

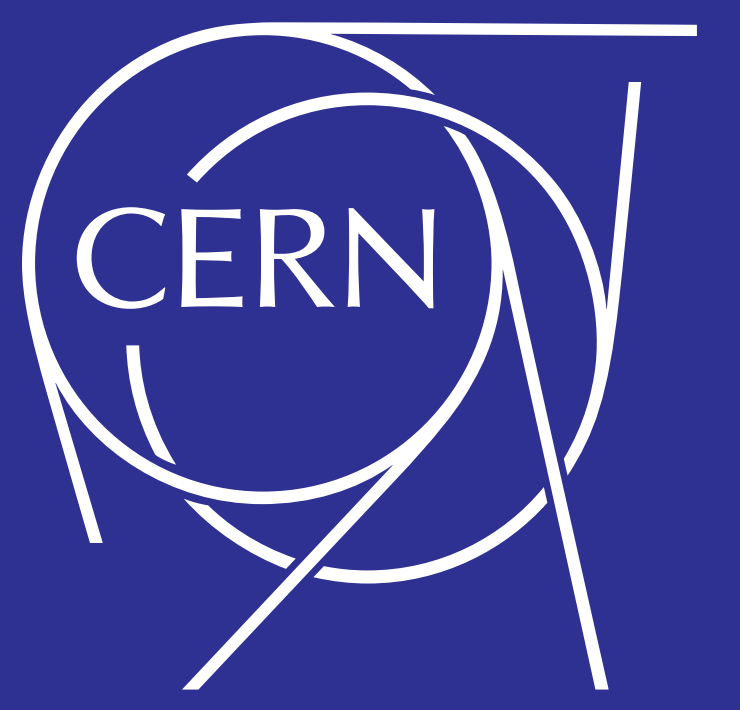


THPD100

Software Development and Management Tools

Smart Guided Commissioning of Industrial Control Systems

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Motivation

Testing during commissioning is a critical but error-prone step in bringing new industrial control systems to operation. Traditionally, this testing relies on visual verification of process states, which can be tedious for engineers and prone to mistakes.

Smart Guided Commissioning addresses this by automating repetitive tasks, enforcing testing routines, and providing live feedback and guidance, while still leveraging the expertise and intuition of the commissioning engineer.

Smart Guided Commissioning

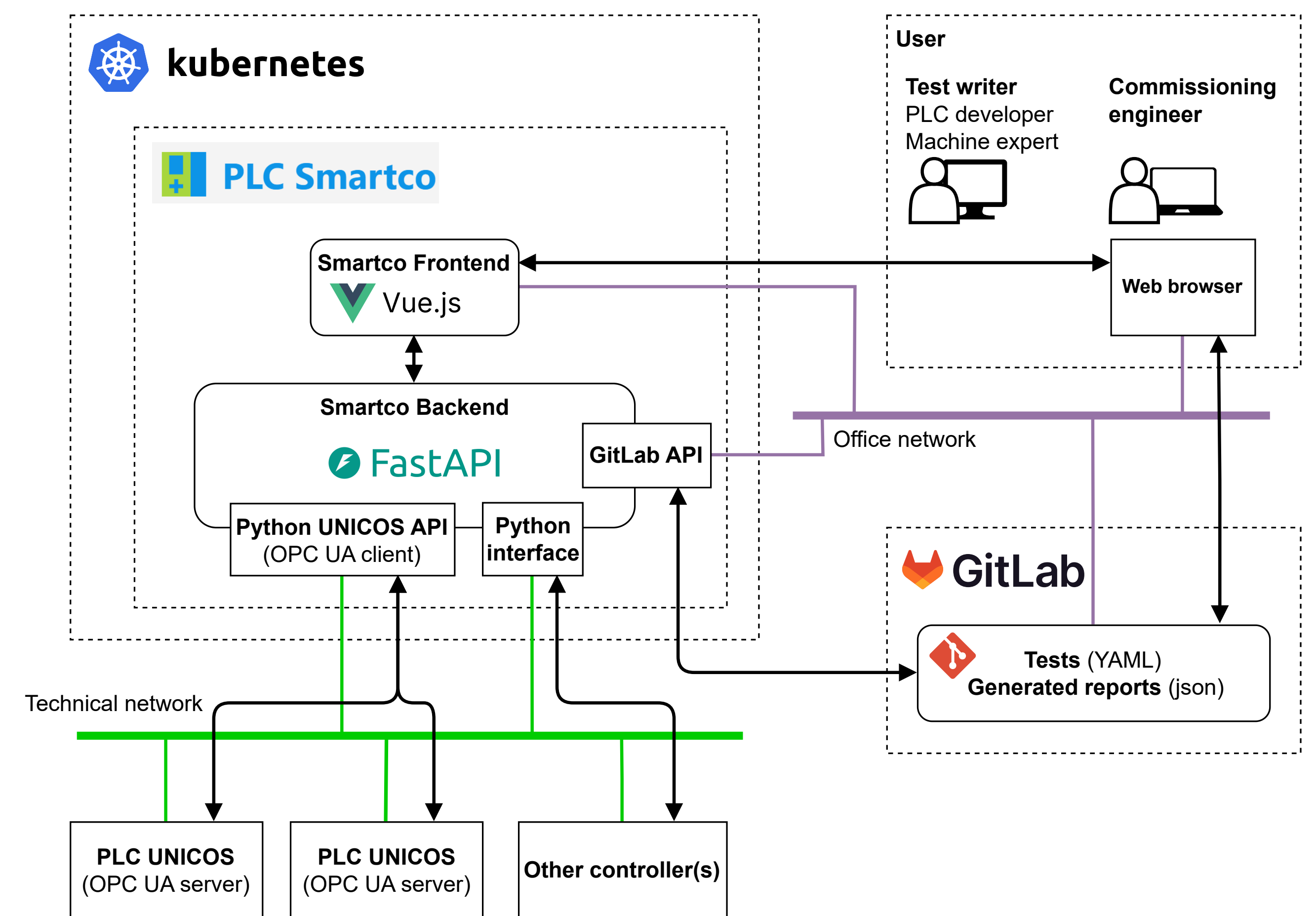
SmartCo is a web application developed to implement the concept of Smart Guided Commissioning. It streamlines testing by guiding engineers step-by-step, verifying live responses, and generating reports, making the testing process **faster**, **more reliable**, **traceable** and **repeatable**.

SmartCo provides a web interface for writing and storing test scripts in YAML format, an interactive test runner, and automatically generated and stored test reports.

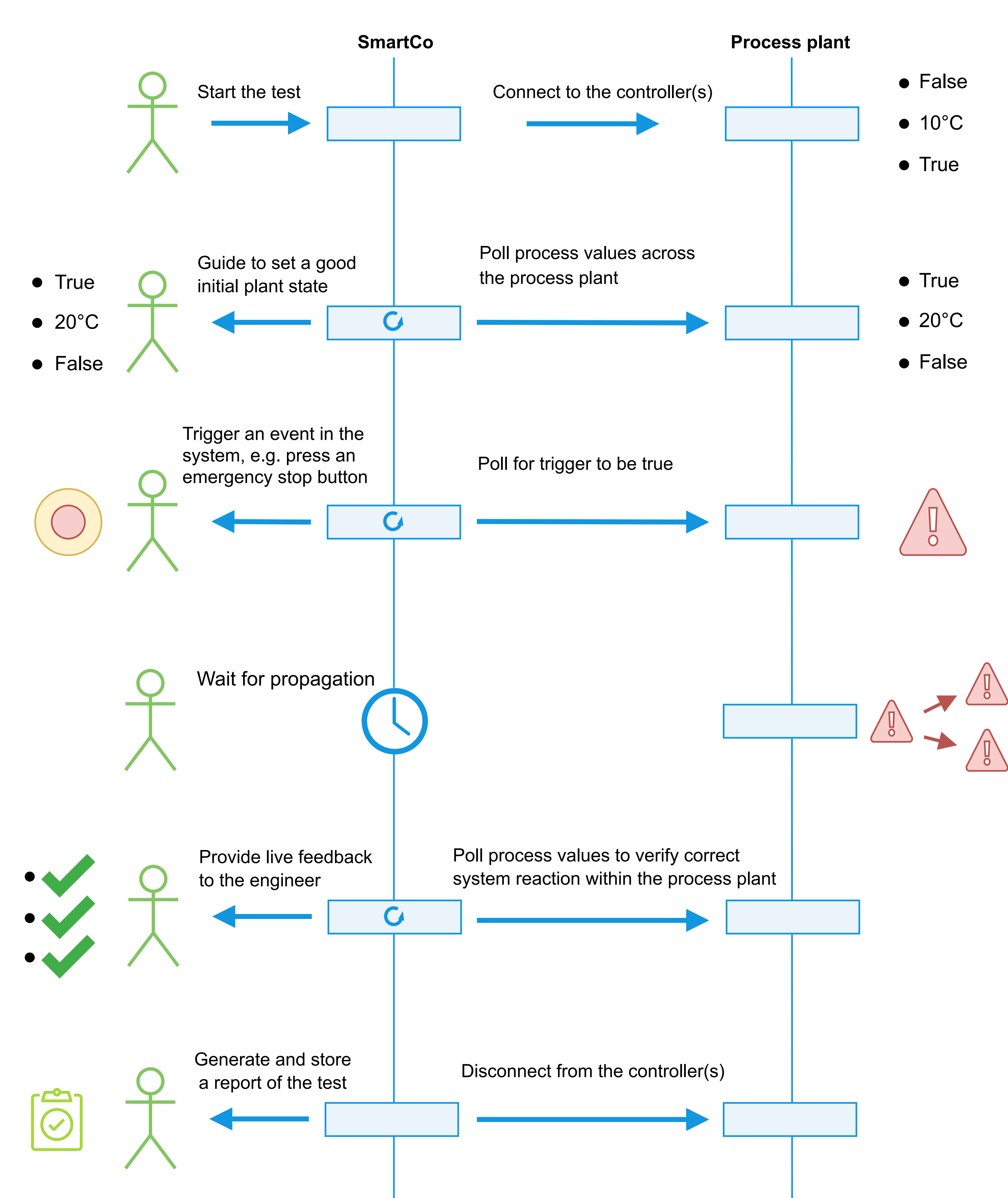
The YAML based test files are used to parametrize the test runner, which executes predefined types of actions. Currently there are three types of actions that can be used in the YAML definitions.

- Trigger: Wait for the process states to be correct.
- Assert: Verify that the process states are currently correct.
- Delay: Wait for a specified amount of time.

SmartCo Implementation Details



Using SmartCo



Running a Test Automatically Fills a Test Report

Trigger Passed

Set B.271 to FLOATING position.

Test	Actual	Status	Timestamp
POPSB_DI_271_MAGNET_FLOATING.PosSt = True	True	SUCCESS	2025-02-11 11:37:48.110
POPSB_DI_271_MAGNETS_TO_POPSB.PosSt = False	False	SUCCESS	2025-02-11 11:37:45.311
POPSB_DI_271_MAGNETS_TO_OLD_MPS.PosSt = False	False	SUCCESS	2025-02-11 11:37:40.590
POPSB_DI_271_MAGNET_GROUNDED.PosSt = False	False	SUCCESS	2025-02-11 11:37:40.593

Delay Passed

Wait for propagation

Duration: 1s

Assert Passed

Confirming alarm states

Test	Actual	Passed?	Timestamp
POPSB_DA_OPERATIONAL_SI6.ISt = True	True	SUCCESS	2025-02-11 11:37:49.121
POPSB_DA_OPERATIONAL_SI.ISt = True	True	SUCCESS	2025-02-11 11:37:49.124

Trigger ⌂

B.271 to POPSB position and reset POPSB_SYSTEM SIs.

Test	Actual	Status	Timestamp
POPSB_DI_271_MAGNETS_TO_POPSB.PosSt = True	False	Waiting...	2025-02-11 11:37:49.126
POPSB_DI_271_MAGNET_FLOATING.PosSt = False	True	Waiting...	2025-02-11 11:37:49.129
POPSB_DI_271_MAGNETS_TO_OLD_MPS.PosSt = False	False	SUCCESS	2025-02-11 11:37:49.134
POPSB_DI_271_MAGNET_GROUNDED.PosSt = False	False	SUCCESS	2025-02-11 11:37:49.138
POPSB_SYSTEM.StartISt = False	True	Waiting...	2025-02-11 11:37:49.142

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MORE INFORMATION



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<https://epc-ccs.web.cern.ch/content/industrial-controls>