FULLY AUTOMATED ECU TEST IN CONTINUOUS INTEGRATION
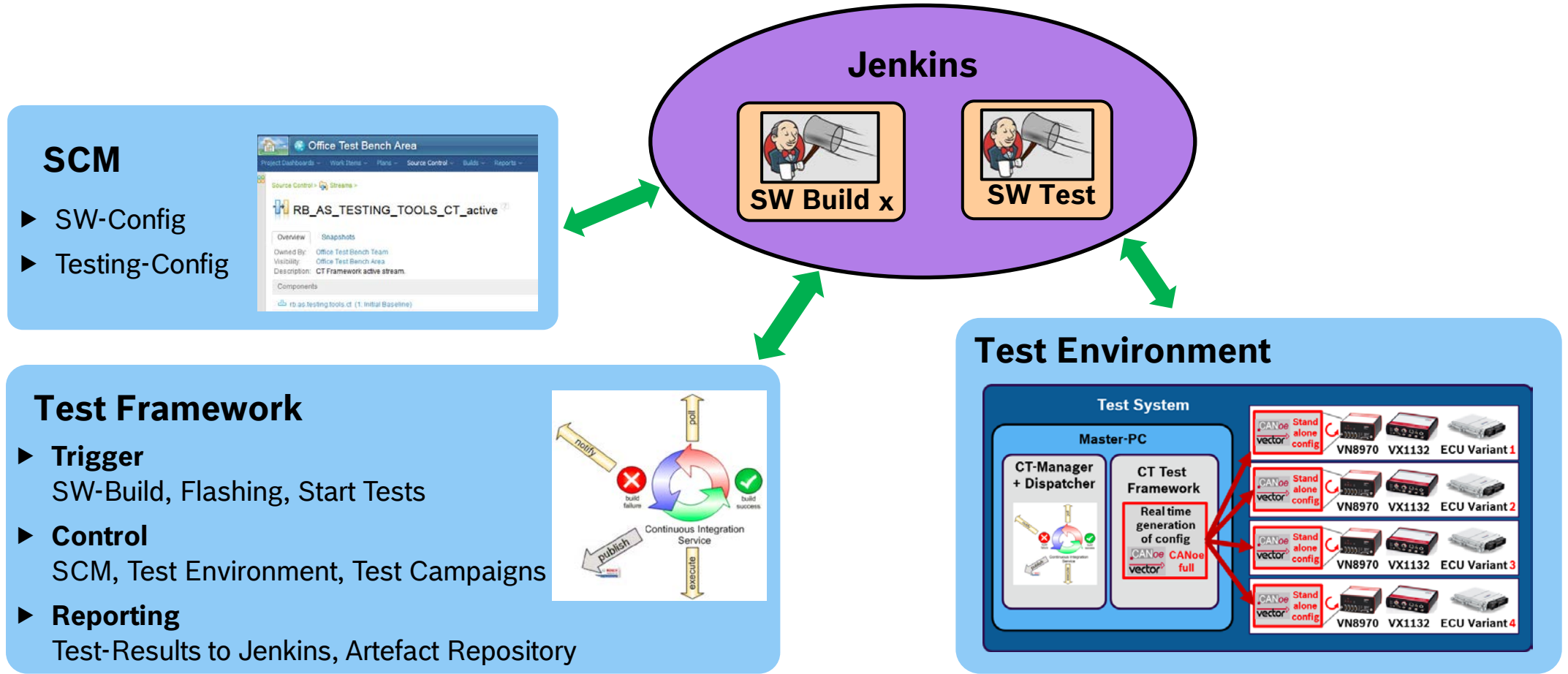
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Fully automated ECU test in Continuous Integration
Agenda

▶ Overview

▶ Motivation

▶ Test focus

▶ Setup of test automation

▶ Summary and outlook

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Fully automated ECU test in Continuous Integration
Overview

Jenkins

SW Build x

SW Test

SCM

▶ SW-Config

▶ Testing-Config

Test Framework

▶ **Trigger**
SW-Build, Flashing, Start Tests

▶ **Control**
SCM, Test Environment, Test Campaigns

▶ **Reporting**
Test-Results to Jenkins, Artefact Repository
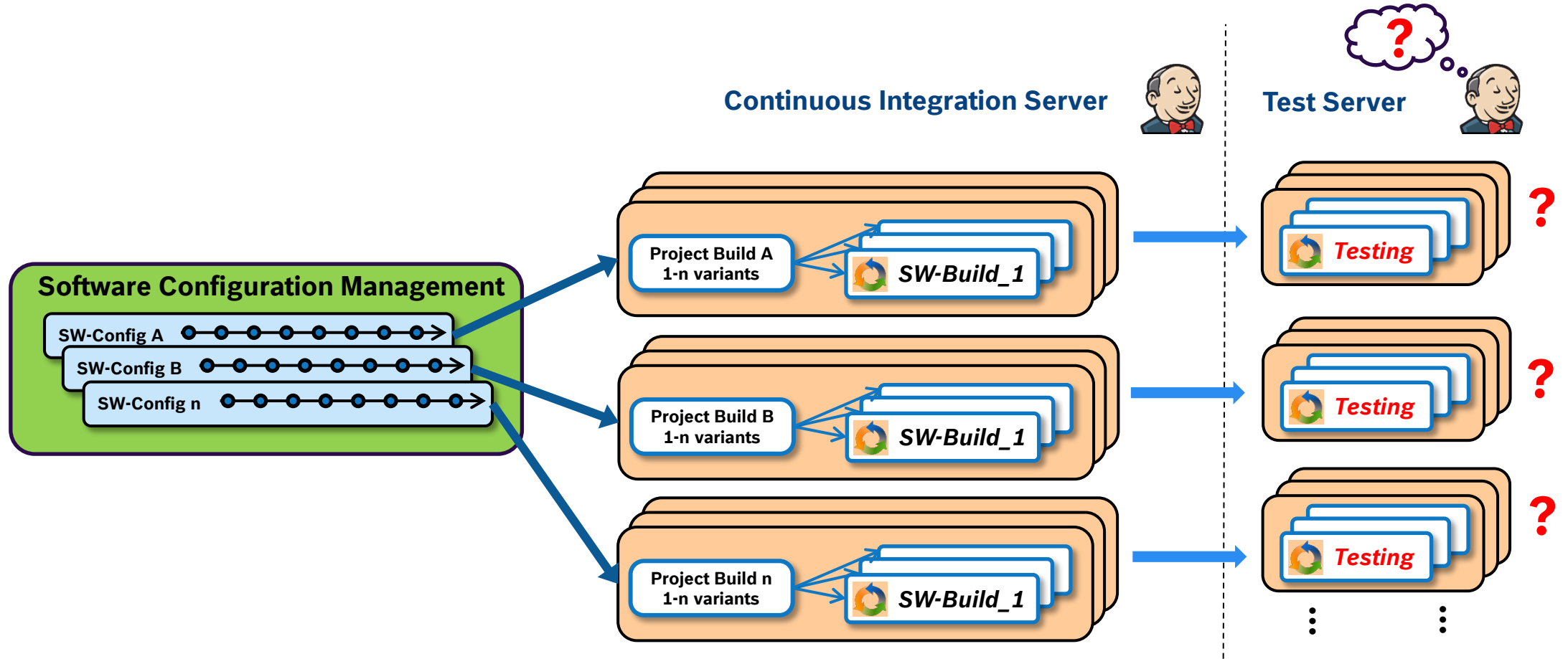
Test Environment

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MOTIVATION

Fully automated ECU test in Continuous Integration
Motivation

▶ Reduction loading and cost of complex HIL systems

▶ Verification of big amount of variants

  ▶ Enable feedback of quality with high level of automation

▶ Increased flexibility

  ▶ small size and short setup time: ~5min

  ▶ multi project sharing

▶ Enabler for enhanced test strategy

  ▶ early integration test

  ▶ quick regression tests on real HW

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Fully automated ECU test in Continuous Integration
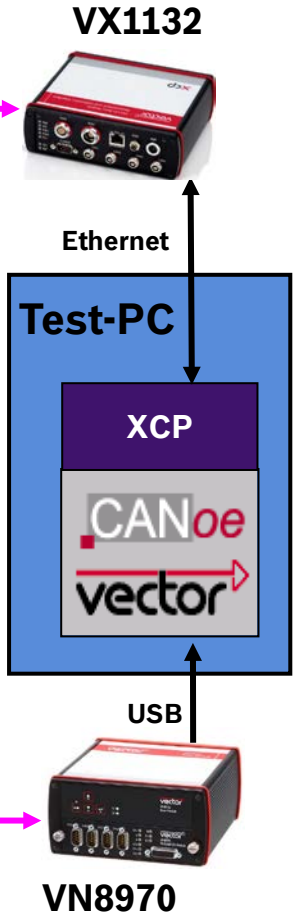## Challenge: Verification of huge amount of variants

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TEST FOCUS

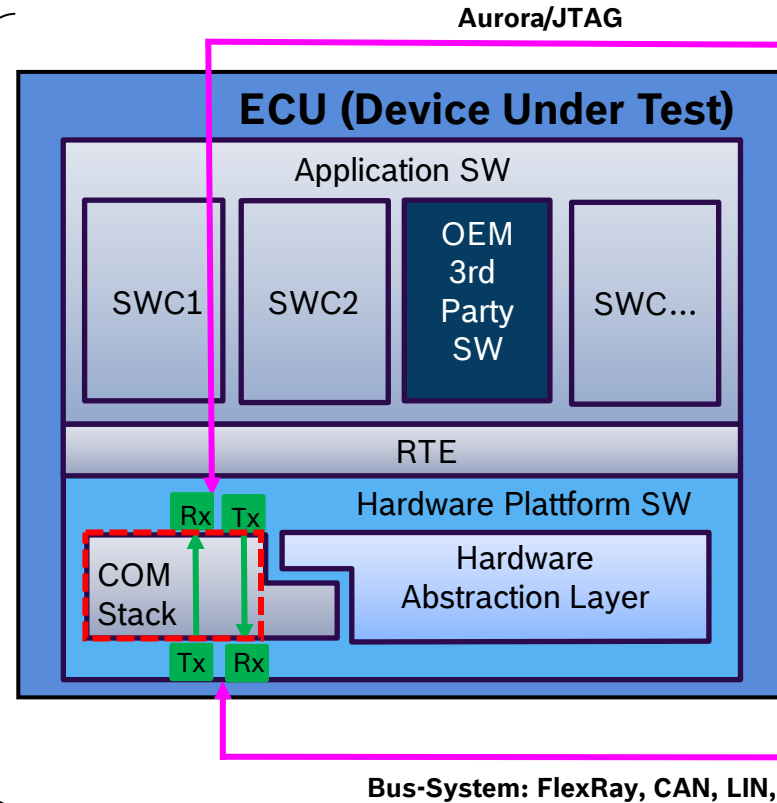# Fully automated ECU test in Continuous Integration
Focus of testing

▶ Open loop testing
  ▶ SW/HW-Integration test
▶ Black and white box test
  ▶ Basic tests of complete SW
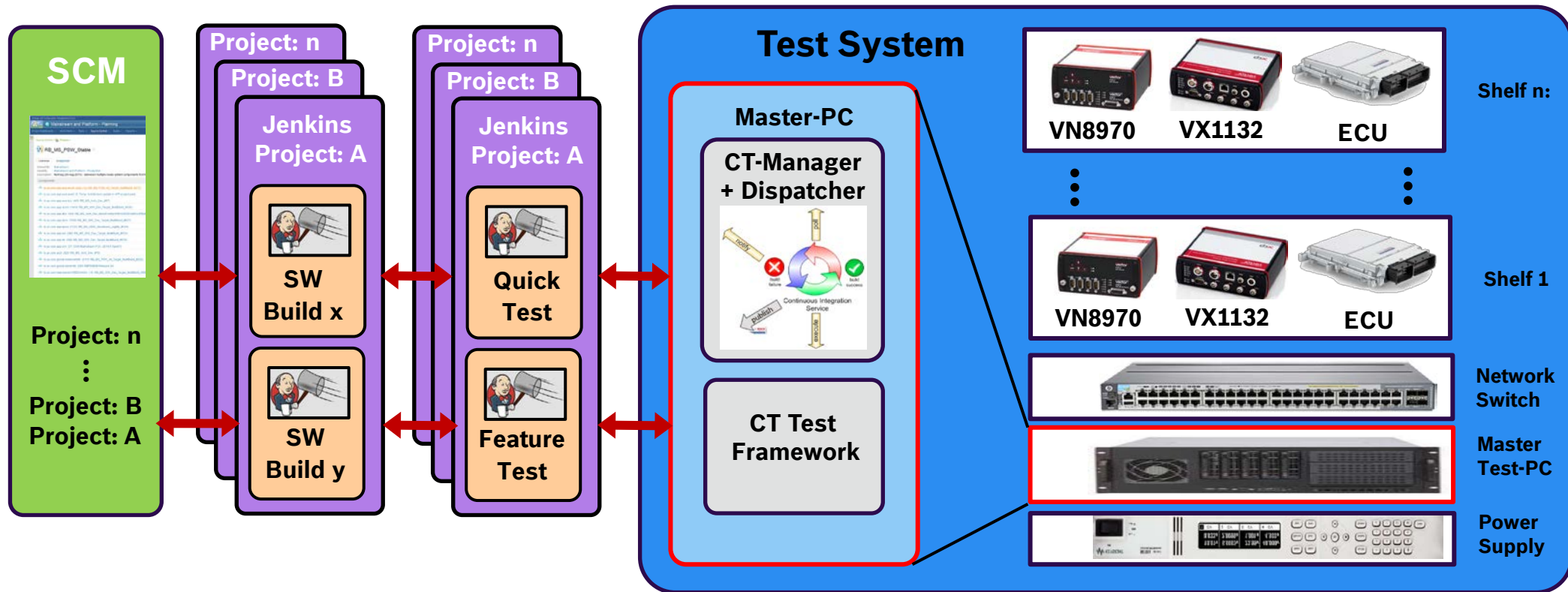 ▶ Detail tests of infrastructure SW

= 1 Shelf

VN8970   **VX1132**   **ECU**

SW   = Software
SWC = Software Component

VX1132

Aurora/JTAG

ECU (Device Under Test)

Application SW

| SWC1 | SWC2 | OEM 3rd Party SW | SWC... |

RTE

Rx Tx

Hardware Plattform SW

COM Stack

Hardware Abstraction Layer

Tx Rx

Bus-System: FlexRay, CAN, LIN,

VN8970

Ethernet

Test-PC

XCP

.CANoe vector
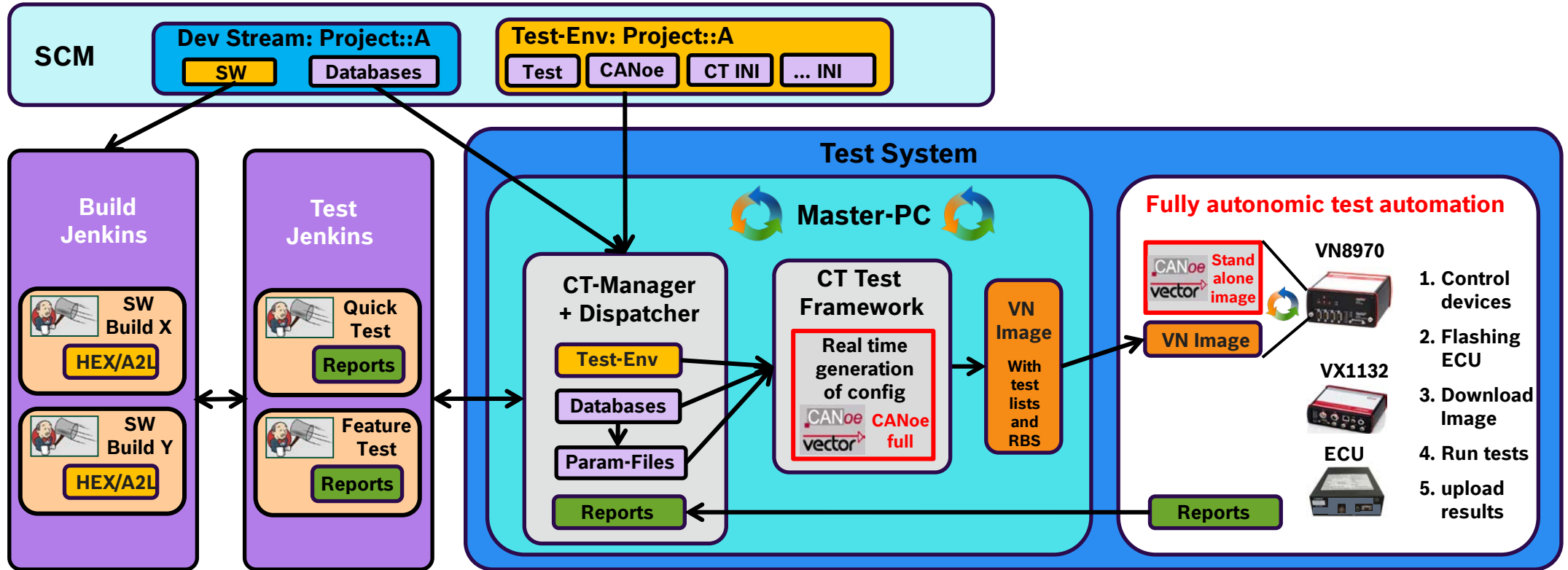
USB

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SETUP OF TEST AUTOMATION

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Fully automated ECU test in Continuous Integration
Setup of test automation

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Fully automated ECU test in Continuous Integration
Workflow of test automation

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SUMMARY AND OUTLOOK

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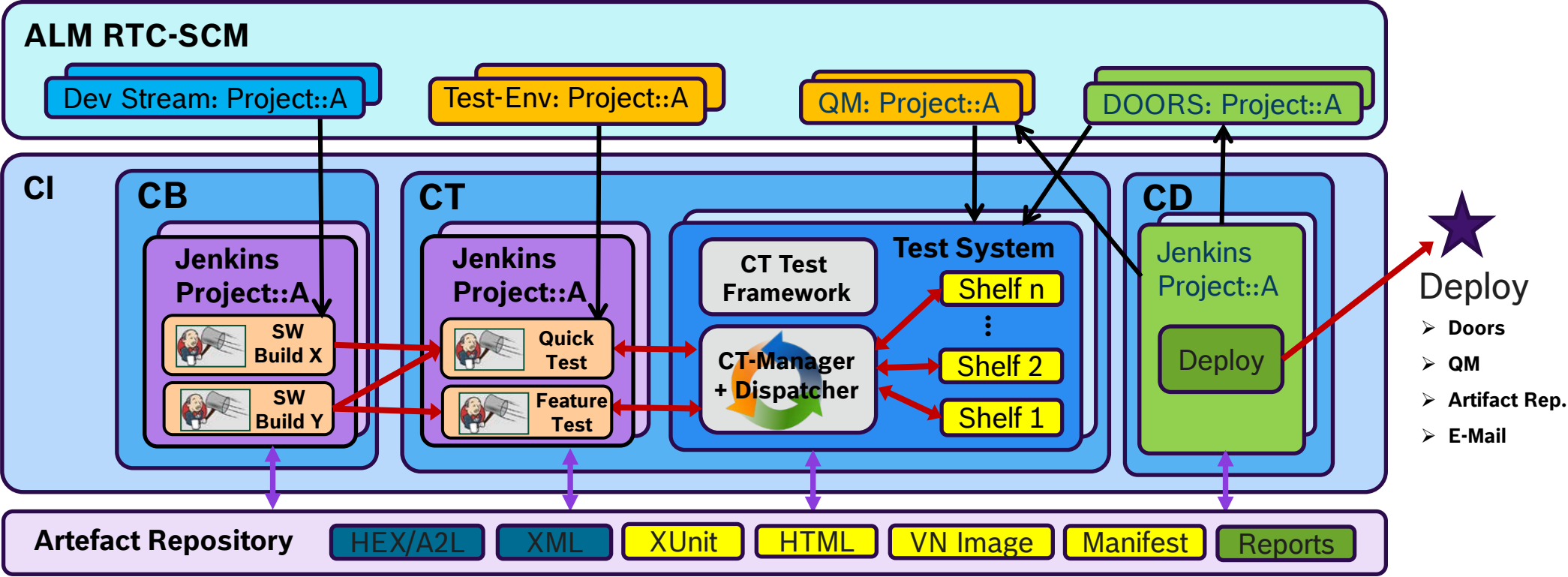
Fully automated ECU test in Continuous Integration
Test campaigns for Continuous Testing

- Level 1: Testset_1 ~ 5min
  - Test of flashing
  - Basic network communication
  - ECU load and task/event verification
  - Basic diagnostic tests

- Level 2: detail tests
  - Tx-Test (Frame, PDU, CRC, ALIVE, Cycle Time)
  - Timing tests, runtime dependencies
  - Robustness and stress test
  - Network management test (start up / shut down)
  - Undervoltage test
  - Physical Layer test ...

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Fully automated ECU test in Continuous Integration
Outlook 1

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THANK YOU

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