SET Level

Simulation-based Development and Testing of Automated Driving

Test Case Specification

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Requirement-based testing in automotive V & V
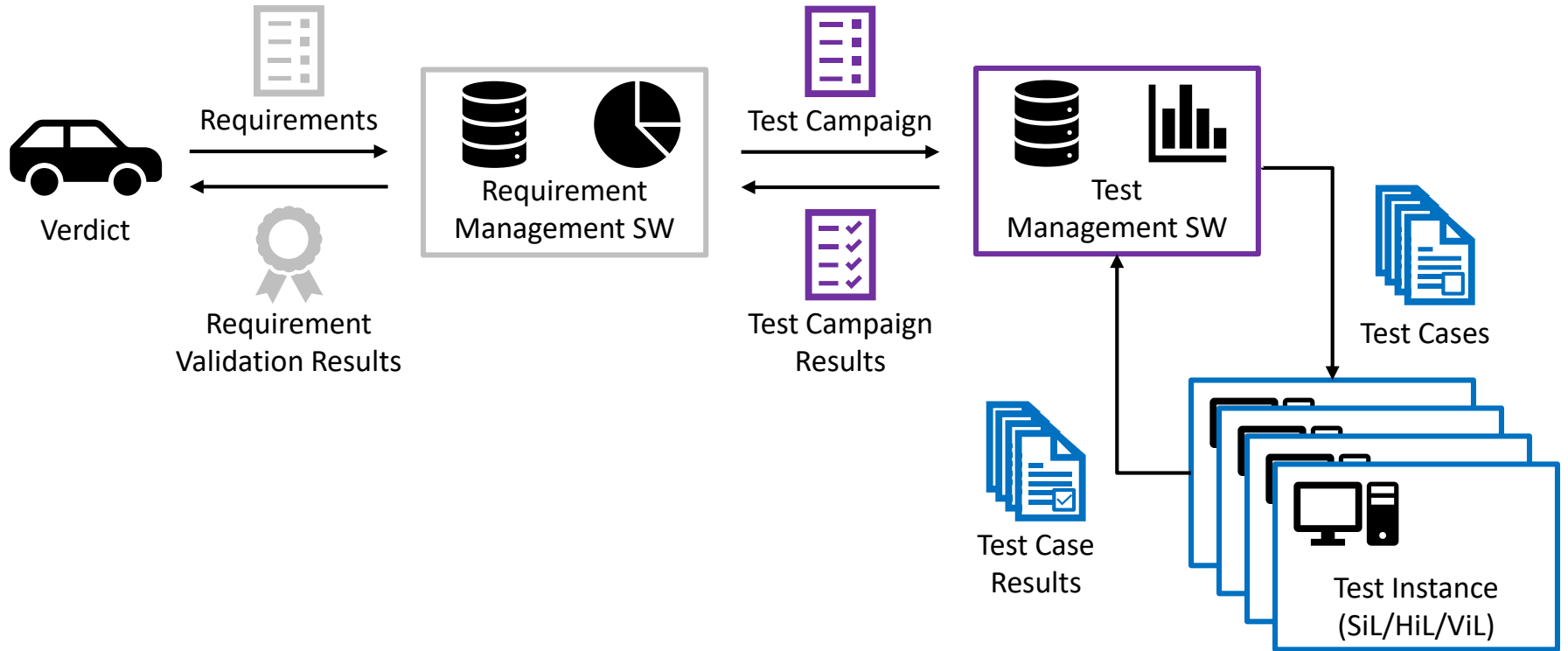
Integration of scenario-based testing

SET Level
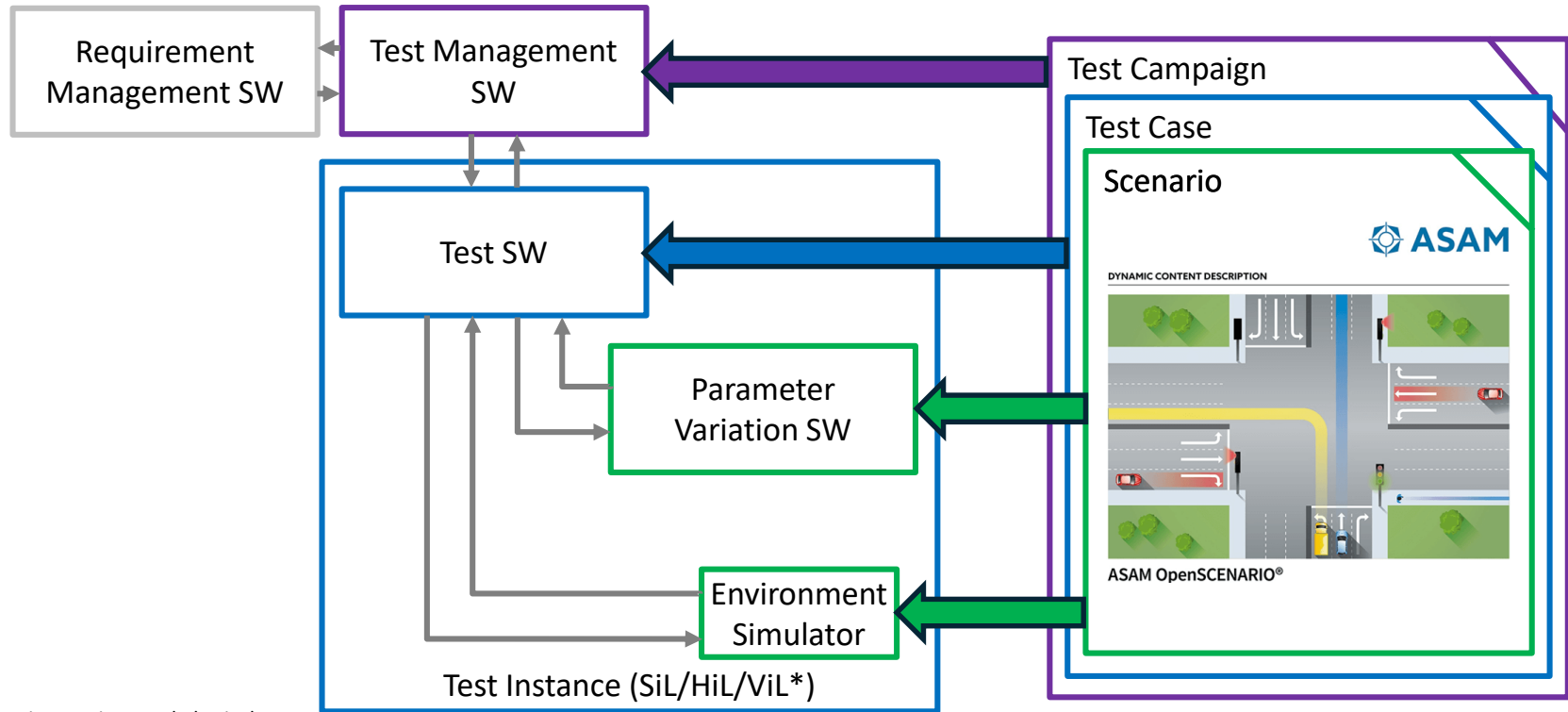
* ViL: Driving instructions and physical tests replace scenario and simulation

A layered approach for SW architecture and file formats

SET Level

Scenario

- Script of the virtual world

- „Bird view" (no vehicle internal models/states)

- Reference to map and environment model

- No evaluators

Test Case

Initialization

- Establishment of operational readiness

- Establishment of traceability between requirement and test case

- Run parameter variation (external, optional)

- Initialization of environment simulation with concrete scenarios (external, optional) *

- Start of (environment) simulation (external) *

Execution

- Runtime interaction (error injection, triggers) *

- Run time test evaluation *

- Post-run test evaluation *

Tear down

- Storage of results

- Clean up, preparation for next run

Test Campaign

- Reference to requirement

- List of test cases

- Distribution of test cases to test instances (SiL/HiL/ViL)

- Scheduling

- Consolidation of test results

* ViL: Driving instructions and physical tests
  replace scenario and simulation

sed Development and Testing of Automated Driving

Consistent use of test cases & scenarios by instance-specific implementation

Test Case

- Establishment of operational readiness

- Establishment of traceability between requirement and test case

- Run scenario variation (external, optional)

Initialization

- Initialization of environment simulation with concrete scenarios (external) *

```xml
...
<initSimulation>
  <script name="Actions/InitScript.py" type="python" function="Initialize">
    <parameters>
      <parameter name="Scenario" value="../FollowVehicle.xosc" />
      <parameter name="SUT" value="../ACCFunction.ssp" />
      <parameter name="EnvModel" value="../ACCEnvironment.ssp" />
    </parameters>
  </script>
</initSimulation>
...
```
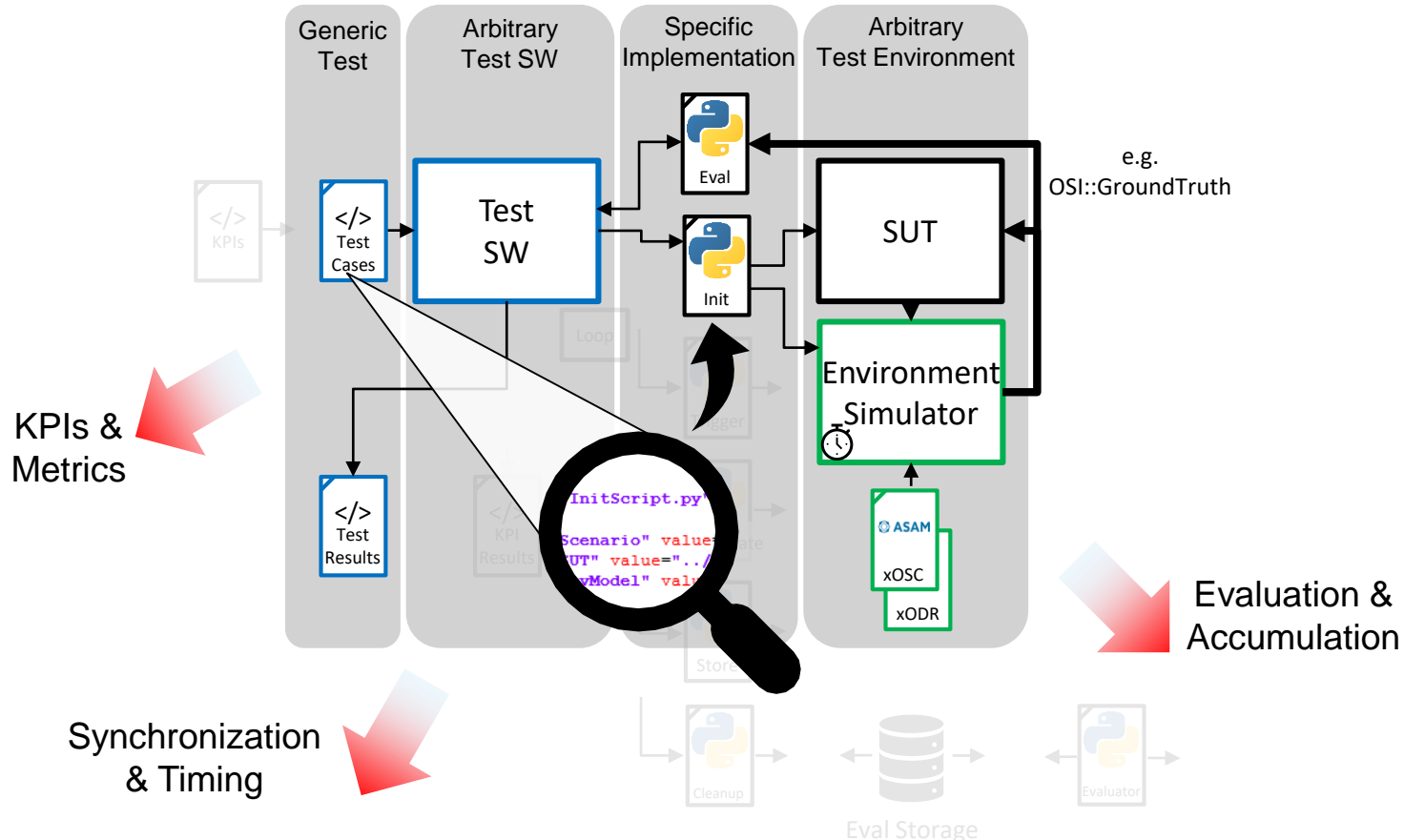
- Storage of results

- Clean up, preparation for next run

Tear down

...ed Development and Testing of Automated Driving

Concept verification in POCs: An iterative approach

SET Level

Generic Test

Arbitrary Test SW

Specific Implementation

Arbitrary Test Environment

KPIs

Test Cases

Test SW

Eval

Init

SUT

e.g. OSI::GroundTruth

Environment Simulator

Test Results

InitScript.py

Scenario" value
UT" value="../
Model" value

ASAM

xOSC

xODR

KPIs & Metrics

Evaluation & Accumulation

Synchronization & Timing

Eval Storage

Simulation-based Development and Testing of Automated Driving

Questions & Answers

Simulation-based Development and Testing of Automated Driving