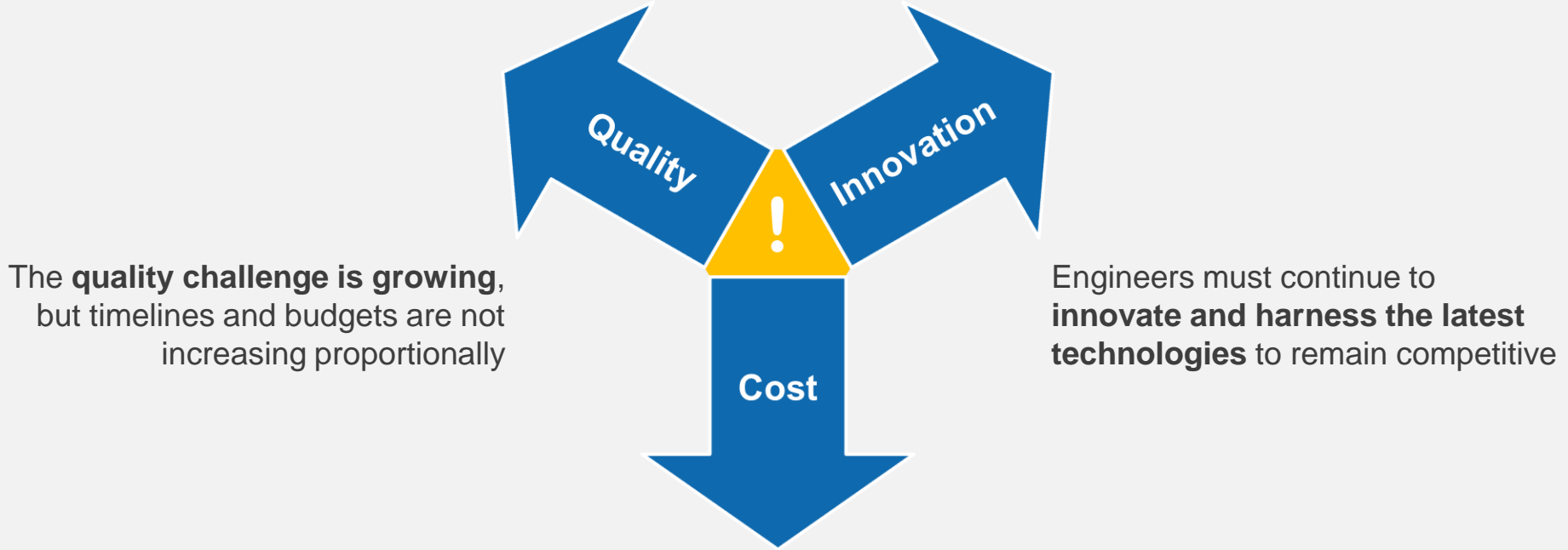


Future-Proof your Test System Architecture

Daniel Clapham
Field Marketing Engineer
National Instruments

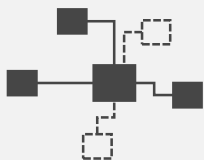


What We Know About the Future



Automotive Trends are Challenging Test Organizations

TRENDS



Evolving Vehicle Architectures



Uncertain Regulatory Environment

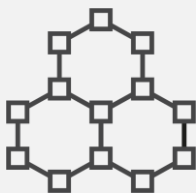


Software Focused Development



Deep Learning Algorithms

TESTING IMPACTS



Increasing Complexity



Changing Requirements



Unrealistic Schedules



More Simulation

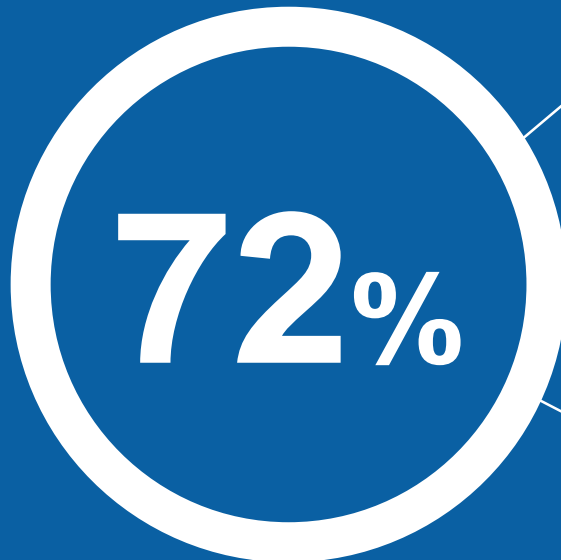
Customization is a Requirement for Test System Development

CLOSED

- “Vendor knows best”
- Fixed functionality
- Closed ecosystem
- Customer pays



Which of the following levels of product and service do you require for your test and measurement solutions?



25%

Vendor provides a programming API, customizable hardware, and support services so that I can tailor the end instrument to meet my requirements

47%

Vendor works with me to tailor the solution to my requirements

Approaches to Test and Measurement

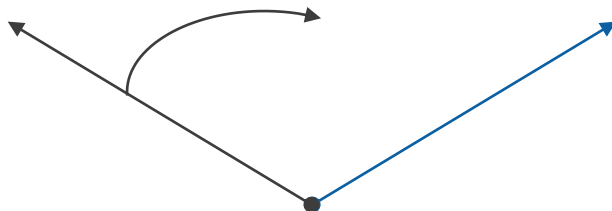
CLOSED

- “Vendor knows best”
- Fixed functionality
- Closed ecosystem
- Customer pays



PLATFORM

- “Customer knows best”
- Customizable solution
- Open, vibrant ecosystem
- Customer designs



Hardware in the Loop



NI HIL Systems



Turnkey HIL
Simulator



In-House
HIL System

Built on Commercial Off the Shelf NI Platforms



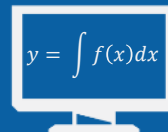
PXI and RIO



Switch Load
Signal Conditioning



ATE Core Configurations

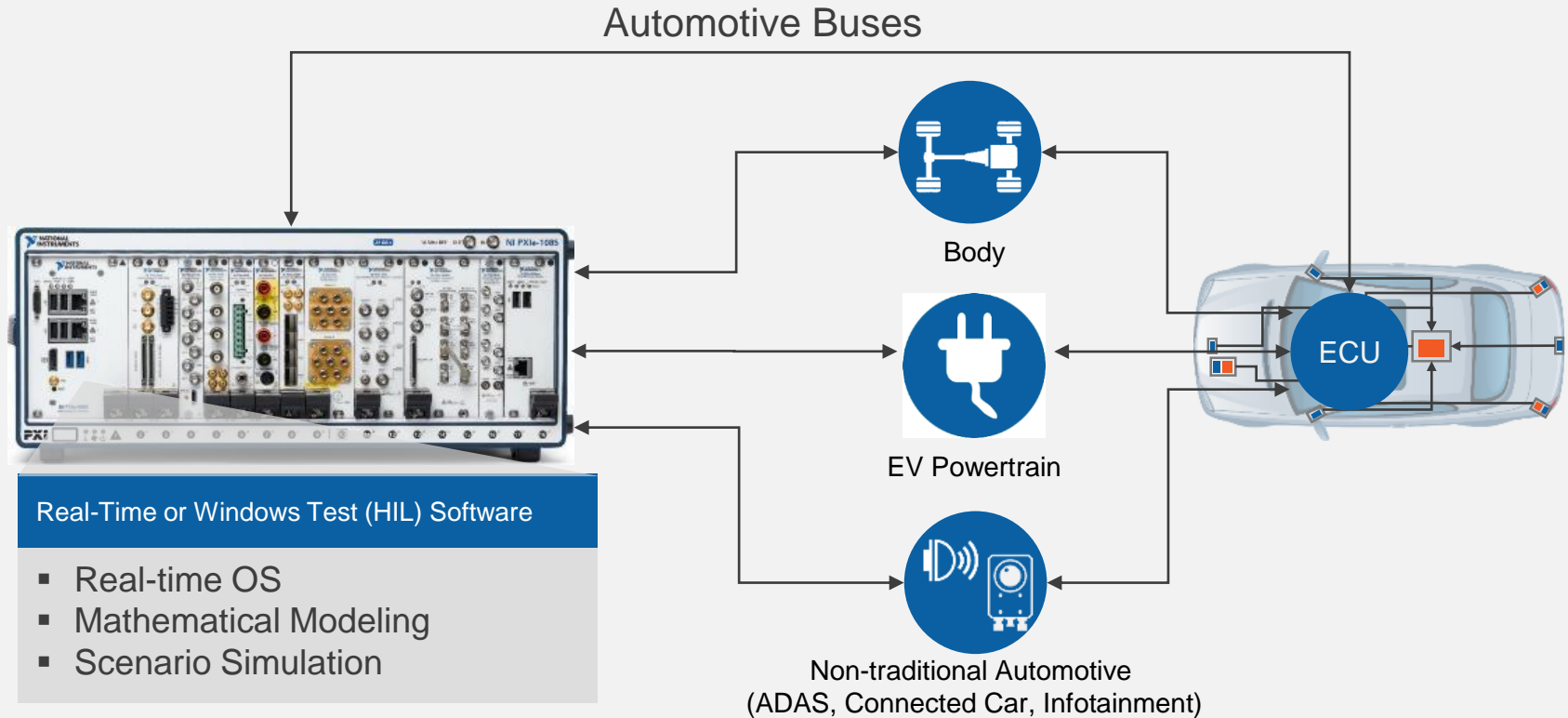


VeriStand

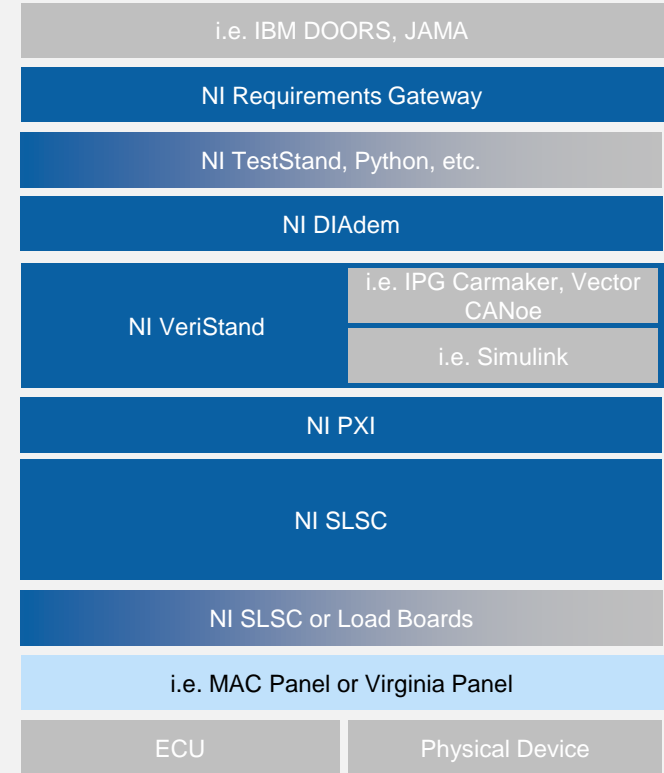
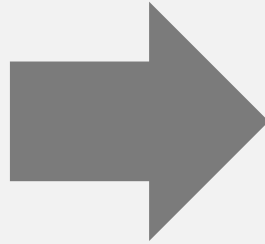
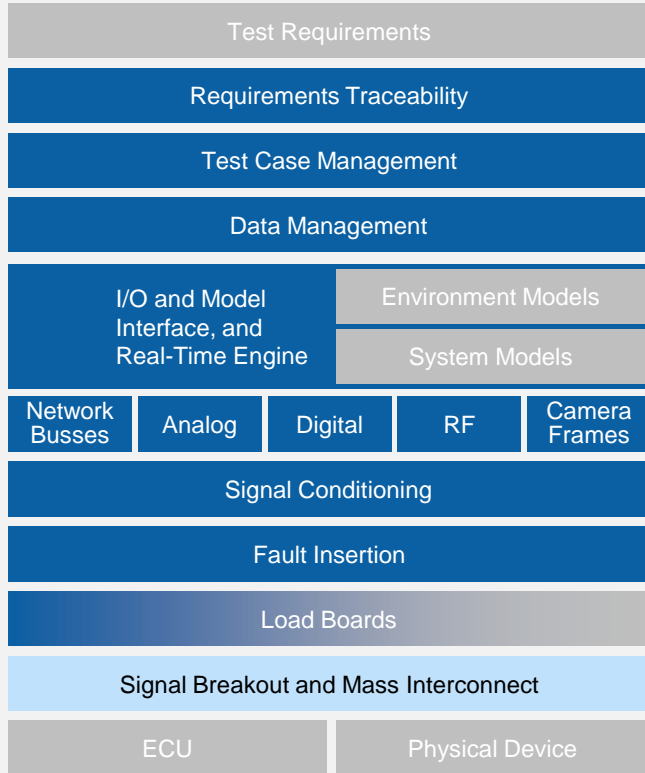


HIL Specialty
Technology Partners

A Standard for Software Defined Test

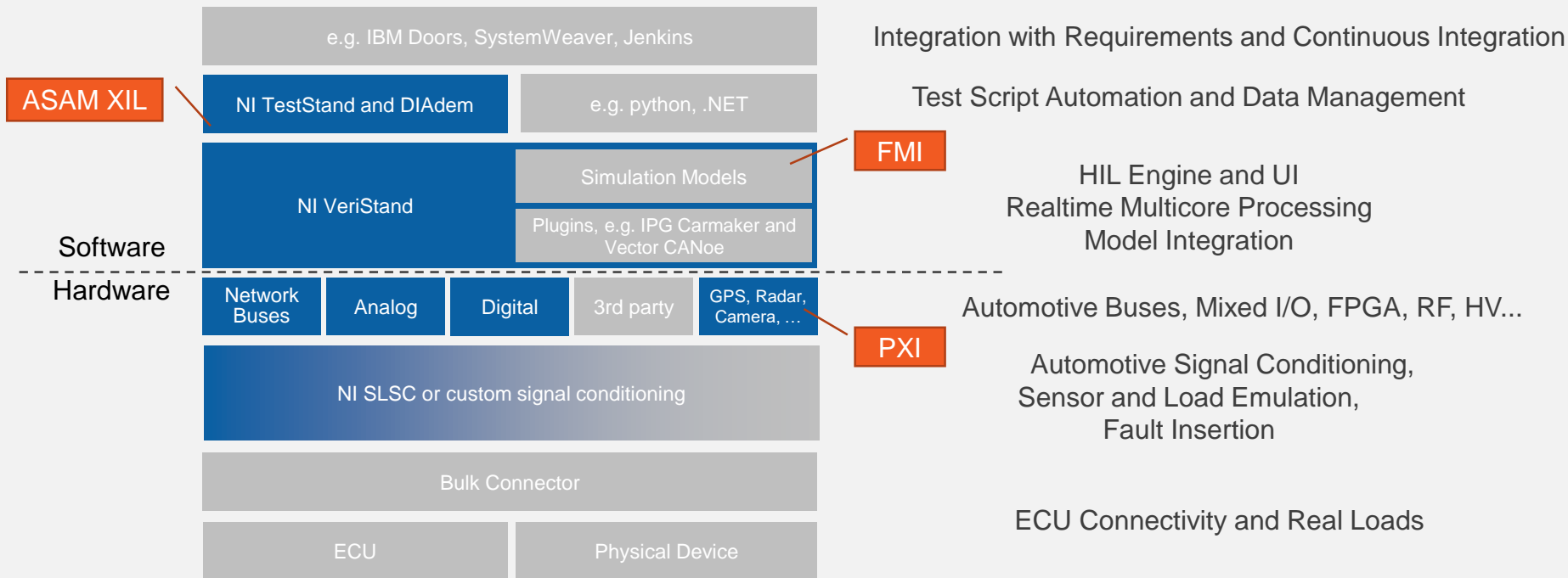


Building a HIL System on COTS Components

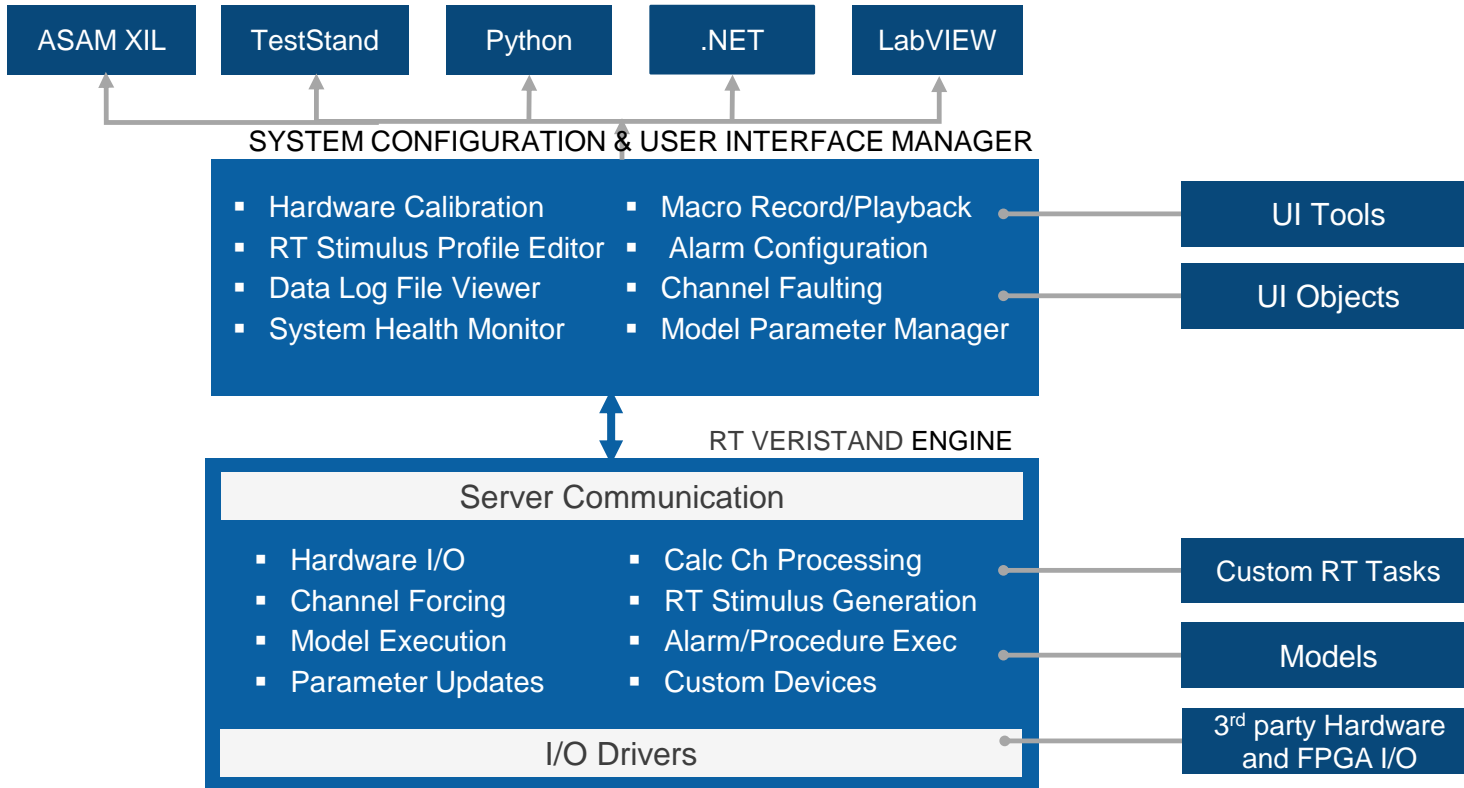


NI HIL Platform - Layers of Functionality

Reuse what you want

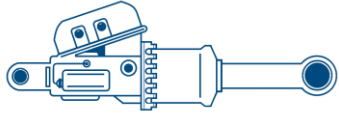


VeriStand's Open Interfaces Enables Flexible HIL Systems

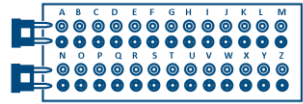


Platform Based HIL Design

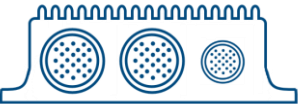
Real Actuator



Breakout Box

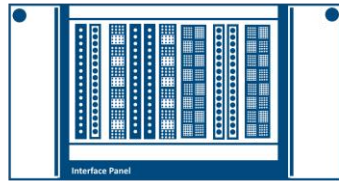


ECU



Cable
Harness

Mass Interconnect



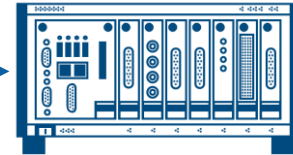
Real/Sim Switch

$F(X)$

Signal
Conditioning
And Loads

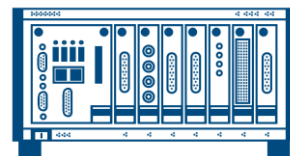
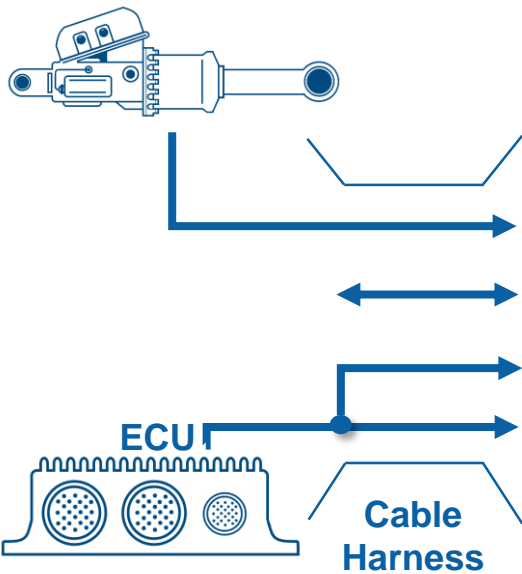
Fault

Sense Lines

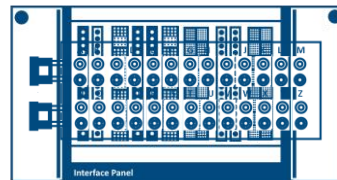


Platform Based HIL Design

Real Actuator

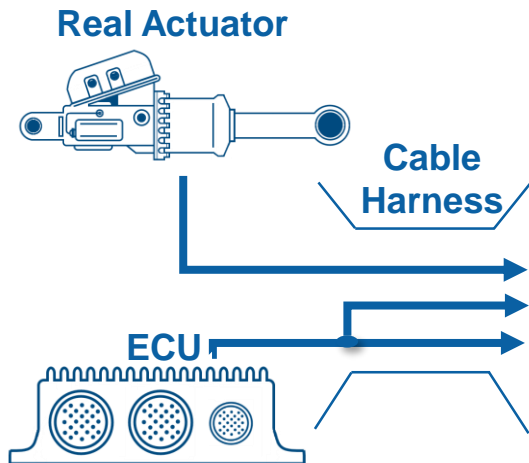


Signal
Conditioning
And Loads



Mass Interconnect
Breakout Box

Platform Based HIL Design



PXI Measurement and Computing



Standard PXI to Bank Cables



SLSC

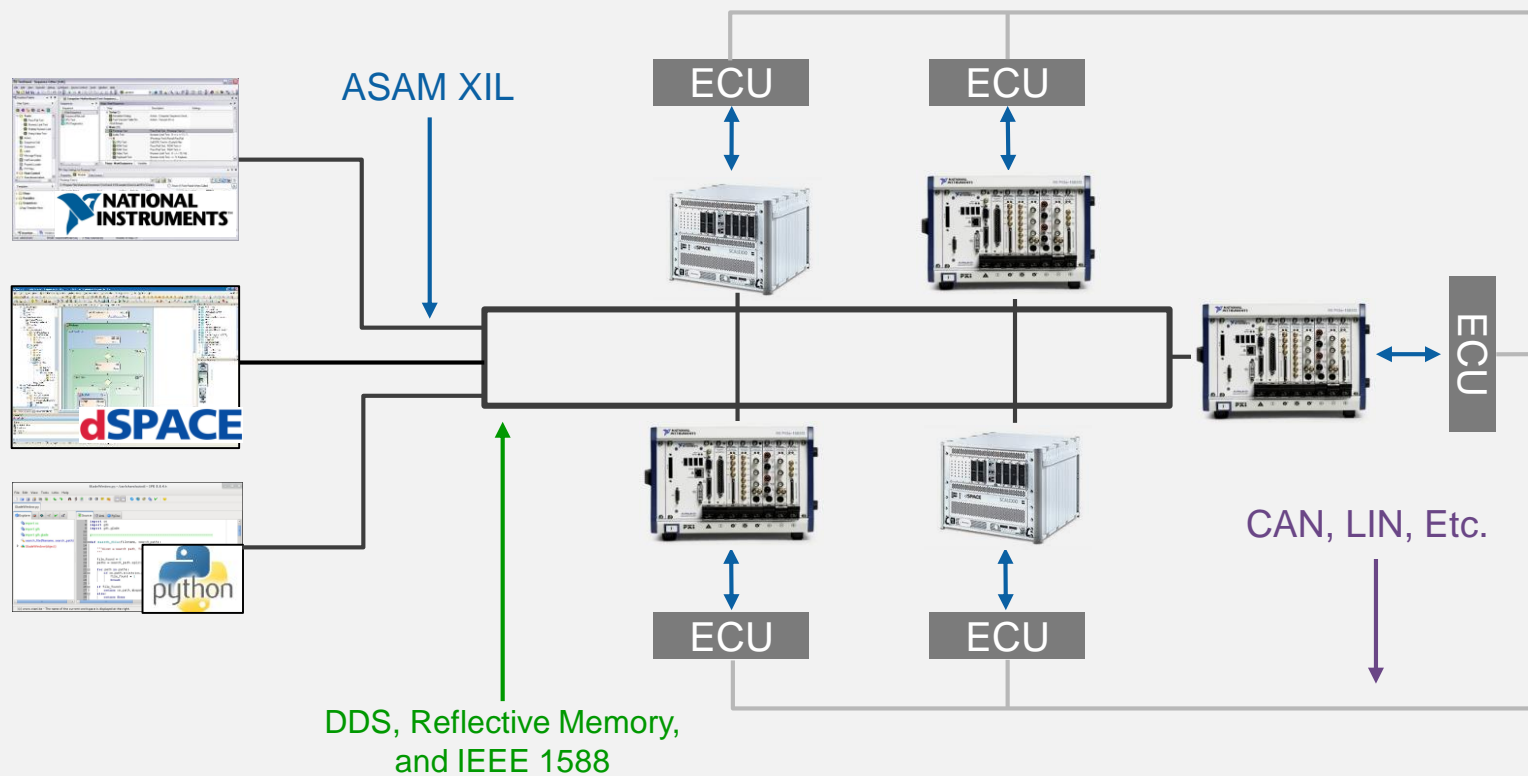


Standard D-Sub Breakout Cables



Standard Interface Panels

Integration HIL Test System Using XIL API

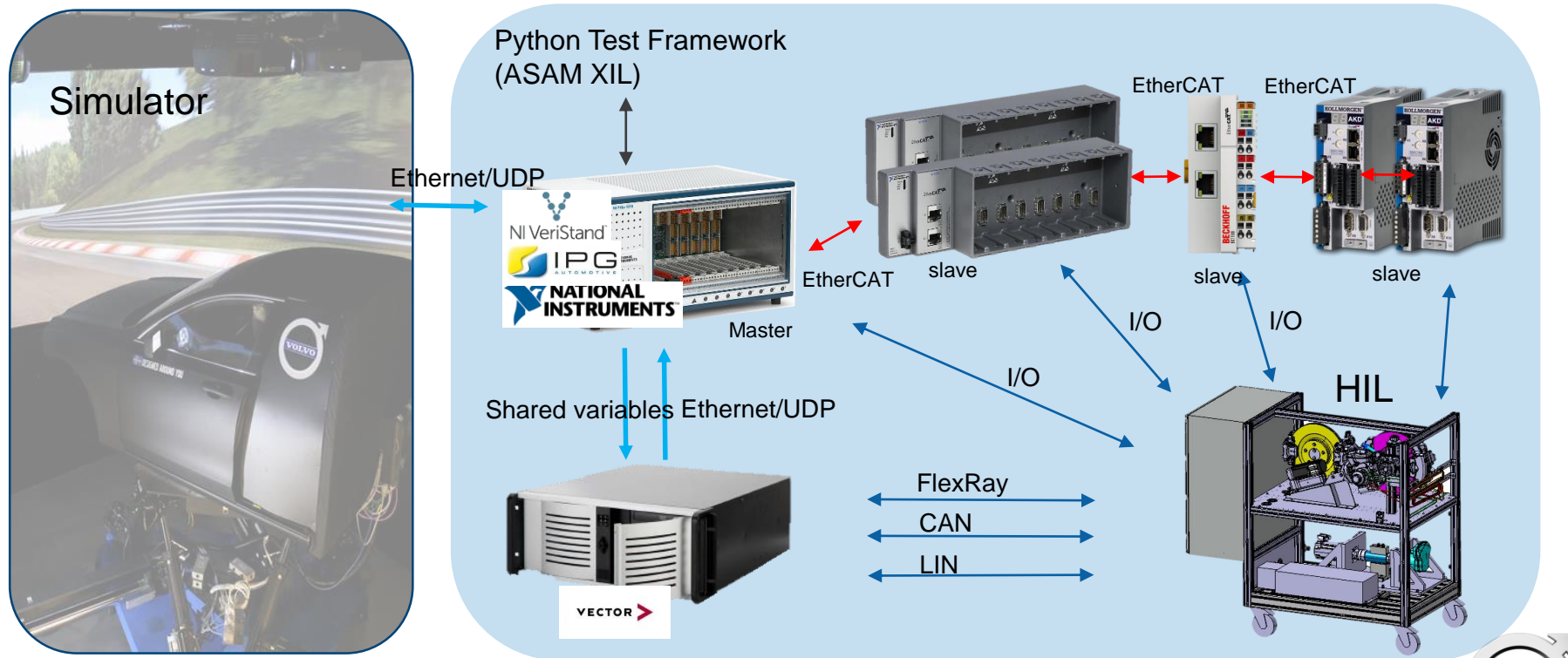




Volvo Cars Use Case:

Integration of vehicle motion controllers in the Volvo driving simulator

Our Open HIL Platform Solution



Business & technology Impact

Using the open HIL platform solution enabled us to:

- Use multiple vendors - Right vendor for the right job
- Built a flexible and modular HIL platform - Prepared for future needs
- Integrate 3rd party Hardware and SW - Flexibility

Last but not least:

- Ease of setting up the whole system enabled us to deliver in time, at the right cost and world class quality with a limited amount of resources





Thank you for your Attention!
Visit us Hall 1 Stand 11

daniel.clapham@ni.com