<Which kind of data goes into the workflow step / which format does the data have. Example: video recordings / MP4>	<Which kind of data is produced as result of the workstep / which format does the data have. Example: video recordings plus annotations in text format>	<code/data sample>	<List of standards used in this workstep>
	1.1		<Describe the subworkstep in a few words.>	see above	see above	see above	see above	see above	see above

Closing Words

- This is intended as a supporting activity for you, the industry, to gain a better shared understanding of the topic
- It is dependent on your resource investment (time)!
- The outcome of this study group is intended to guide the direction of future ASAM standardization activities
- Roadmap is planned as a short sprint
  → Ensure we can support parallel OpenX activities with the output
- Potential to lead to further ASAM activities that begin finding solutions

Closing Words

- Two requirements for this study group to continue:

1. At least 3 companies must commit resources, i.e. their time (ASAM membership required)

    - Study Group planned to run for 4 months
      → recommended resource commitment: 20 man-days

2. A study group lead (i.e. project lead) needs to volunteer and be approved by the participants
    - Main task: Coordinate and drive the group
    - Supported by ASAM office

Next Steps

- Recording and Presentations will be made available on the ASAM website – where you registered for the event
- Offline collection of resource commitments to gauge your interest (non-binding)
- Offline collection of users (perspectives) & use cases
- Next meeting early December to:
  - Review use cases & commitments
  - Voting by committed parties on users & use cases

- **Register your commitment by 30.11.2020 here:**
  https://www.asam.net/project-detail/test-specification/
- **Committed participants will receive an email with a link to the growing shared set of use cases & users**