

UDS WHISPERER

by efs

DIAGNOSTICS
WITHOUT
LEASHES

INTRO

A 32-bit embedded diagnostic dongle that connects to any vehicle via OBD. It executes UDS sequences autonomously, logs data and manages ECU flashing. No laptop, no specialist tester, no manual intervention.

KEY FACTS

- Scripts run on-device. No host software required during execution.
- Operates stand-alone in a parked vehicle for hours or days.
- Connects to cloud backends, HIL systems and PC tools via the same device.
- Fits in a coat pocket. Survives -40°C to $+105^{\circ}\text{C}$.
- Supports ISO 14229-1 (UDS), ISO 15765-2, ISO 22900-2, ISO 13400-2, SAE J1979/J1939 out of the box.

THE CHALLENGE

Diagnostic tooling in development and fleet operations is too heavy, too slow and too manual.

WHERE TEAMS LOSE TIME

- UDS sequences executed manually. Not reproducible across the fleet.
- No lightweight option for stand-alone, in-vehicle data capture without a running PC.
- Remote diagnosis requires complex VPN and toolchain setup - if even possible.

THE SOLUTION

→ UDS WHISPERER

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The UDS Whisperer handles ECU communication, persistent data logging and automated flashing directly in the vehicle. At the critical handover point between virtual and real-world validation. Three operating modes: stand-alone, direct (local PC, Wi-Fi, USB, BLE) and cloud-connected.

Vehicle OBD port at top feeding into the UDS Whisperer block

- (Session Control
- ISO-TP
- JSON Scripting
- Logging
- Flashing
- Secure Boot)

Three output paths:

USB-C → PC/HIL; Wi-Fi/BLE → CLOUD
ZIGBEE/2.4 Ghz → FLEET/MOBILE

KEY CAPABILITIES I

01. AUTOMATED UDS SEQUENCING

JSON-based scripts define diagnostic routines and run autonomously on-device, compliant with ISO 14229-1, ISO 15765-2 and ISO 13400-2 (DoIP). No host software required during execution.

02. PERSISTENT DATA LOGGING

Cyclic DID/PID capture written to internal flash and microSD, triggered by events or thresholds. Multi-gigabyte capacity for extended fleet monitoring.

KEY CAPABILITIES II

03. AUTOMATED ECU FLASHING (FIRE & FORGET)

The complete flash sequence runs without operator involvement: Boot-loader, Application, Dataset. VIN and confirmed software version are reported automatically to the backend.

04. TOOLCHAIN INTEGRATION

ISO 22900-2 D-PDU API for standard tools, plus a CAN/UDS bridge over TCP for ADTF, CASSANDRA and HIL environments. Open scripting for Python and CI/CD.

SPECIFICATIONS & USE CASES

TECHNICAL SPECIFICATIONS

DIAGNOSTIC PROTOCOLS

- ISO 14229-1 (UDS)
- ISO 15765-2 (ISO-TP)
- ISO 13400-2 (DoIP)
- SAE J1979
- SAE J1939

TOOL INTERFACE

- ISO 22900-2 D-PDU API
- SAE J2534 on request

CONNECTIVITY

- Wi-Fi (STA/AP/Mesh)
- BLE
- Zigbee
- USB-C
- 2.4 GHz direct

OPERATING RANGE

- 5–40 V DC
- -40 °C to +105 °C

SECURITY

- Secure Boot
- AES/SHA/RSA/HMAC
- OTA signature verification

STORAGE & FORMATS

- Internal Flash + microSD
- .odx, .bin, .hex

USE CASE

REMOTE DIAGNOSIS (FIELD & WINTER TESTING)

The dongle stays in the vehicle on location. A remote engineer reads fault codes and captures data via the company network or mobile hotspot.

USE CASE

FLEET COMMISSIONING

Arriving vehicles are plugged in once. VIN, software version and pending flash are handled automatically and reported to the backend.

USE CASE

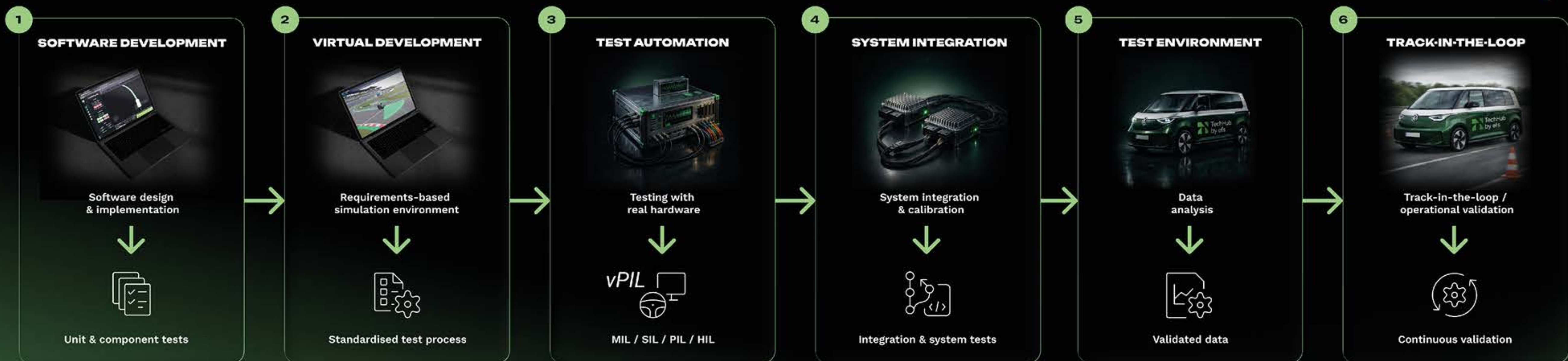
HIL AND TEST BENCH INTEGRATION

Acts as a CAN/UDS bridge between the HIL system and the ECU under test. Standards-compliant physical layer via TCP and D-PDU API.





END-TO-END VERIFICATION WITH IDENTICAL TESTS AND CONSISTENT DATA FLOW



MODEL-BASED SYSTEMS ENGINEERING

AI METHODS AS ENABLERS

(test design, anomaly detection, data analytics, predictive analytics, scenario generation)



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