DolP

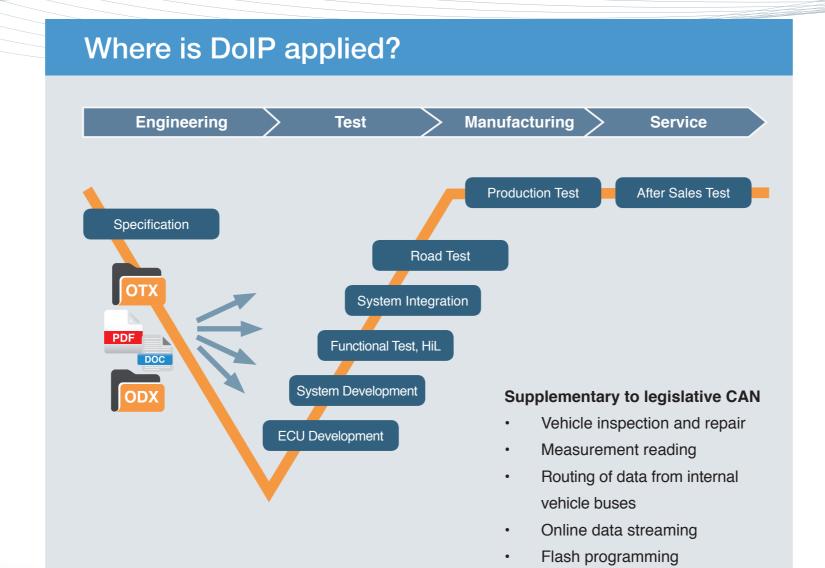
Diagnostic Communication over Internet Protocol

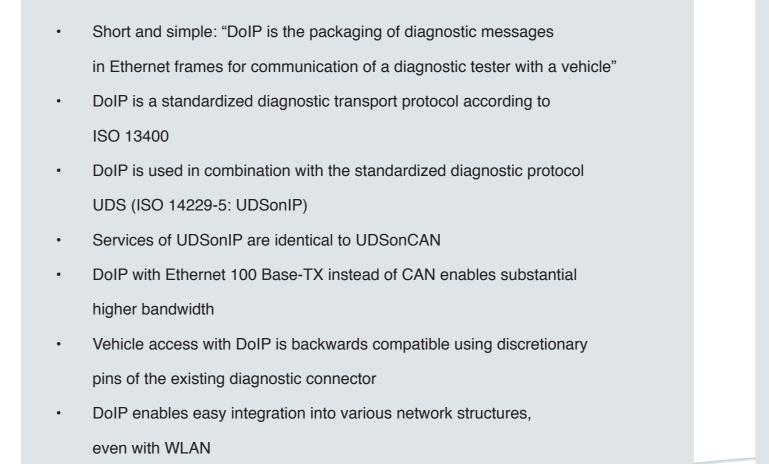


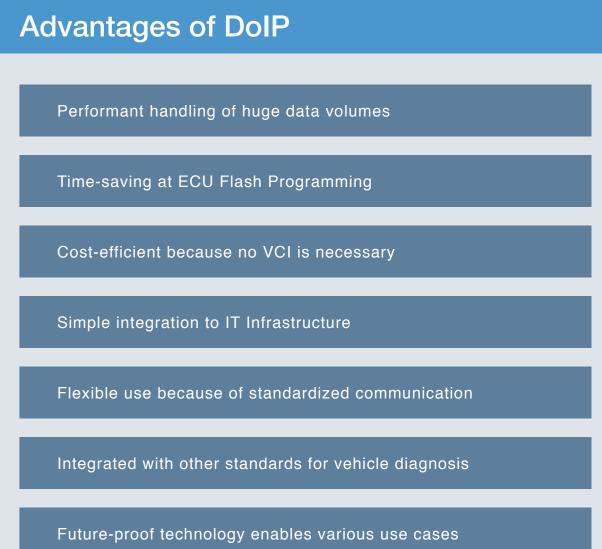
Automotive Data and Connectivity Safety **Accessibility Efficiency Environment** Increasing interconnection of vehicles and their environment

Driving assistance and infotainment systems cause huge data volume

Increasing time for flash programming at production line and after-sales service







DoIP in Combination with other Standards

DoIP as a performant and flexible vehicle access

OTX (Open Test sequence eXchange)

- DoIP extensions in preparation

MCD-3D API

- ISO 22900-3
- ASAM MCD-3D 3.0 required

D-PDU API

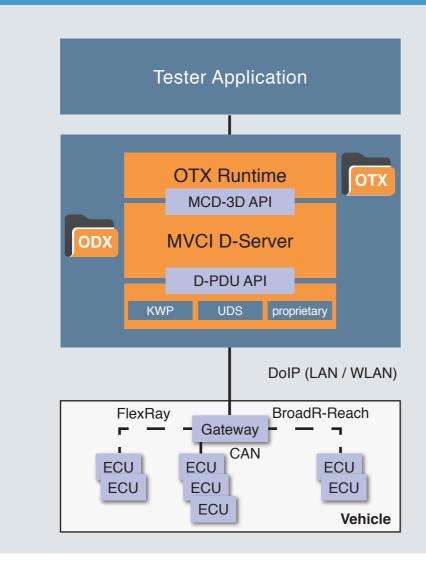
- ISO 22900-2
- DoIP specified as amendment

UDS (Unified Diagnostic Services)

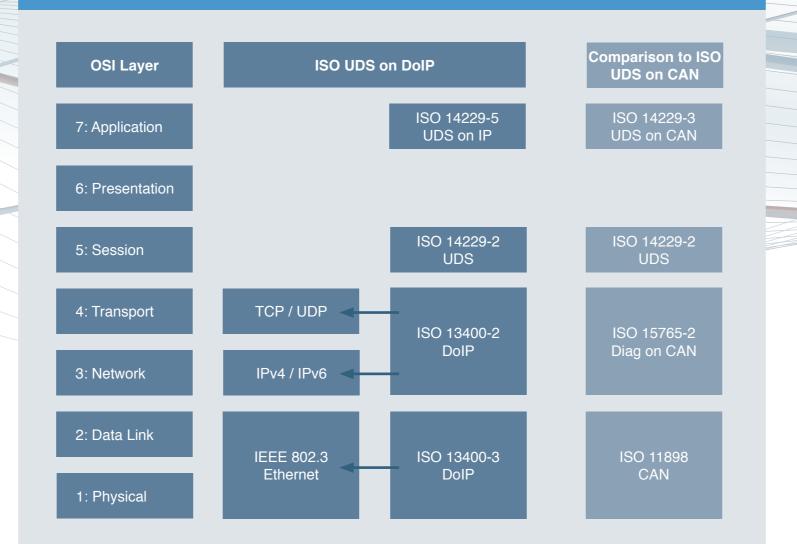
ISO 14229-5 for DoIP

WWH-OBD

ISO 27145 for DoIP and CAN



DoIP at the OSI Reference Model



The DoIP Standard: ISO 13400

What is DoIP?

Part 1 – General information and use case definition

Part 2 – Transport protocol and network layer services

- Assignment of IP address
- Vehicle search
- Link connection
- Status information
- Data routing to sub buses
- Message types
- Error handling

Part 3 – Wired vehicle interface based on IEEE 802.3

Part 4 - Ethernet-based high-speed data link connector

Part 5 – Conformance test specification

DoIP at D-PDU API Standard

Two Use Cases:

With virtual modules: Direct access of tester to vehicle (=MVCI)

Different combination modes / network topologies:

- Single tester and single ECU (DoIP Entity)
- Single tester and single vehicle (DoIP Vehicle and DoIP Group)

With physical module: Real MVCI which supports DoIP protocol

- Single tester and multiple vehicles (DoIP Collection and DoIP Group)
- Multiple tester and single / multiple vehicles

Specification of vehicle identification (discovery) Definition of DoIP specific Communication Parameter (ComParams) Description of DoIP socket and protocol handling

DoIP Communication Principles

Diagnostic tester communicates with vehicle via Gateway ECU

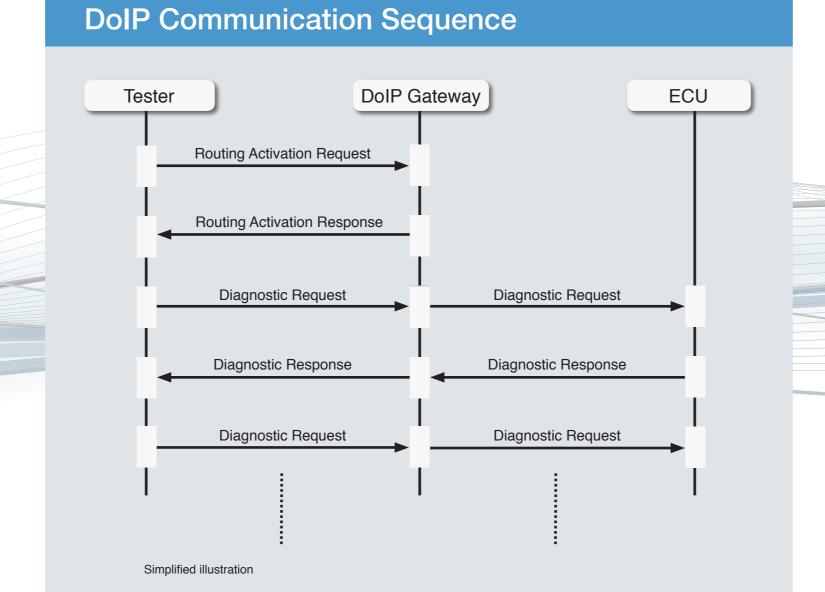
- Ethernet Activation Line enables Ethernet port of the Gateway
- Gateway is routing the message to sub buses CAN / FlexRay / MOST

Link connection

- Configuration of the Gateway with valid IP address (DHCP)
- Tester sends Vehicle Identification Request (UDP)
- Gateway responses with Vehicle Announcement Message (UDP), contains VIN, Gateway address etc.

Diagnostic commands

- Routing Activation Request: Command for routing of subsequent diagnostic messages to ECUs behind the Gateway (TCP)
- Diagnostic communication based on UDS (Unified Diagnostic Services)



Message Structure

DoIP Message

DoIP Payload Data (up to 4 GByte)

Diagnostic Services (UDS)

Ethernet Frame

Ethernet Payload Data (42 – 1500 Byte)

DoIP Message / Segment of DoIP Message

DoIP Vehicle Access

Ethernet pin assignment at OBD connector



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

☐ ISO 15031 signals ☐ DoIP signals OEM specific CAN signals





