

**Continental**   
The Future in Motion



## CDSF Continental

CI/CD and embedded world

Patrice Truong Van Nga

# Summary

- › Who am I:
  - › My background
- › Continental:
  - › Organizations
- › Use Case 1 : OEM Collaboration on HW & BSW
  - › Organizational View
  - › PI Planning
  - › Technical View
- › Use Case 2 : OEM Collaboration on HW & Algos
  - › Software Development Cycle

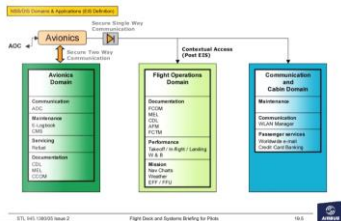
# Who am I

## > My background

> 2004 - CMS A380



A380



> 2008 – Software Foundry



> 2012 – NavBlue Flysmart



Internal



25 February 2021

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# Continental

## > Organizational Units



- > Autonomous Mobility & Safety (ADAS, Hydraulic brake System, Passive Safety & Sensorics, Vehicle Dynamics)
- > Contitech (all sustainable solution beyond rubber)
- > Tires (bicycle, car, motorcycle, truck and bus, speciality)
- > Vehicle Networking & Information

### > Business Units

- > Commercial Vehicles & Services

### CVS R&D Toulouse

...

- > Vitesco Technologies (PowerTrain solutions)

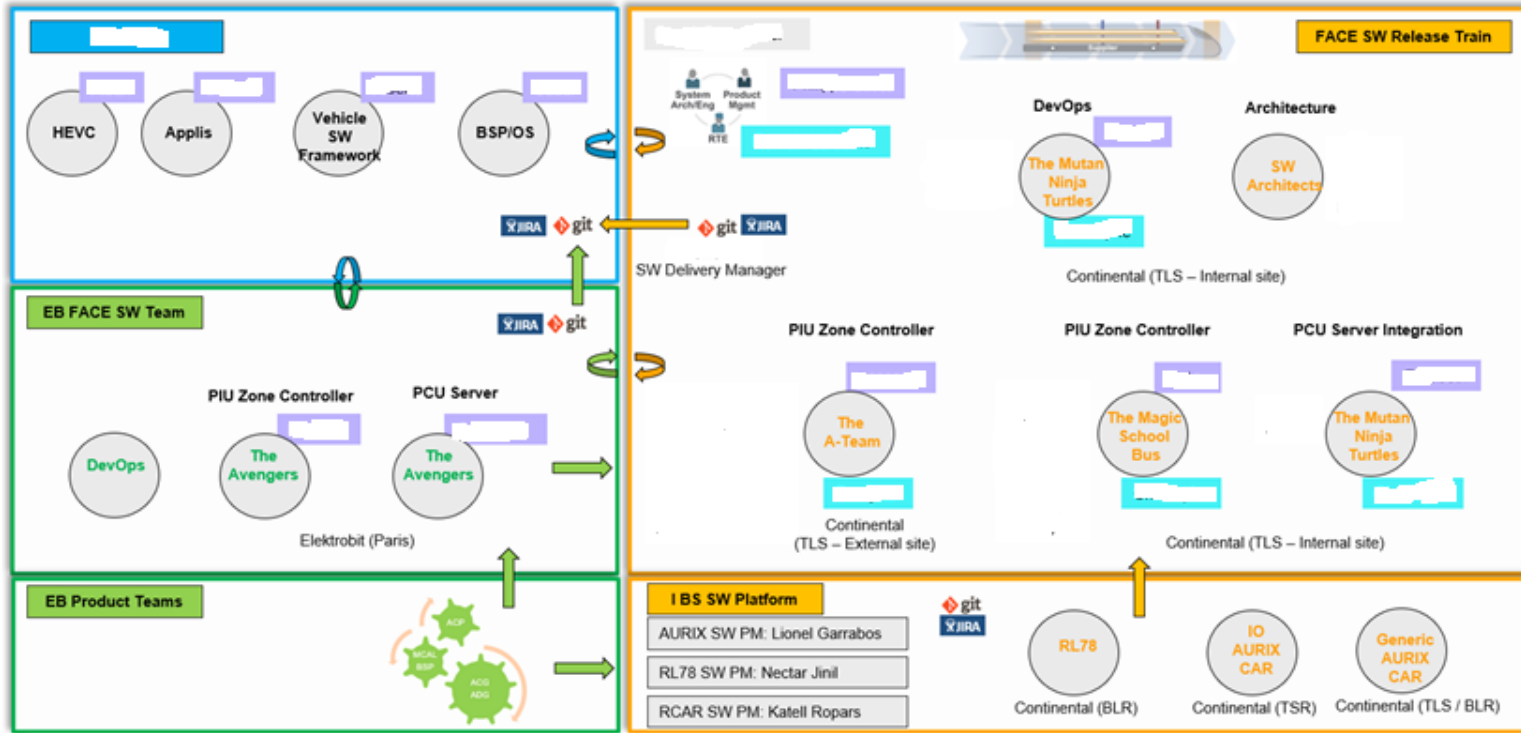


# Use Case 1

## › OEM Collaboration on HW & BSW

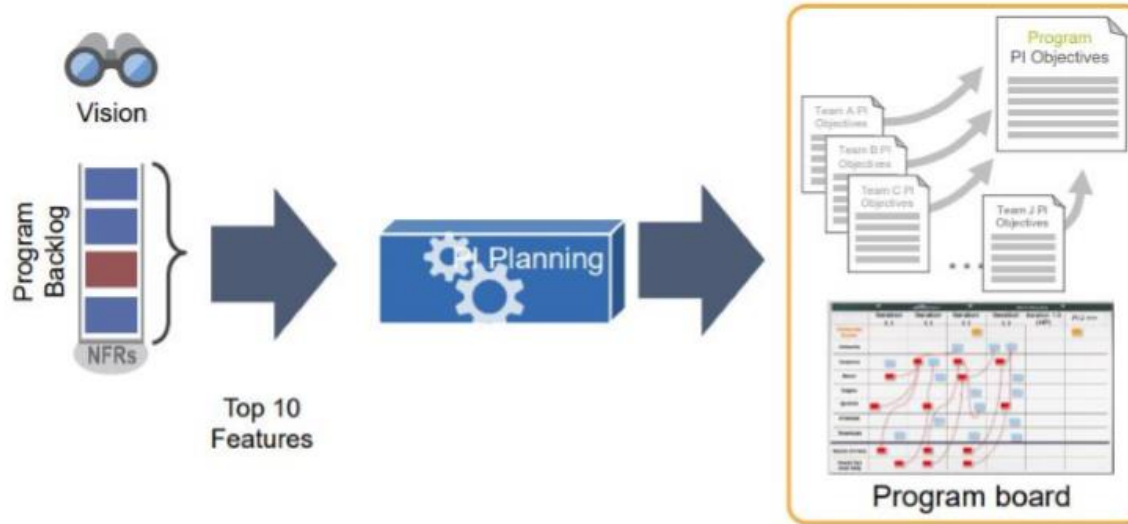
- › During 1 year R&D on new HW architecture in the car

# Organizational View – Safe:Release Trains



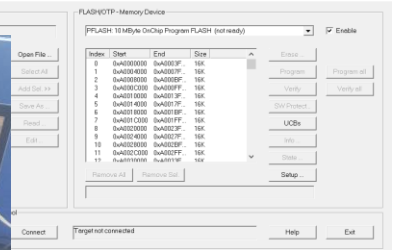
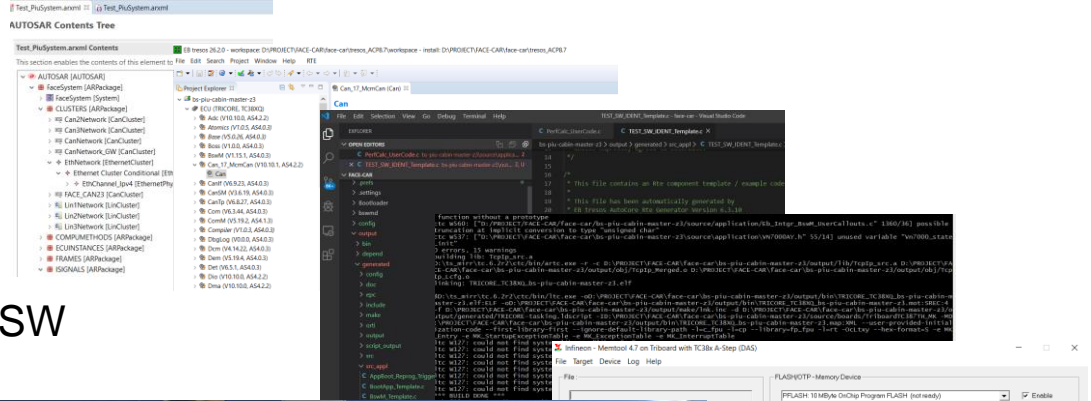
# PI Planning Process

- › INPUT : Vision and Top Features
- › OUTPUT : Team and Program PI Objectives AND Program board



# Technical View – Conti PIU Integrators

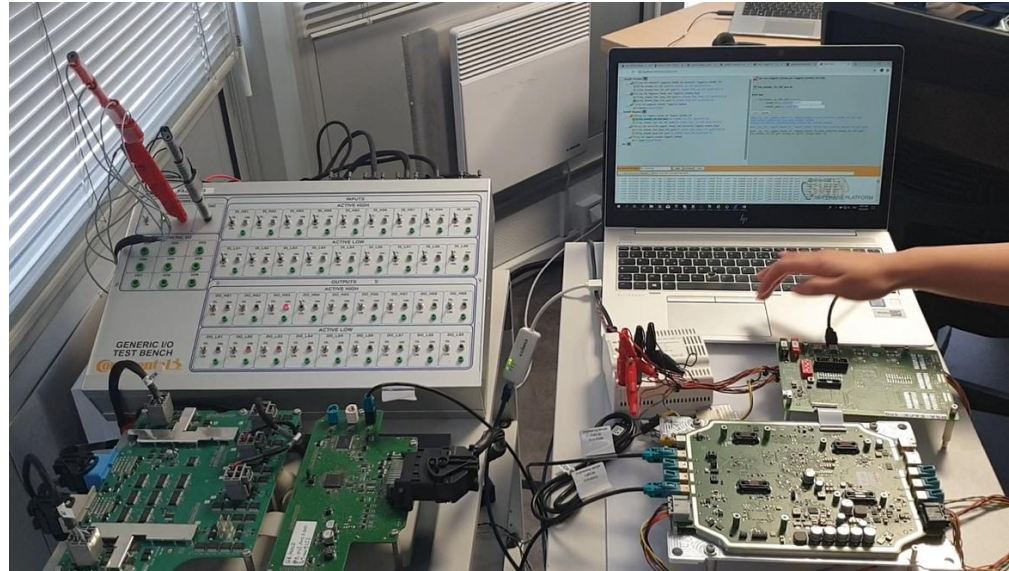
- › Read Micro and PCB Data Sheet
- › Create AUTOSAR files
- › Import, Configure, and generate BSW
- › Implement sw components
- › Compile
- › Flash
- › Test (wireshark, pc tester ...)



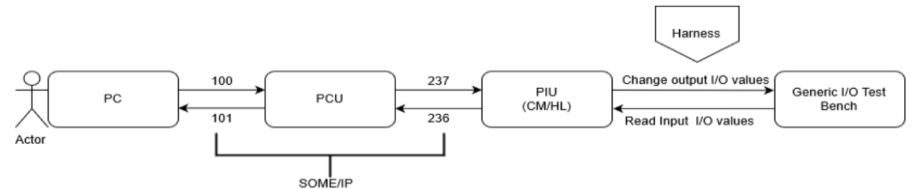


# Technical View – PCU Integrators

- › Reproduce the EB build system (yocto)
- › Implement sw components to test with piu
- › Validate the system concept
- › Stress the system

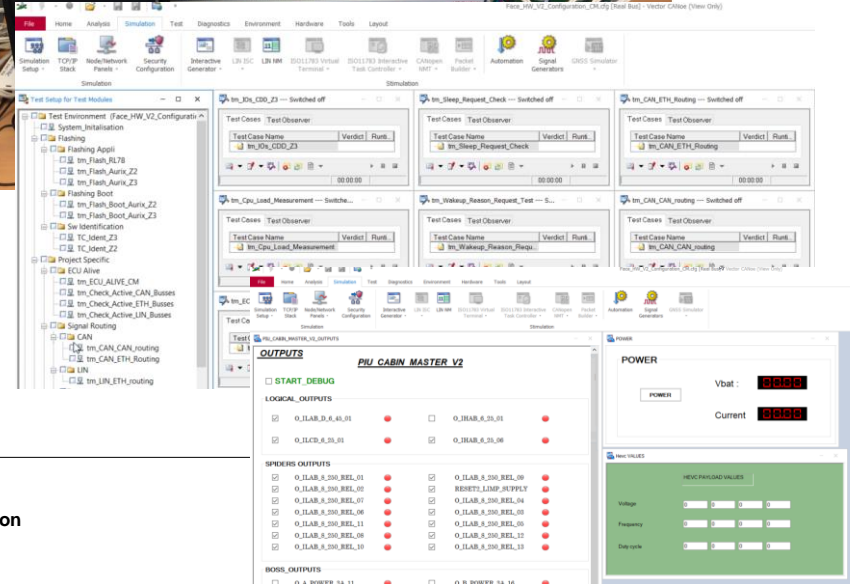
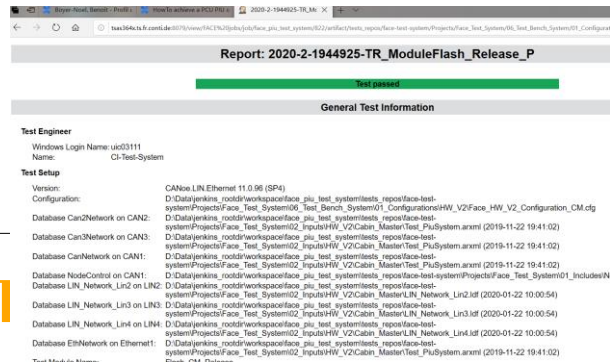


Environnement setup



# Technical View – CFST Tests Developers

- › Wire the board
- › Flash the board
- › Implement tests to validate feature
- › Analyse reports



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# Technical View – Devops

## › Automate Collaboration between integrators

(setup dev environment / non regression tests / review via gerrit)

## › Automate System tests every night

## › Automate Internal Releases

## › Synchronize technically the teams

(Integrators / Architects / POs / HW team / Customer deliveries)

## › Develop tools

(gen ARXML / piuChecker / jira Ticket / Sw id ...)

The screenshot shows the Gerrit 'My Reviews' interface. It lists 'Outgoing reviews' (e.g., RSAFACEPC-2443 Add new Multitask\_Coming wizard), 'Incoming reviews' (e.g., RSAFACEPC-2159 ReleaseNote for 10Jan2020), and 'Recently closed' reviews. Below the list is a table of jobs for the Gerrit test server, showing job names like 'face-cockpit\_test', 'face-rngliby\_tests', and 'face\_full\_release\_code\_generator', along with their last success and failure times and durations.

The photo shows a hardware test bench with a Raspberry Pi, various cables, and a power supply unit on a desk.

### Artifact Repository Browser

The screenshot shows an 'Artifact Repository Browser' with a search bar and a tree view. The tree view shows a folder structure: 'Tree Simple' > 'i\_bs\_faceInternals\_generic\_I' > 'Boot' > 'CFST\_Report' > 'CI' > 'CanADPVM'.

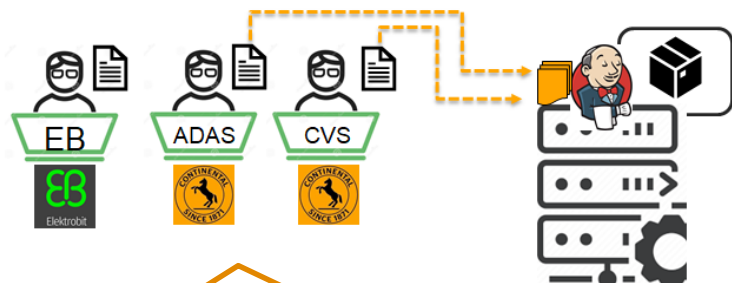
The screenshot shows a CI/CD dashboard for 'PACE System'. It includes a 'Build out' section with 'Apply changes' and 'Cancel changes' buttons, and a 'Run Test Suite' section with 'Apply changes' and 'Cancel changes' buttons. The dashboard displays statistics: 40 Run #, 959 Testcases #, and 9,597 Test Cases #. Below these are three charts: 'PACE System Test Module Exec Time group by run\_id', 'PACE System Test Case Failed Exec Time group by run\_id', and 'PACE System Test Module Exec Time group by run\_id'. A heatmap shows the execution status of various test cases across multiple runs.

## Use Case 2

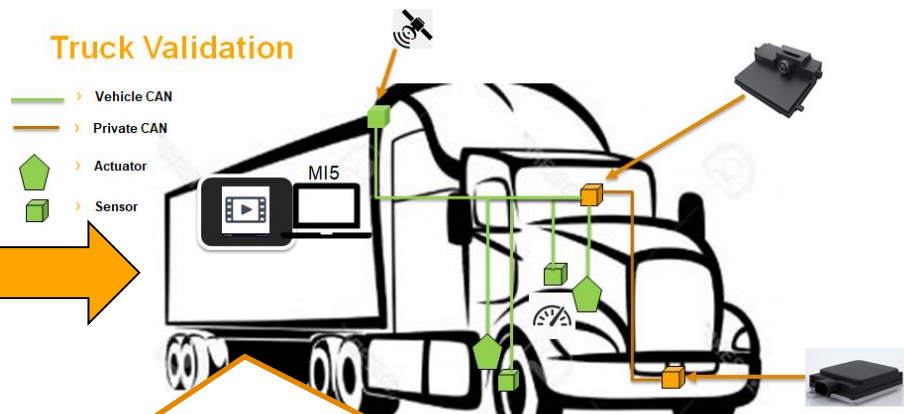
### › OEM Collaboration on HW & Algos

- › During 2 years R&D on new sensors architecture in the truck

## Software development



## Truck Validation

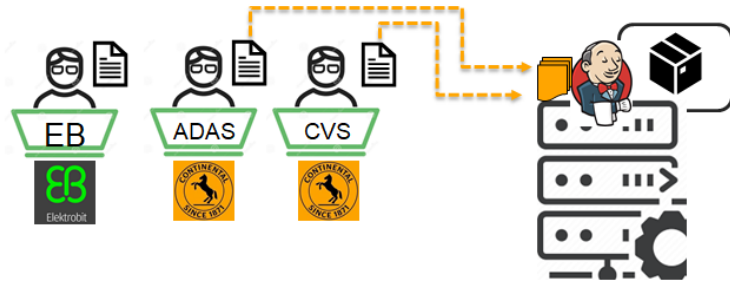


**Elektrobit** provide Autosar Basic Softwares and tools

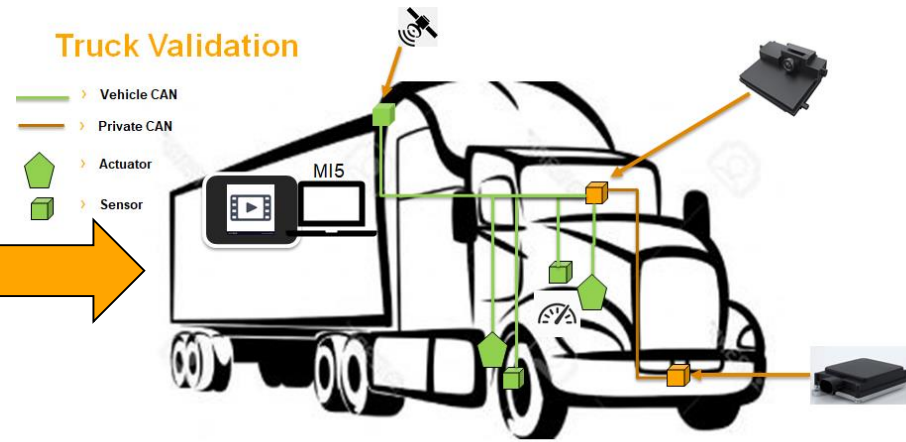
- **ADAS teams** provide a **Base SW** per ECU
  - A radar (ARS430)
  - A camera (MFC525)
- **CVS teams** provide **Specific SW** from Base SW per ECU
  - A radar (ARS430K20)
  - A camera (MFC525CM10)
- All these software are tested **separately** via Conti Continuous integration Tools

- CVS vehicle test teams
  - **Flash** Conti ECU with Specific SW
  - **Install** Conti ECU in vehicle
  - **Calibrate** Conti ECU in vehicle
  - **Drive** the vehicle to **validate** Specific SW and **collect** recordings
- All these actions are done manually for each version

## Software development



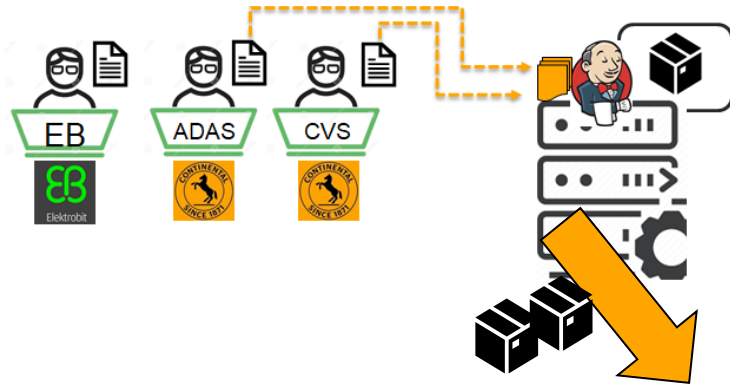
## Truck Validation



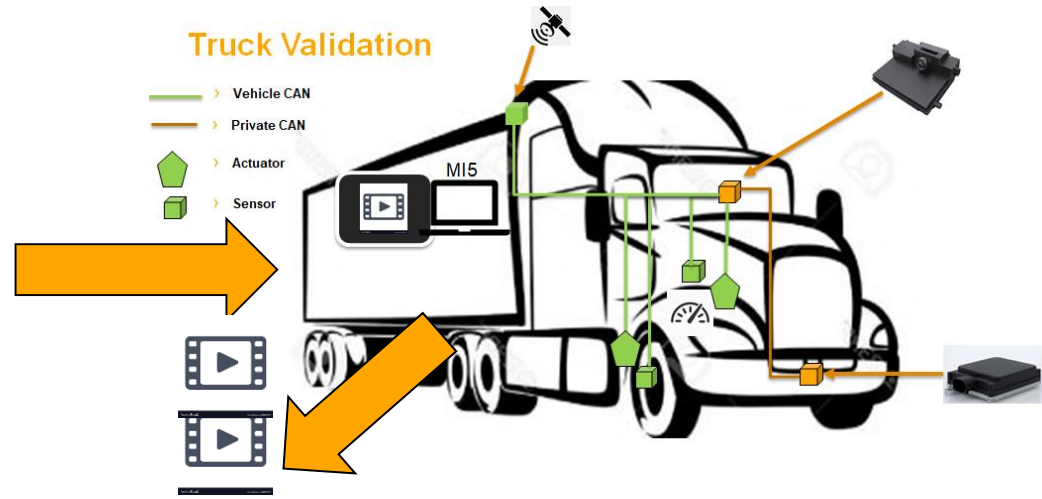
### • HOW TO

- Spare time and money with vehicle validation
- Automate software validation
- Repeat & Analyse errors
- Simulate system weakness to validate safety behaviour

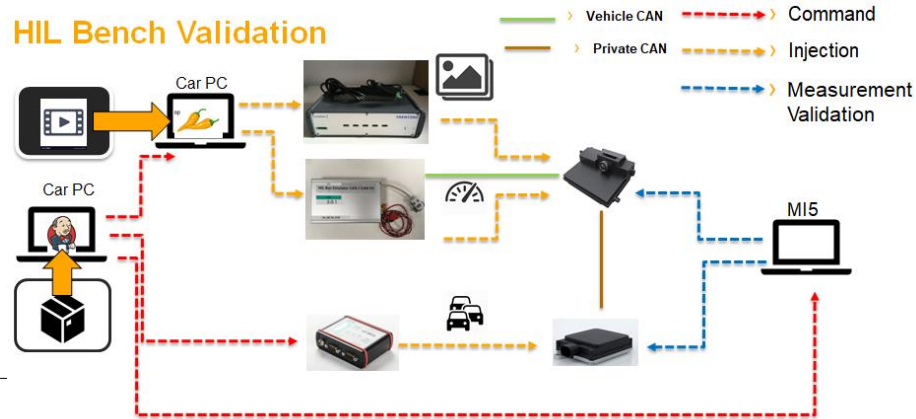
# Software development



# Truck Validation



# HIL Bench Validation



Space for sender information  
Internal

23 February 2021  
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