

PIONEERING
NEW MOBILITY

CONIX HIL SOLUTION

For Open and Closed Loop Validation

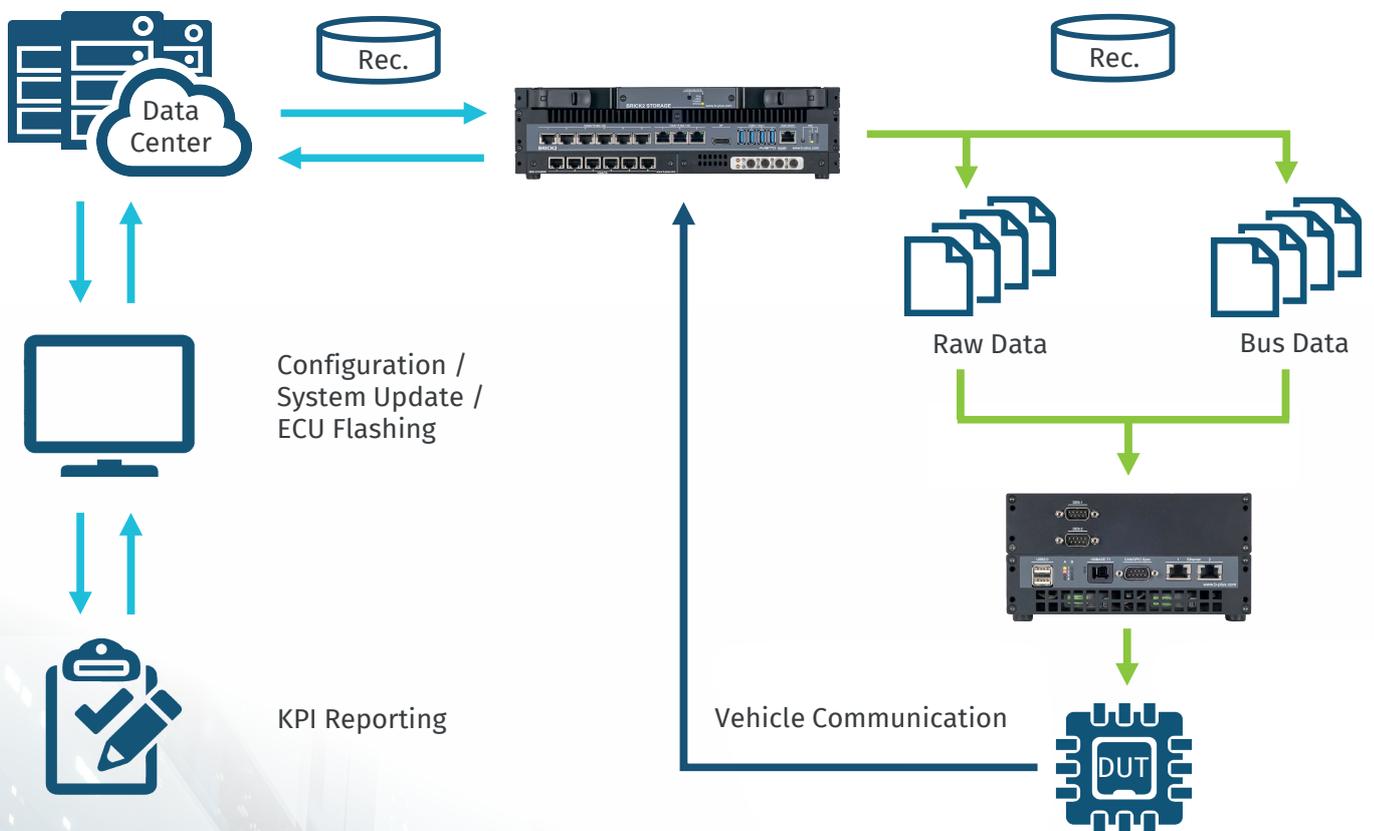


+ CONiX HiL Solution

For Open and Closed Loop Validation

The CONiX HiL Solution offers you modular software and precise hardware in combination with highly qualified development teams

- + for low bandwidth playback on a development table
- + for high bandwidth and automated operation of fully equipped HiL racks
- + for 24/7 use



+ Hardware Building Blocks

A variety of HiL interfaces for time-monitored and intelligent feeding as well as tapping of ADAS/AD raw, measurement and vehicle bus data



b-HiL



HDILink



HDTI

- + We provide scalable HiL interfaces for camera, radar and lidar-based sensor data. Get the data into the ECU exactly, synchronized, with lowest latency, and highest data rate.
- + We support the latest interface technologies, such as CSI-2, GMSL and FPDLink, as well as the associated vehicle bus and network interfaces.
- + Our hardware interfaces support ECU prototypes as a circuit board to the finished control unit and from a single sensor to a domain controller. Thus, we cover everything from the simple HiL on the developer's desk to the colocation data center approach, depending on your needs.
- + In a hybrid approach, we integrate part of the sensor already in hardware and simulate it there.
- + For seamless integration we provide a properly defined API to the simulation software.



Data Center quality replay platforms

- + DATAlynx ATX4
- + BRICK

For a holistic infrastructure, you need high-performance HiL players to buffer and deliver the continuous stream of data consistently and without interruption. This is where our proven DATAlynx and BRICK platforms come in.



Data Distribution

- + EDSwitch

To distribute the data efficiently in a time-synchronized network, we offer EDSwitch of the 100G Ethernet class with integrated XTSS TimeSync Stack for a low latency network.

- + 100G Connectivity

Additionally, we offer the full package of connectivity cables including 100G Smart NICs and Connectivity Cables.

+ A selection of our Software Building Blocks

For Open and Closed Loop Validation

ReproUnit Manager

Efficient management of the individual ReproUnits is the core element for maximum utilization of the individual HiL stations. This flexible module ensures optimal processes throughout the entire workflow, both on the ReproUnit and on the management interface.

HiL Player

The HiL Player plays a central role in complex HiL systems. It controls the playback of recordings, receives the signals and forwards the correct data to the control unit.

ECU/DUT Handling

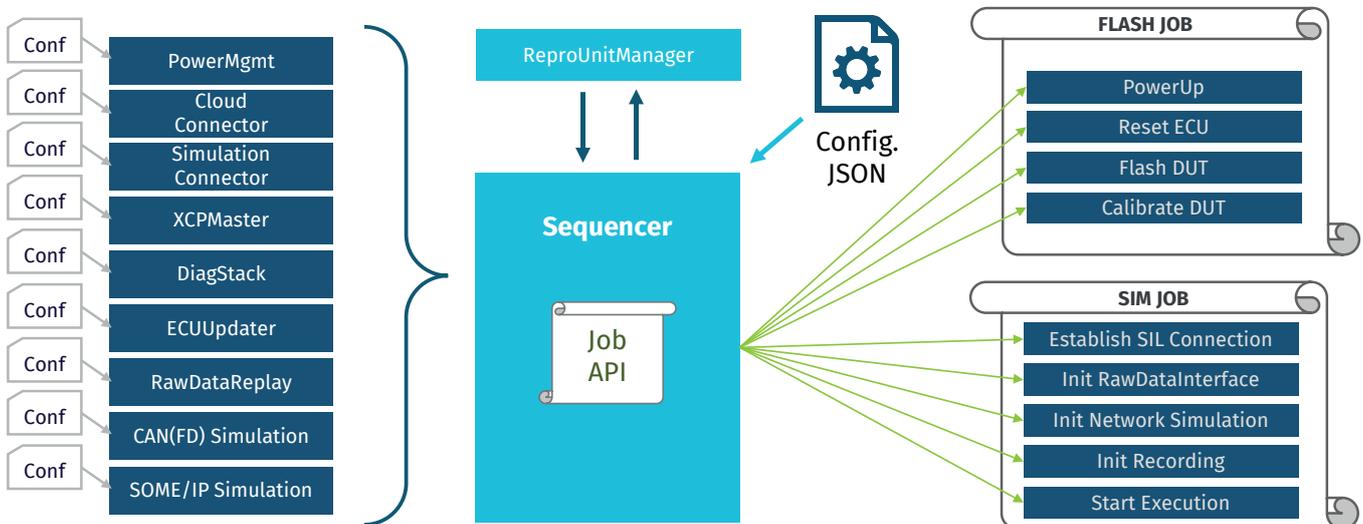
With the Building Blocks around the DUT, such as XCP, DoIP, ECU Updater or various residual bus simulators, we can react quickly and comprehensively to new requirements in the projects.

Time Synchronization

With the help of our TSN stacks, e.g., according to the IEEE 802.1AS profile, our solution ensures correct time bases and synchronous playback.

Integration

Connection to existing simulation software, use of 3rd party hardware and integration into existing HiL systems are the most important aspects of our CONiX HiL Solution.





At a Glance: **Characteristics** and **Benefits** of our CONiX HiL Solution



Scalability

- + Supports both simple and complex test configurations
- + Adapts to changing needs and technological advances



High speed and efficiency

- + Enables efficient sequential and parallel test runs in real-time
- + Enhances throughput and accelerates the testing process



Flexibility

- + Supports configurable open-loop and closed-loop tests
- + Accommodates different hardware components and sensor models



Integration

- + Integration with existing development and test environments
- + Compatibility with other tools and systems



Hardware

- + Out-of-the-box inject hardware
- + Raw data interfaces: CSI-2, GMSL2, FPD-Link III
- + Suitable for high-performance AD platforms



Connectivity

- + Remote access capabilities
- + Support for automotive communication protocols and standards
- + CONiX HiL solution interfaces with various protocols



High data throughput

- + Robust support for high data rates
- + Essential for ADAS/AD simulations
- + Seamless handling of substantial data volumes



Compatibility & interoperability

- + Seamless compatibility with range of data center HW and SW
- + Effortless interoperability with external systems



Access to latest Technologies

- + Take advantage of data center technology innovations
- + Provides interaction with cutting-edge simulation capabilities
- + Open or expandable hardware setup



Expert teams

- + Minimization of project escalation and validation costs
- + Achieving quality through a team of highly skilled engineers
- + Time savings due to perfected technology right from the start

+ Reap the advantages of a hardware and software solution expertly tailored to suit your unique HiL application

b-Hil Reinjection

Designed for **developer workspaces**, offering early access to hardware in the loop and sensor data re-injection for improved software reliability



CONiX HiL Integrator

Provides a compact **19" rack-based** development environment with powerful hardware, integrated raw data interface, flexible integration options, configurable workflows, and support for various protocol stacks to adapt to ECU characteristics or cloud/data center platforms



CONiX HiL Racksystem

A **highly scalable** and automated 19" rack solution that minimizes maintenance, ensures 24/7 high data rate performance, and offers optional packages, making it ideal for sensor and ECU validation applications

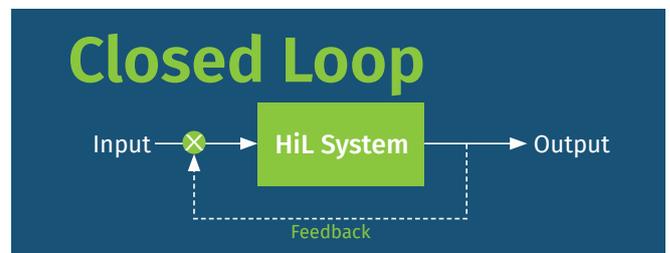


+ Use Cases

Open vs. Closed Loop Validation



- + Scene origin is usually a recording of a testdrive.
- + Device under test (DUT) has very limited influence on the reproduced scenes.
- + Time exactness is the most important thing whereas latency doesn't really matter.



- + Data/scene is generated with a simulation tool.
- + DUT influences the scene generator (e.g., speed, brakes, steering angle).
- + Latency is one of the key figures.

✦ Use your time efficiently and focus on the development of your ADAS/AD functions

Raw data interfaces: **CSI-2, GSML2, FPDLink III**

Seamless integration into customer processes

Synchronous playback of raw sensor data, vehicle bus and network information

Hardware is suitable for **powerful AD platforms**

Supports common sensor technologies (radar, lidar and camera)



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