



Automated Protocol Conformance/Compliance Testing with CANoe

For Ethernet (TC8), J1939, LIN, Smart Charging Communications, Car2x, CANopen, and Diagnostics

Agenda

► **CANoe, vTESTstudio, Network Interfaces and the VT System**

CANoe.Ethernet (TC8)

CANoe.J1939 (J1939-82)

CANoe.LIN (LIN Slave)

CANoe.SCC (Smart Charging Communications)

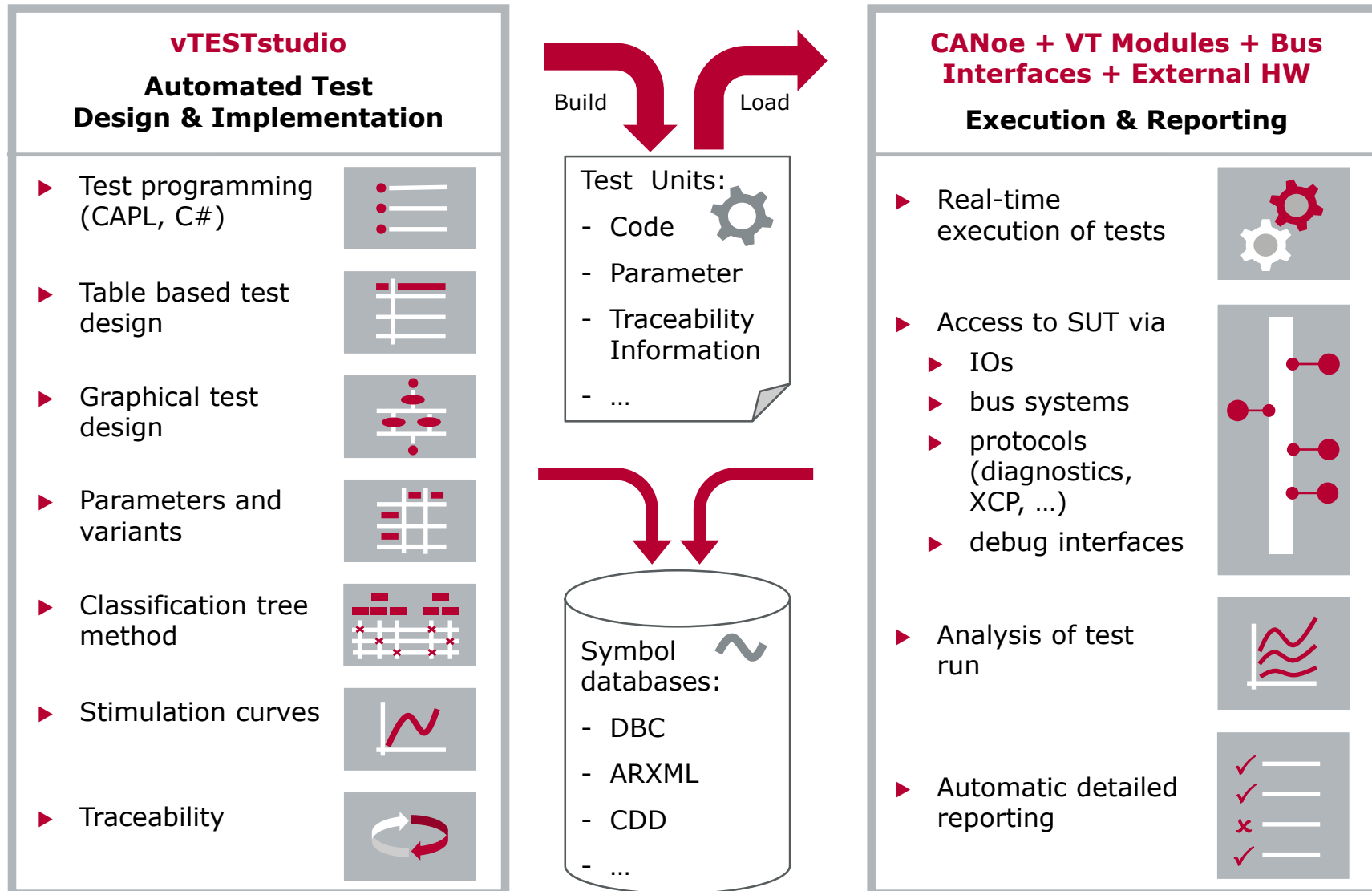
CANoe.Car2x (Scenario Simulation)

CANoe.CANopen

CANoe.DiVa (Diagnostic Integration and Validation Assistant)

Application and hardware requirements

The Vector Testing Toolset



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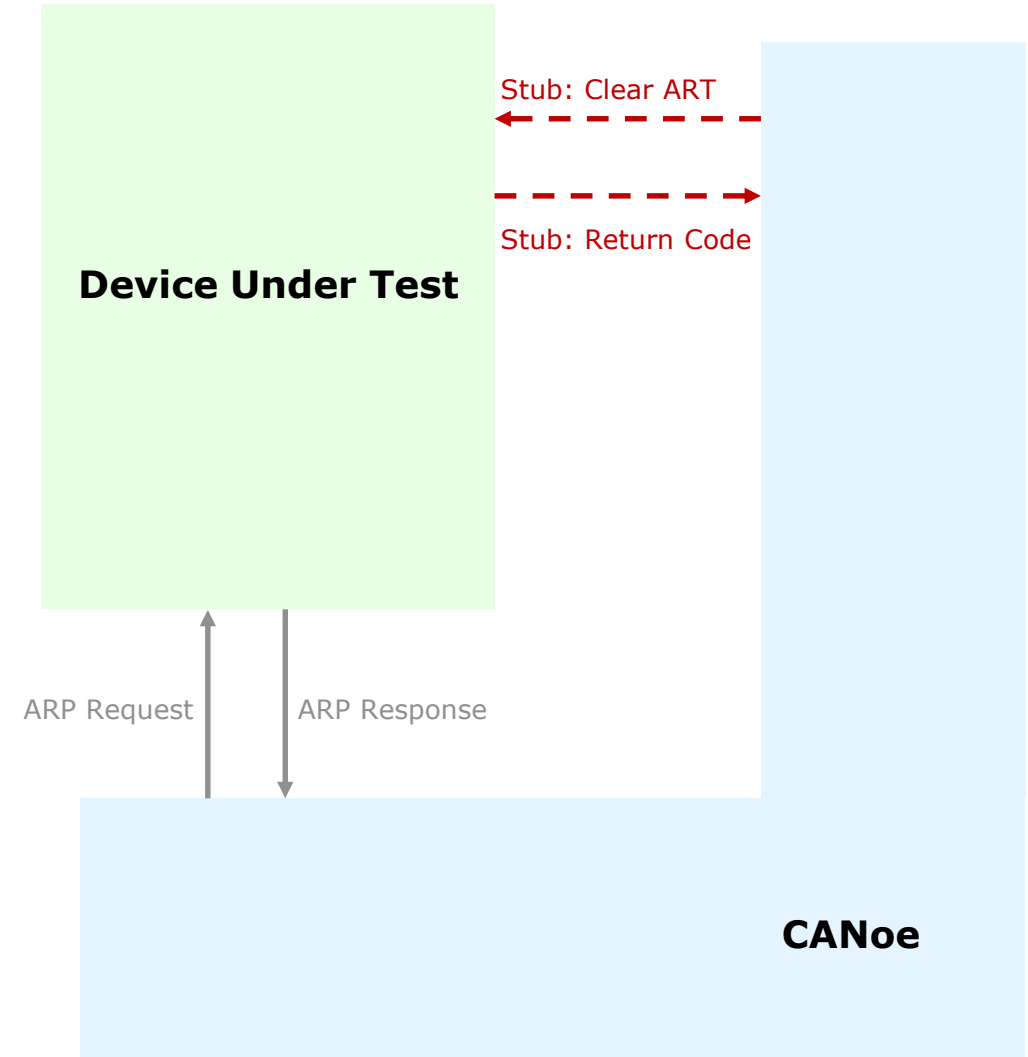
CANoe.DiVa (Diagnostic Integration and Validation Assistant)

Application and hardware requirements

Open Alliance Tech Committee 8 (TC8) Ethernet Conformance



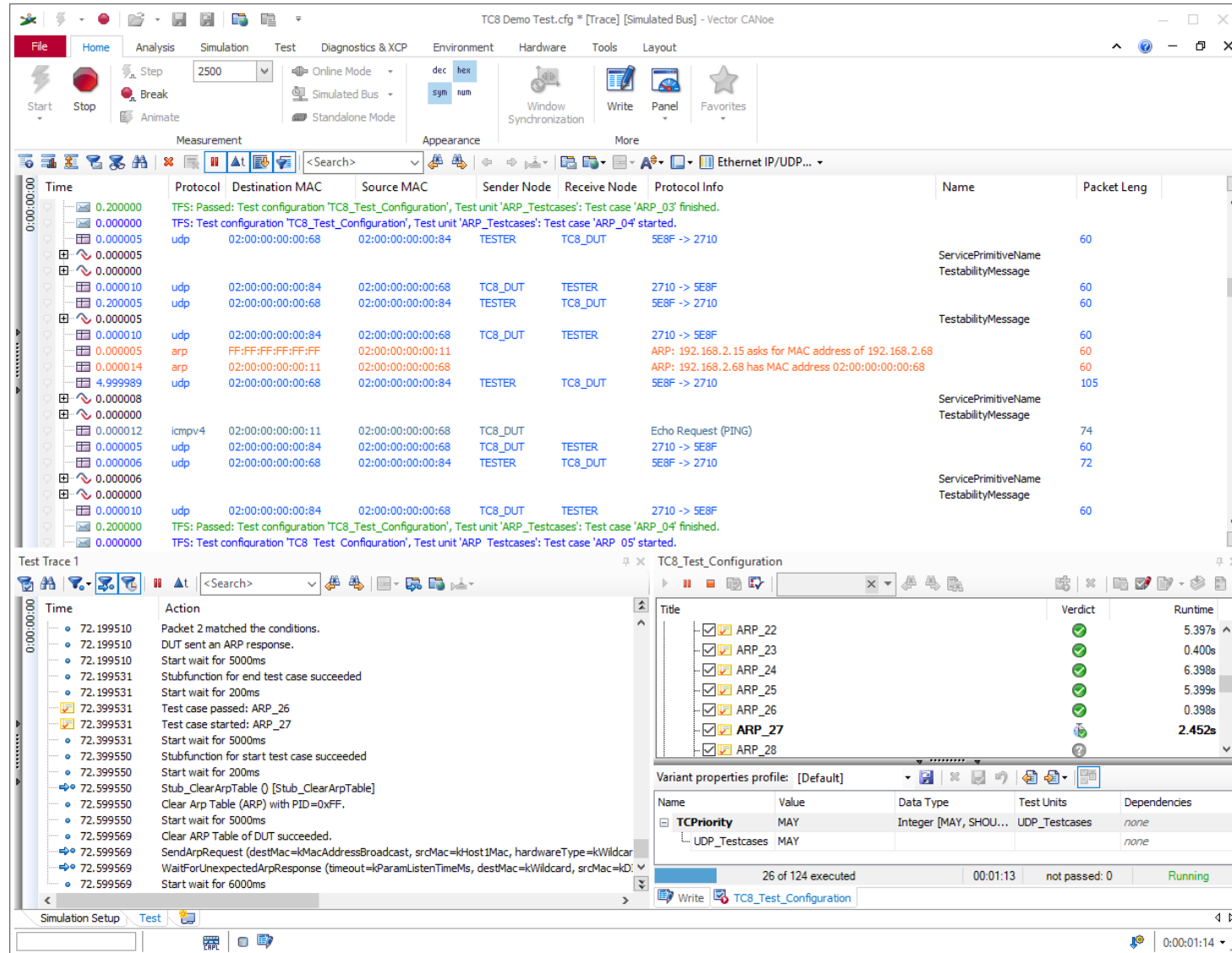
- ▶ Test Procedure defined in vTESTstudio (required)
 - ▶ easily configurable via Test Parameters
 - ▶ easy selection of Test Cases
 - ▶ different Test Variants (must, may)
- ▶ Upper Tester Stub Functions
 - ▶ allows individual implementation
 - ▶ Autosar Testability Protocol as default implementation
 - ▶ sample of non-standard Service Primitives
- ▶ Includes a Golden Simulated Node
- ▶ Delivered as Demo with CANoe.Ethernet
 - ▶ allows continuous testing during development



Current release of CANoe

	Test Group	CANoe 12.0 SP2
Layer 1	Physical Layer	partially
	TC8 Switch Tests	✓
Layer 2	TC11 Switch Tests	
	ARP (Address Resolution Protocol)	✓
	ICMPv4	✓
Layer 3	IPv4	✓
	Dynamic IPv4 Link Local Address	✓
	UDP (User Datagram Protocol)	✓
Layer 4	TCP (Transmission Control Protocol)	✓
	DHCPv4	✓
Layer 7	SOME/IP Server	✓
	SOME/IP ETS	✓

TC8 Example Configuration



The screenshot displays the Vector CANoe software interface, specifically the 'TC8 Demo Test.cfg * [Trace] [Simulated Bus] - Vector CANoe' window. The interface is divided into several sections:

- Top Bar:** Contains tabs for File, Home, Analysis, Simulation, Test, Diagnostics & XCP, Environment, Hardware, Tools, and Layout. Below these are various icons for simulation control (Start, Stop, Break, Animate) and measurement settings (Step: 2500, Online Mode, Simulated Bus, Standalone Mode).
- Measurement Section:** Includes a search bar and a list of measurement items. The 'Ethernet IP/UDP...' item is selected.
- Trace Table:** A table showing network traffic. The columns are Time, Protocol, Destination MAC, Source MAC, Sender Node, Receive Node, Protocol Info, Name, and Packet Length. The trace shows various UDP and ARP packets, including test case results like 'TFS: Passed: Test configuration 'TC8_Test_Configuration', Test unit 'ARP_Testcases': Test case 'ARP_03' finished.'
- Test Trace 1:** A section showing the execution of test cases. It includes a list of actions and their corresponding times. The actions include 'Packet 2 matched the conditions.', 'DUT sent an ARP response.', 'Start wait for 5000ms', 'Stubfunction for end test case succeeded', 'Start wait for 200ms', 'Test case passed: ARP_26', 'Test case started: ARP_27', 'Start wait for 5000ms', 'Stubfunction for start test case succeeded', 'Start wait for 200ms', 'Stub_ClearArpTable () [Stub_ClearArpTable]', 'Clear Arp Table (ARP) with PID=0xFF.', 'Start wait for 5000ms', 'Clear ARP Table of DUT succeeded.', 'SendArpRequest (destMac=kMacAddressBroadcast, srcMac=kHost1Mac, hardwareType=kWildcard)', 'WaitForUnexpectedArpResponse (timeout=kParamListenTimeMs, destMac=kWildcard, srcMac=kD...', and 'Start wait for 6000ms'.
- TC8_Test_Configuration:** A section showing the configuration for the test. It includes a table of test cases with columns for Title, Verdict, and Runtime. The test cases are ARP_22, ARP_23, ARP_24, ARP_25, ARP_26, ARP_27, and ARP_28. The verdict for ARP_27 is 'Failed' (red X), and its runtime is 2.452s. The other test cases have a 'Passed' (green checkmark) verdict.
- Variant properties profile:** A table showing the configuration for the test. It includes columns for Name, Value, Data Type, Test Units, and Dependencies. The properties are TCPriority (MAY, Integer [MAY, SHOU...], UDP_Testcases) and UDP_Testcases (MAY, none).
- Bottom Bar:** Includes a 'Simulation Setup' button, a 'Test' button, and a status bar showing '26 of 124 executed', '00:01:13', 'not passed: 0', and 'Running'.

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CANoe.LIN (LIN Slave)

CANoe.SCC (Smart Charging Communications)

CANoe.Car2x (Scenario Simulation)

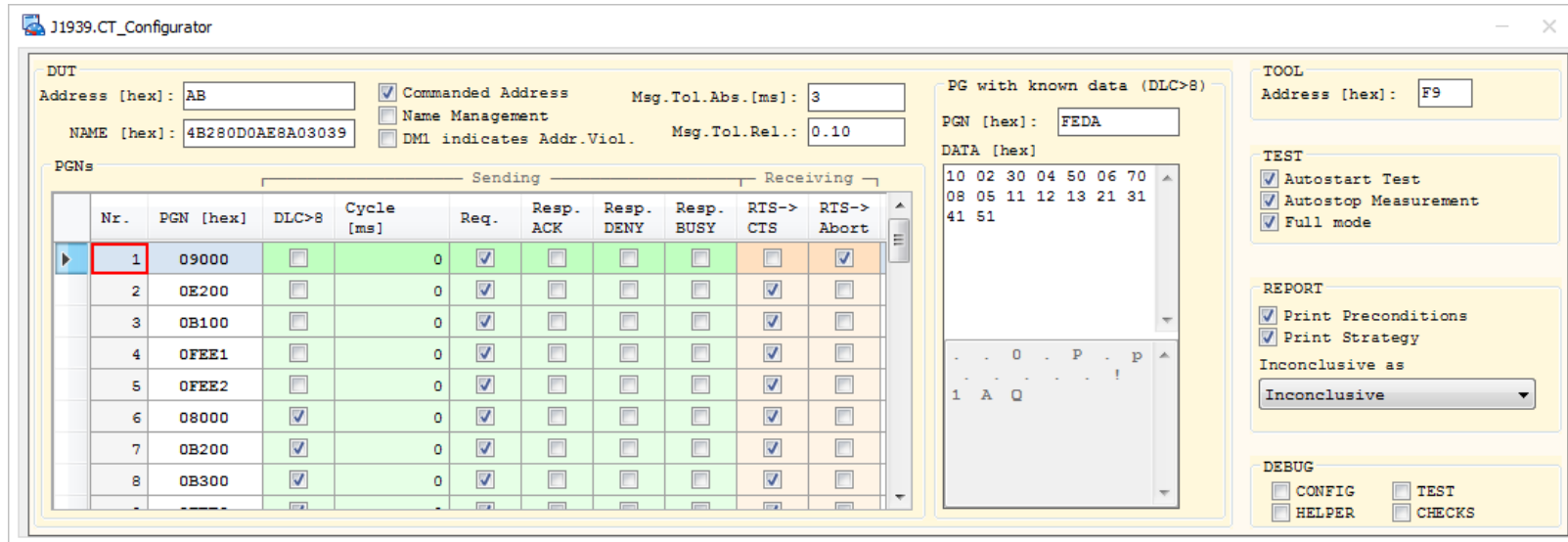
CANoe.CANopen

CANoe.DiVa (Diagnostic Integration and Validation Assistant)

Application and hardware requirements

J1939-82 Compliance Test: 2008 and 2015 specification have been implemented

- Easy configuration with panel:



J1939.CT_Configurator

DUT
 Address [hex]: AB
 NAME [hex]: 4B280D0AE8A03039
☒ Commanded Address
☐ Name Management
☐ DM1 indicates Addr.Viol.
 Msg.Tol.Abs.[ms]: 3
 Msg.Tol.Rel.: 0.10

PGNs

Nr.	PGN [hex]	DLC>8	Cycle [ms]	Req.	Resp. ACK	Resp. DENY	Resp. BUSY	RTS-> CTS	RTS-> Abort
1	09000	<input type="checkbox"/>	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	0E200	<input type="checkbox"/>	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	0B100	<input type="checkbox"/>	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	0FEE1	<input type="checkbox"/>	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5	0FEE2	<input type="checkbox"/>	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6	08000	<input checked="" type="checkbox"/>	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7	0B200	<input checked="" type="checkbox"/>	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8	0B300	<input checked="" type="checkbox"/>	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

PG with known data (DLC>8)
 PGN [hex]: FEDA
 DATA [hex]:
 10 02 30 04 50 06 70
 08 05 11 12 13 21 31
 41 51

TOOL
 Address [hex]: F9

TEST
☒ Autostart Test
☒ Autostop Measurement
☒ Full mode

REPORT
☒ Print Preconditions
☒ Print Strategy
 Inconclusive as
 Inconclusive

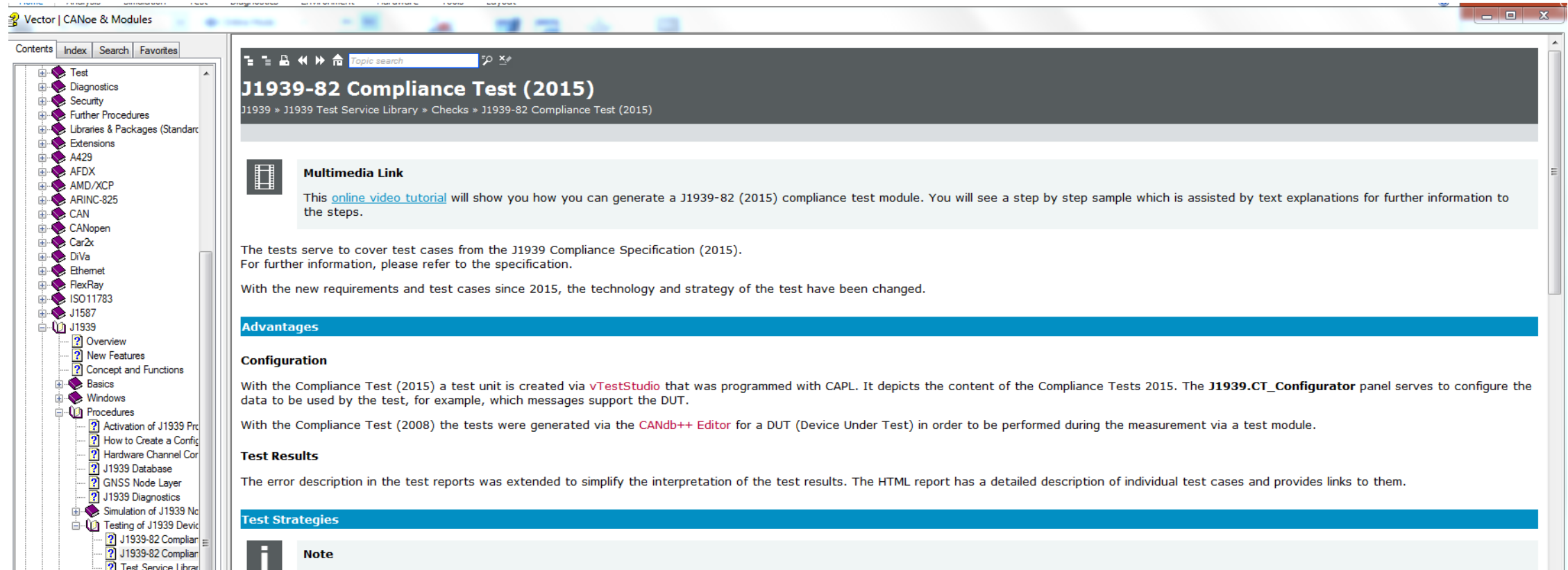
DEBUG
☐ CONFIG ☐ TEST
☐ HELPER ☐ CHECKS

- Well structured report:

Name	Verdict
J1939 Compliance Tests Runtime [1]	✓
J1939 Compliance Test Tables [1]	✓
Table A3	?
Table A4 [1]	✓
1. CTC_A04_01_MsgTolerance ()	✓
CTC_A04_02_CAN2B ()	?
CTC_A04_03_PGNReceivePrioI...	?
CTC_A04_04_EDPinPGN ()	?
CTC_A04_05_DPinPGN ()	?
CTC_A04_06_FilterOnDstAddr ()	?
CTC_A04_07_GlobDestAddr ()	?

1. CTC_A04_01_MsgTolerance ()	Pass
[TC 0x000401] Standard Frame Message Tolerance Verify DUT operation is not adversely affected by CAN Standard Frames on the network	
TEST-PRECONDITIONS - DUT has produce cyclic messages - DUT has to provides requestable messages	
TEST-STRATEGY 1) Generate continuously high frequent low prio standard CAN Frames (11bit) during the test 2) Request all requestable messages from the DUT. They have to be answered correctly 3) Wait 4 times the max. cycle time of all cyclic messages 4) The cyclic messages have to be sent within abs. and rel. message tolerance to identify they are not disturbed	
REFERENCES: J1939-21 - 5.1.3	

J1939 Compliance Test Help Page and Tutorial



Vector | CANoe & Modules

Contents Index Search Favorites

J1939-82 Compliance Test (2015)
J1939 » J1939 Test Service Library » Checks » J1939-82 Compliance Test (2015)

Multimedia Link
This [online video tutorial](#) will show you how you can generate a J1939-82 (2015) compliance test module. You will see a step by step sample which is assisted by text explanations for further information to the steps.

The tests serve to cover test cases from the J1939 Compliance Specification (2015).
For further information, please refer to the specification.

With the new requirements and test cases since 2015, the technology and strategy of the test have been changed.

Advantages

Configuration
With the Compliance Test (2015) a test unit is created via **vTestStudio** that was programmed with CAPL. It depicts the content of the Compliance Tests 2015. The **J1939.CT_Configurator** panel serves to configure the data to be used by the test, for example, which messages support the DUT.

With the Compliance Test (2008) the tests were generated via the **CANdb++ Editor** for a DUT (Device Under Test) in order to be performed during the measurement via a test module.

Test Results
The error description in the test reports was extended to simplify the interpretation of the test results. The HTML report has a detailed description of individual test cases and provides links to them.

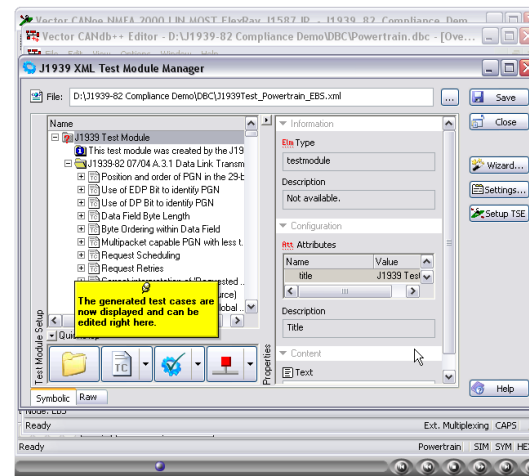
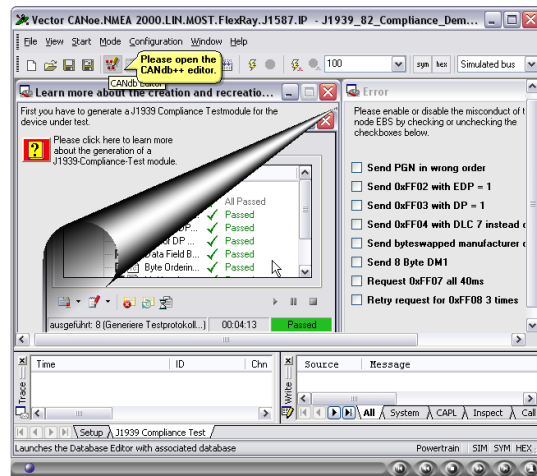
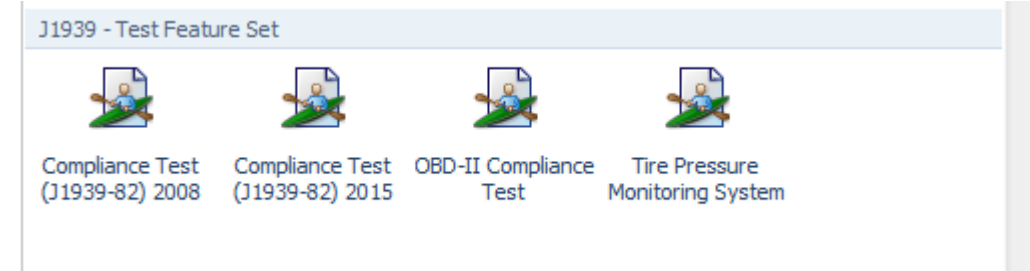
Test Strategies

Note

- J1939-82 Tables A3-A8 and A10 are implemented

Test Feature Set (CANoe)

- ▶ J1939 Test Service Library
 - ▶ J1939 specific test functions and extensions
- ▶ J1939 XML Test Module Manager
 - ▶ Test Management
 - ▶ Configuration of test cases
 - ▶ Generation of compliance tests according to J1939-82
 - ▶ Step by step example how to create compliance tests



J1939-82 0704 A.3.3 Data Link Transmitt Tests - TP B&M

Row	Test Name	Requiring Document	Description	SAE and User Requirements					Date Tested	Pass/Fail	Test Result Comments
				A	B	C	D	E			
1	B&M Protocol B&M is valid (content and format)		Verify correct PGN, data size, and # packets. Verify all match the B&M TP DT from the DUT.						2009-10-16 12:08:40	P	
2	B&M Protocol B&M is sent before Data Packets		Verify DUT sends B&M prior to Data Packets. Verify time between B&M and first Data Packet is between 50 and 200 ms (S 10.1.3).						2009-10-16 12:08:40	P	
3	B&M Protocol Verify no Com_Abort is sent		Verify DUT does not send a TP Com_Abort for any reason for a B&M. Verify DUT ignores a TP Com_Abort received for the PGN of the B&M.						2009-10-16 12:08:42	P	
4	B&M Protocol Only one per Originator at a time		Verify DUT doesn't start a B&M a previous B&M data transferred.						2009-10-16 12:08:43	P	
5	B&M Protocol Simultaneous B&Ms with different Originators		Verify DUT doesn't start a B&M a previous B&M data transferred.						2009-10-16 12:08:45	P	
6	Transport Data Packets content correct		Verify first data byte is sequence number. Verify remaining 7 bytes are correct data for packet.						2009-10-16 12:08:45	P	
7	B&M Transport Data Packets sent in ascending sequential order		Verify DUT sends the TP Data Packets for B&M in sequential order. Verify the first TP DT packet is sequence number = 1.						2009-10-16 12:08:46	P	
8	AS Transport Data packets (PGN 60160) frame size 11 bytes Data Field		Verify DUT sends packets with 8 bytes						2009-10-16 12:08:46	P	

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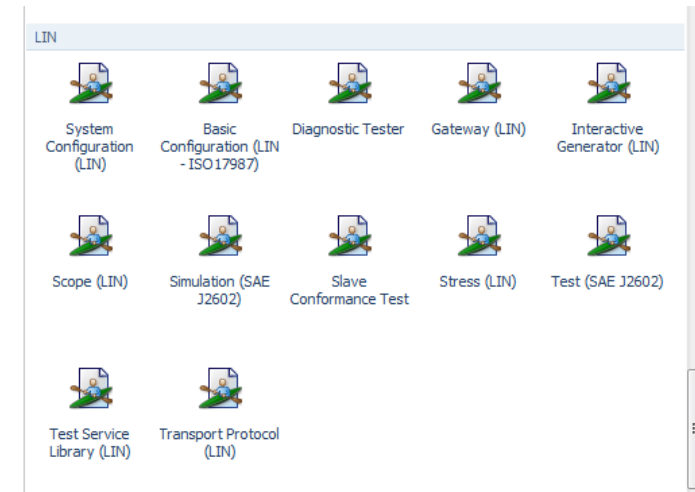
CANoe.CANopen

CANoe.DiVa (Diagnostic Integration and Validation Assistant)

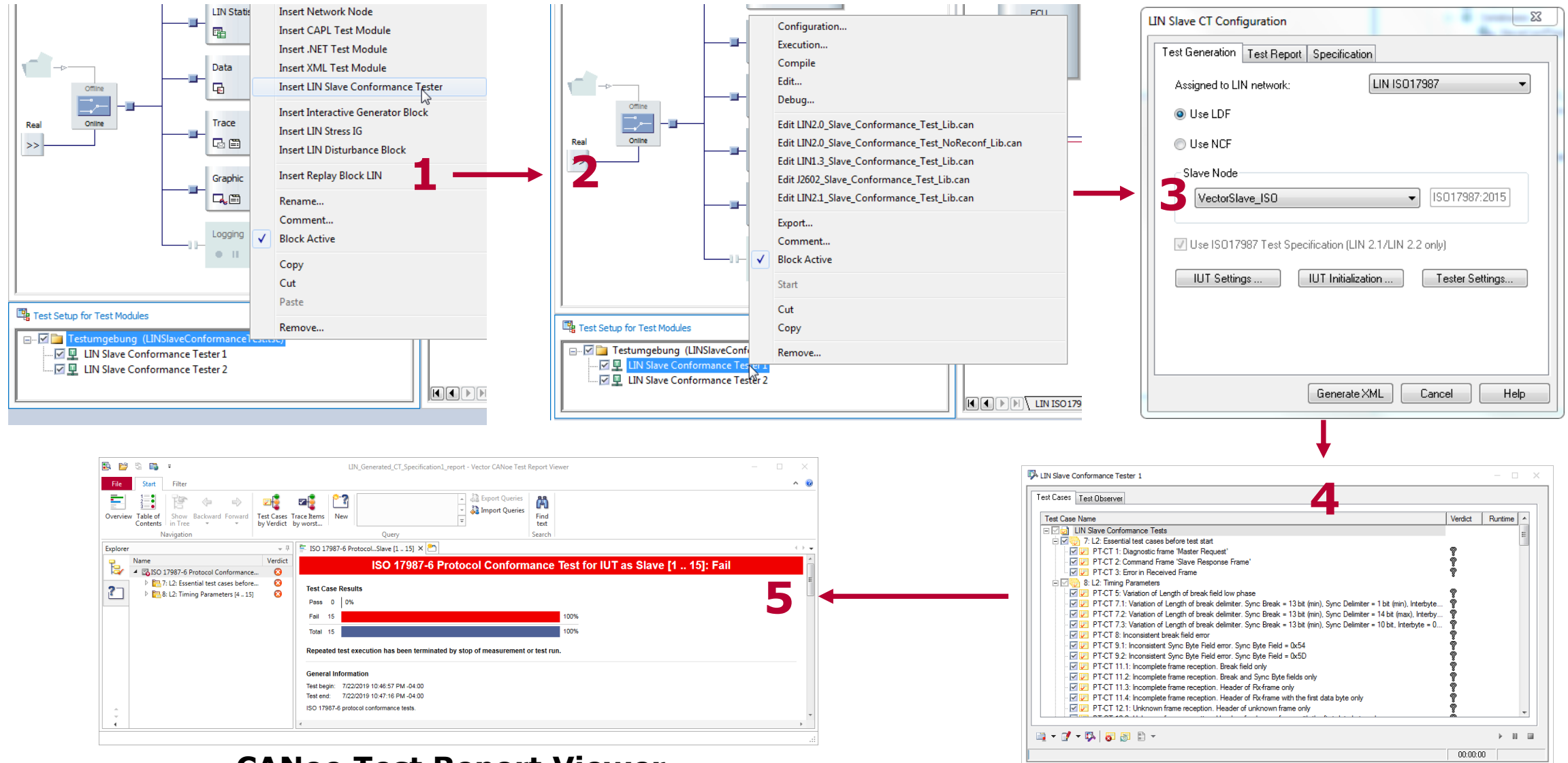
Application and hardware requirements

LIN Slave Conformance Tests

- ▶ Slave Conformance Test Module
 - ▶ Preconfigured XML test module can be added to the Test Setup
 - ▶ Automated conformance testing of any Slave in your Simulation Setup
 - ▶ Automatic configuration of conformance tests according to LDF (or optionally NCF)
 - ▶ Create a reference trace or logging by testing the simulated version of your Slave
 - ▶ Full support of the LIN1.3, LIN2.x and J2602 Slave conformance tests (Data Link Layer)
 - ▶ Optional hardware reset prior to each test case using VH1150 or VT System with a VT7001 (no extra configuration required)
 - ▶ All settings automatically saved with the configuration
 - ▶ Test cases can be repeated at any number of times
 - ▶ Detailed XML-report automatically translated to HTML



5 Steps to Insert a LIN Slave Conformance Tester



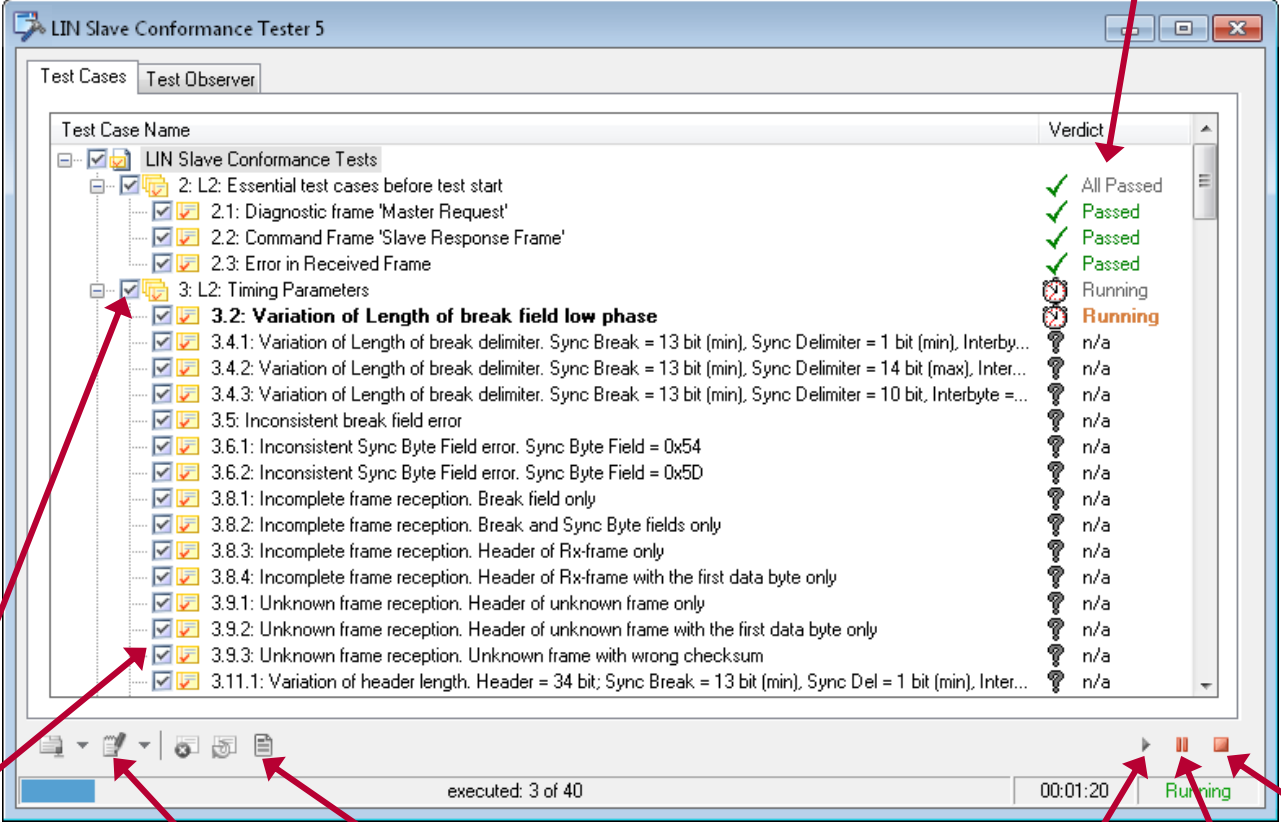
The diagram illustrates the five steps to insert a LIN Slave Conformance Tester into a CANoe project:

- Step 1:** In the 'Test Setup for Test Modules' window, right-click on the 'LIN Slave Conformance Tester' block and select 'Insert LIN Slave Conformance Tester' from the context menu.
- Step 2:** In the 'Configuration...' dialog, select the 'LIN Slave Conformance Tester' block and click 'Block Active'.
- Step 3:** In the 'LIN Slave CT Configuration' dialog, configure the test generation settings, including the assigned LIN network (LIN ISO17987), test generation method (Use LDF), and slave node (VectorSlave_ISO).
- Step 4:** In the 'LIN Slave Conformance Tester 1' window, click the 'Test Cases' tab to view the list of test cases.
- Step 5:** In the 'CANoe Test Report Viewer' window, view the test results for the 'ISO 17987-6 Protocol Conformance Test for IUT as Slave [1 .. 15]: Fail'.

CANoe Test Report Viewer

LIN Slave Conformance Test Module (Number 4 in previous slide)

Feedback during test sequence



The screenshot shows the 'LIN Slave Conformance Tester 5' window. It has two tabs: 'Test Cases' and 'Test Observer'. The 'Test Cases' tab is active, displaying a tree view of test cases. The 'Test Observer' tab shows the execution status of the selected test case. The test cases are listed in a table with columns for 'Test Case Name' and 'Verdict'. The verdicts are: 'All Passed', 'Passed', 'Passed', 'Passed', 'Running', 'Running', and then several 'n/a'.

Test Case Name	Verdict
LIN Slave Conformance Tests	All Passed
2: L2: Essential test cases before test start	Passed
2.1: Diagnostic frame 'Master Request'	Passed
2.2: Command Frame 'Slave Response Frame'	Passed
2.3: Error in Received Frame	Passed
3: L2: Timing Parameters	Running
3.2: Variation of Length of break field low phase	Running
3.4.1: Variation of Length of break delimiter. Sync Break = 13 bit (min), Sync Delimiter = 1 bit (min), Interbyte = ...	n/a
3.4.2: Variation of Length of break delimiter. Sync Break = 13 bit (min), Sync Delimiter = 14 bit (max), Interbyte = ...	n/a
3.4.3: Variation of Length of break delimiter. Sync Break = 13 bit (min), Sync Delimiter = 10 bit, Interbyte = ...	n/a
3.5: Inconsistent break field error	n/a
3.6.1: Inconsistent Sync Byte Field error. Sync Byte Field = 0x54	n/a
3.6.2: Inconsistent Sync Byte Field error. Sync Byte Field = 0x5D	n/a
3.8.1: Incomplete frame reception. Break field only	n/a
3.8.2: Incomplete frame reception. Break and Sync Byte fields only	n/a
3.8.3: Incomplete frame reception. Header of Rx-frame only	n/a
3.8.4: Incomplete frame reception. Header of Rx-frame with the first data byte only	n/a
3.9.1: Unknown frame reception. Header of unknown frame only	n/a
3.9.2: Unknown frame reception. Header of unknown frame with the first data byte only	n/a
3.9.3: Unknown frame reception. Unknown frame with wrong checksum	n/a
3.11.1: Variation of header length. Header = 34 bit; Sync Break = 13 bit (min), Sync Del = 1 bit (min), Inter...	n/a

Selection of test cases

Test specification

Test report

executed: 3 of 40

00:01:20

Running

Start / Pause / Stop

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Application and hardware requirements

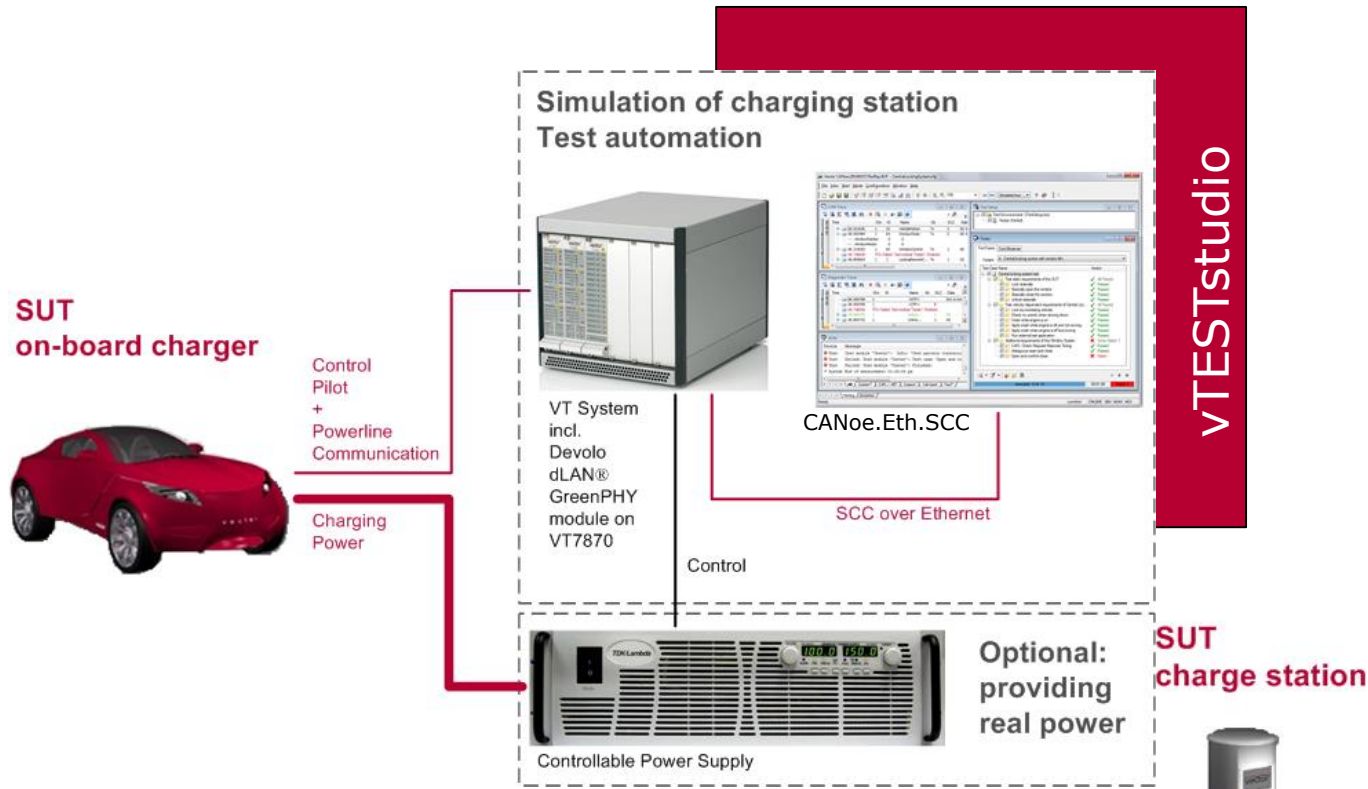
Features

- ▶ ISO15118 & DIN70121 (requires Option Ethernet)
 - ▶ Vehicle and charge point simulation
 - ▶ Analysis and monitoring
 - > Man-in-the-middle and Offline analysis of the smart charging communication
 - > Interpretation of the messages in the trace window
 - ▶ Support for SLAC and Vehicle2Grid protocols
 - ▶ Transport Layer Security (TLS) via Security Manager (only ISO 15118)
 - > TLS communication with automatic encryption and decryption
 - > Public Key Infrastructure (PKI) support and management of certificates

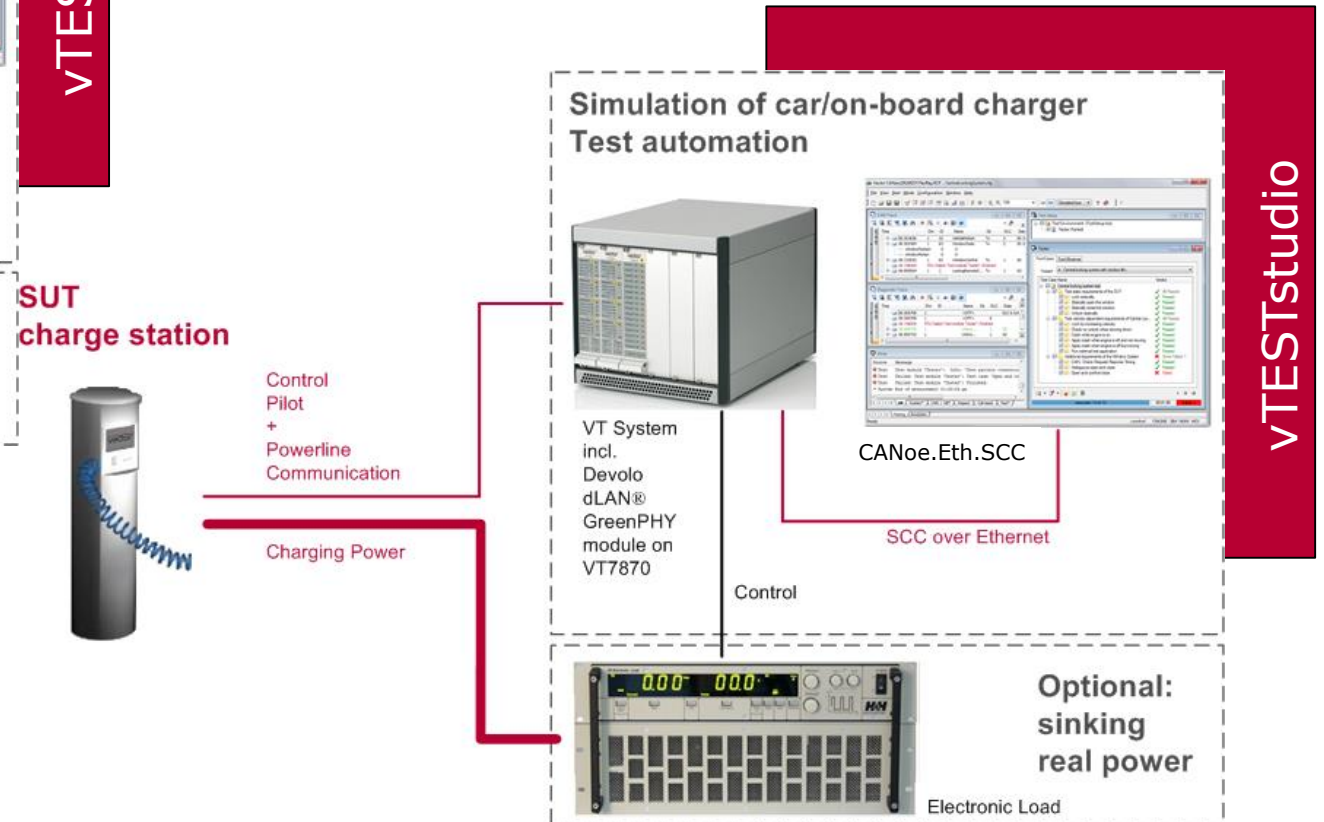
- ▶ GB/T 27930 (requires Option J1939)
 - ▶ Trace window analysis
 - > Clear and compact presentation of the message flow
 - > Interpretation of each individual GB/T 27930 message

- ▶ CHAdemo (requires Option CAN)
 - ▶ Currently no special support

SCC Testing configurations



EVSE Test Configuration



Smart Charging Communication Standards and Test Packages

Standard	Region	Connector	Standards
CCS (AC/DC)	US + EU	IEC 62196-2	IEC 61851 (PWM) ISO15118, DIN70121, SAE J2847 (Ethernet)
GB/T (DC)	China	GB/T 20234.3	GB/T 27930 (J1939)
CHAdeMO (DC)	Japan	CHAdeMO	CHAdeMo (CAN)

Standard	VT-Modules	Required CANoe Options	CANoe Test Packages*
CCS (AC/DC)	7900A 7870	Smart Charging Ethernet	CCS EV CCS EVSE (Next year)
GB/T (DC)	6104A/6204 2004A	Smart Charging J1939	GB/T EV (Next year) GB/T EVSE (Next year)
CHAdeMO (DC)	6104A/6204 2004A	Smart Charging (planned) CAN	CHAdeMO 2.0 EV (planned) CHAdeMO 2.0 EVSE (planned)

* vTESTstudio required

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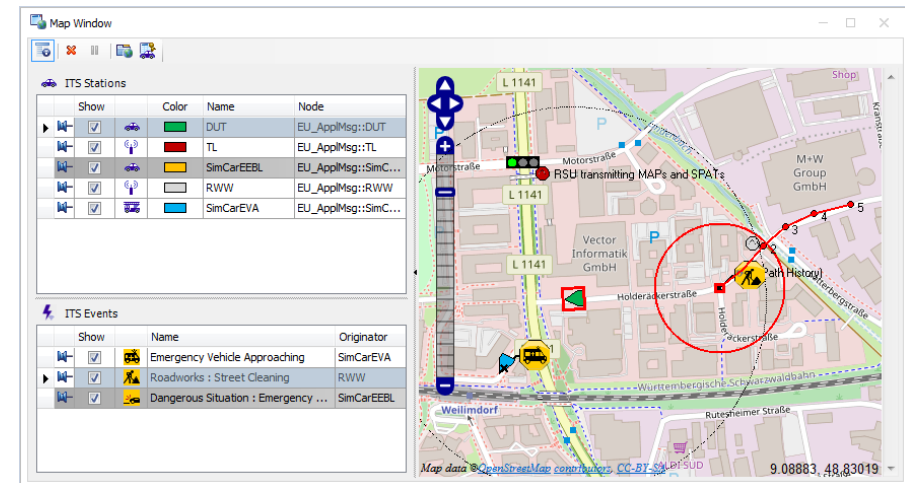
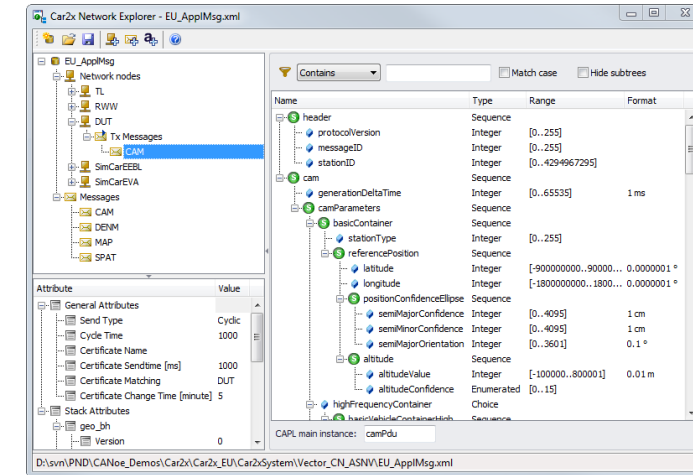
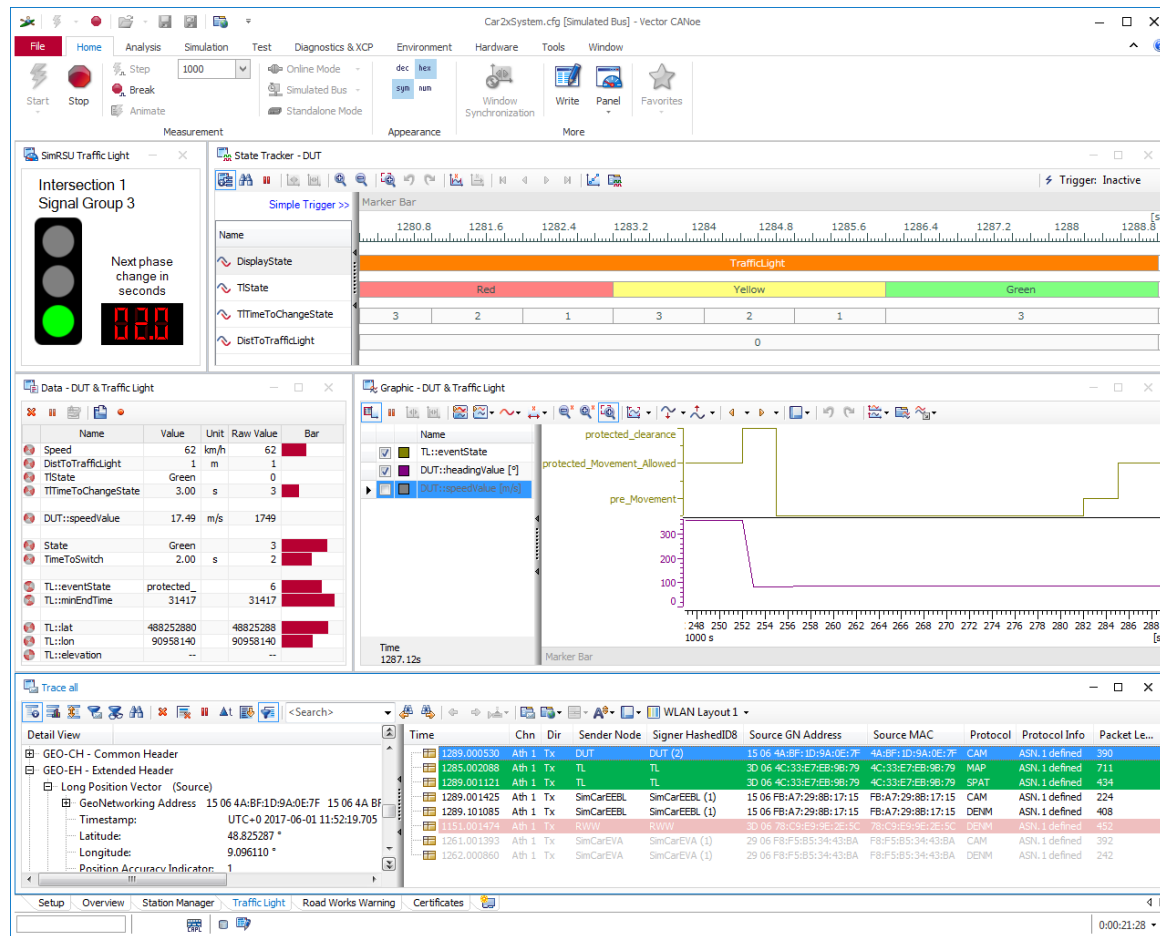
► **CANoe.Car2x (Scenario Simulation)**

CANoe.CANopen

CANoe.DiVa (Diagnostic Integration and Validation Assistant)

Application and hardware requirements

Analysis, Simulation and Test of V2X Communications



Simulation, analysis and test of C-V2X applications

- ▶ Quick and easy test case development with CANoe.Car2x scenario editor
 - ▶ Simulation of multiple vehicles and infrastructure elements (e.g. traffic light)
 - ▶ Generation of ITS frames following European or US standards (ETSI, WAVE/SAE)

- ▶ With Rohde & Schwarz Hardware



- ▶ CMW500 for LTE-PC5 communication
 - ▶ SMBV100A for GNSS simulation
- ▶ Testing of DUT applications
 - ▶ CAN, Automotive Ethernet traffic

CANoe.Car2x with with Rohde and Schwarz Test Equipment



R&S®CMW500

Multi-technology (LTE, WCDMA, GSM and CDMA2000®) protocol tester with a layer 1 to layer 3 stack implementation



R&S®SMBV100A

Fully fledged GNSS simulator with GPS, Glonass, Galileo, BeiDou and QZSS/SBAS

Up to 24 satellites

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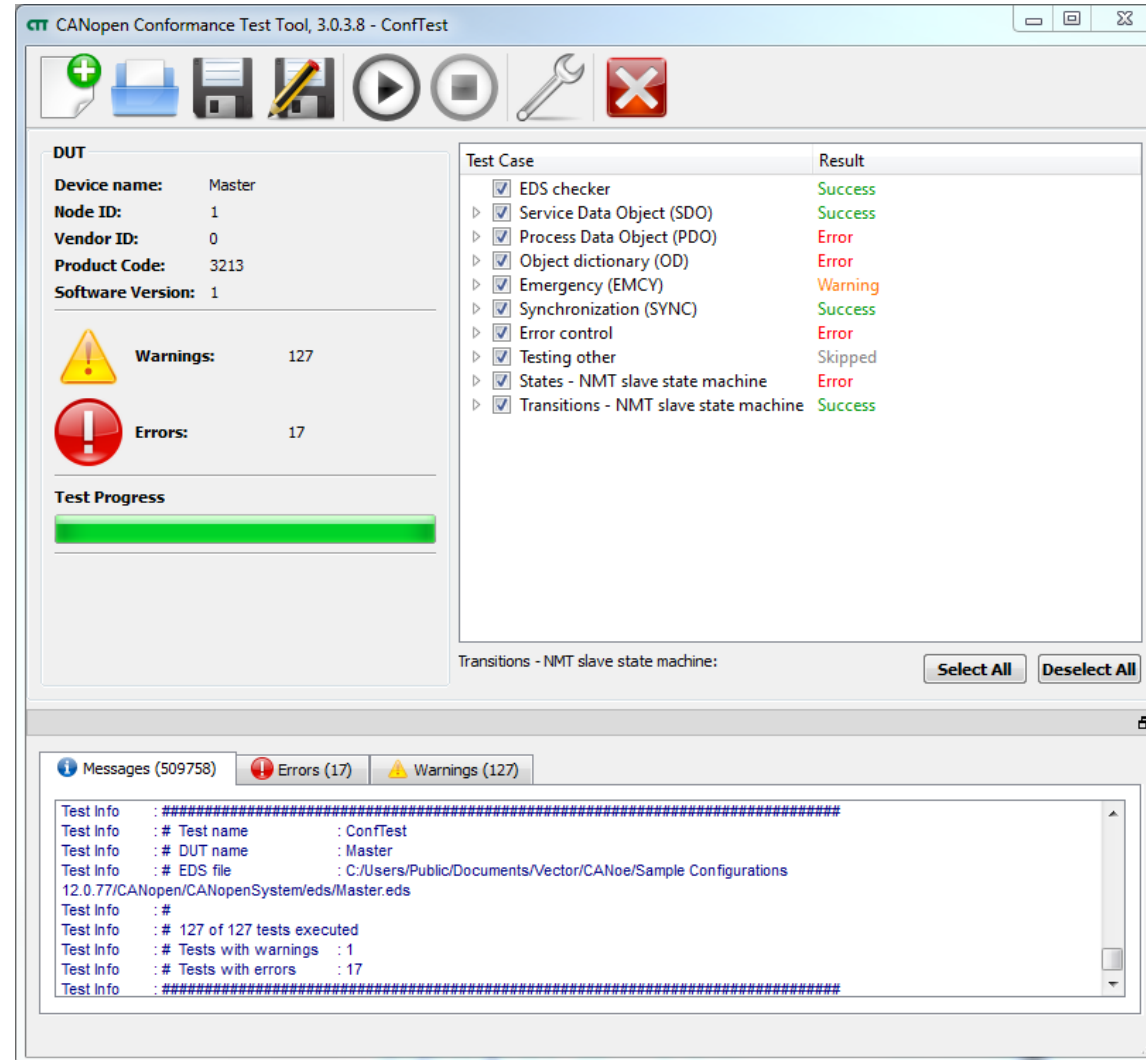
CANoe.Car2x (Scenario Simulation)

► **CANoe.CANopen**

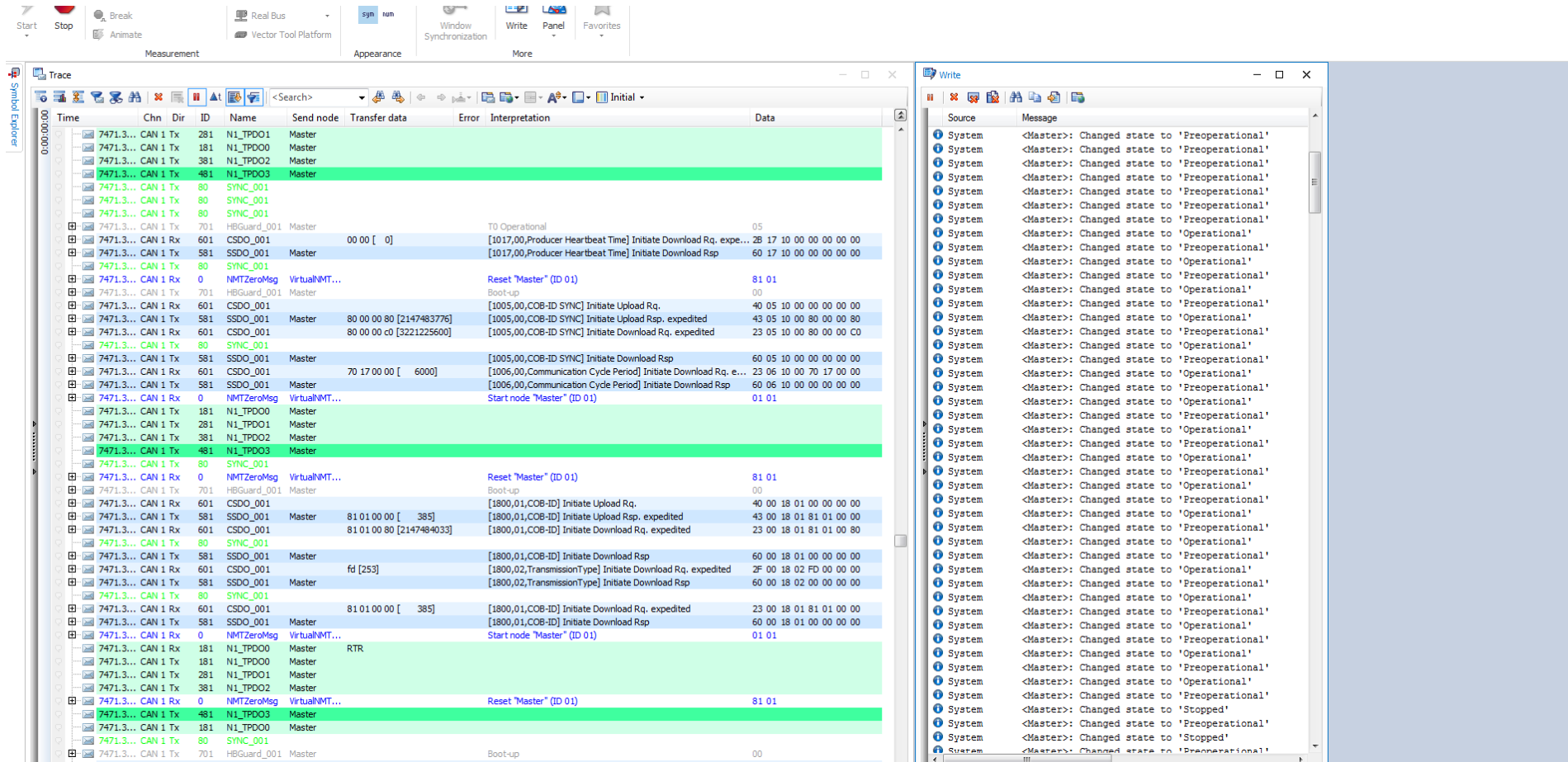
CANoe.DiVa (Diagnostic Integration and Validation Assistant)

Application and hardware requirements


CiA CANopen Conformance Test Tool



CANoe during Conformance Test



CiA Test Report



```
ConfTest_11-07-2019_0001.log
1 11.07.19 : 09:42:30.888 : Test Info : ### Prepare DUT for test #####
2 11.07.19 : 09:42:30.888 : Test Notice : Reset node (wait for 5000[ms])
3 11.07.19 : 09:42:30.888 : Test CAN : CAN1 000 Tx SD 2 81 01
4 11.07.19 : 09:42:30.891 : Test CAN : CAN1 701 Rx SD 1 00
5 11.07.19 : 09:42:30.891 : Test Notice : Bootup message received
6 11.07.19 : 09:42:30.891 : Test Notice : Restored default parameters via 1011h (wait for 500[ms])
7 11.07.19 : 09:42:30.891 : Test CAN : CAN1 601 Tx SD 8 23 11 10 01 6C 6F 61 64
8 11.07.19 : 09:42:30.894 : Test CAN : CAN1 581 Rx SD 8 60 11 10 01 00 00 00 00
9 11.07.19 : 09:42:30.894 : Test Notice : Reset node (wait for 5000[ms])
10 11.07.19 : 09:42:30.895 : Test CAN : CAN1 000 Tx SD 2 81 01
11 11.07.19 : 09:42:30.898 : Test CAN : CAN1 701 Rx SD 1 00
12 11.07.19 : 09:42:30.898 : Test Notice : Bootup message received
13 11.07.19 : 09:42:30.902 : Test Info : ### Test case : 1.0 - Test name : EDS checker #####
14 11.07.19 : 09:42:30.902 : Test Info : Check EDS file
15 11.07.19 : 09:42:30.908 : Test CAN : CAN1 7FF Tx SD 6 01 01 00 00 00 00
16 11.07.19 : 09:42:31.030 : Test CAN : CAN1 080 Rx SD 0
17 11.07.19 : 09:42:31.230 : Test CAN : CAN1 080 Rx SD 0
18 11.07.19 : 09:42:31.430 : Test CAN : CAN1 080 Rx SD 0
19 11.07.19 : 09:42:31.630 : Test CAN : CAN1 080 Rx SD 0
20 11.07.19 : 09:42:31.830 : Test CAN : CAN1 080 Rx SD 0
21 11.07.19 : 09:42:32.030 : Test CAN : CAN1 080 Rx SD 0
22 11.07.19 : 09:42:32.230 : Test CAN : CAN1 080 Rx SD 0
23 11.07.19 : 09:42:32.430 : Test CAN : CAN1 080 Rx SD 0
24 11.07.19 : 09:42:32.630 : Test CAN : CAN1 080 Rx SD 0
25 11.07.19 : 09:42:32.830 : Test CAN : CAN1 080 Rx SD 0
26 11.07.19 : 09:42:33.005 : Test Notice : CANchkEDS 2.4.15.0
27 11.07.19 : 09:42:33.005 : Test Notice : (c)2000-2008 Vector Informatik GmbH
28 11.07.19 : 09:42:33.005 : Test Notice : Open file C:\Users\Public\Documents\Vector\CANoe\Sample Configurations 12.0.77\CANopen\CANopenSystem\eds\Master.eds ...
29 11.07.19 : 09:42:33.005 : Test Notice : Checking ...
30 11.07.19 : 09:42:33.005 : Test Notice : Check is finished
31 11.07.19 : 09:42:33.005 : Test Notice : No errors or warnings detected
32 11.07.19 : 09:42:33.005 : Test Notice : CANchkEDS 2.4.15.0
33 11.07.19 : 09:42:33.005 : Test CAN : CAN1 7FF Tx SD 6 02 01 00 00 01 00
34 11.07.19 : 09:42:33.006 : Test Info : EDS checker: Passed
35 11.07.19 : 09:42:33.007 : Test Info : ### Test case : 2.1 - Test name : SDO 01 #####
36 11.07.19 : 09:42:33.007 : Test Info : Read 1000h:00h with expedited transfer.
37 11.07.19 : 09:42:33.009 : Test CAN : CAN1 7FF Tx SD 6 01 02 01 00 00 00
38 11.07.19 : 09:42:33.009 : Test Notice : SDO 01: Read object 1000h:00h
39 11.07.19 : 09:42:33.009 : Test CAN : CAN1 601 Tx SD 8 40 00 10 00 00 00 00 00
40 11.07.19 : 09:42:33.012 : Test CAN : CAN1 581 Rx SD 8 43 00 10 00 95 01 00 00
```

Agenda

CANoe, vTESTstudio, Network Interfaces and the VT System

CANoe.Ethernet (TC8)

CANoe.J1939 (J1939-82)

CANoe.LIN (LIN Slave)

CANoe.SCC (Smart Charging Communications)

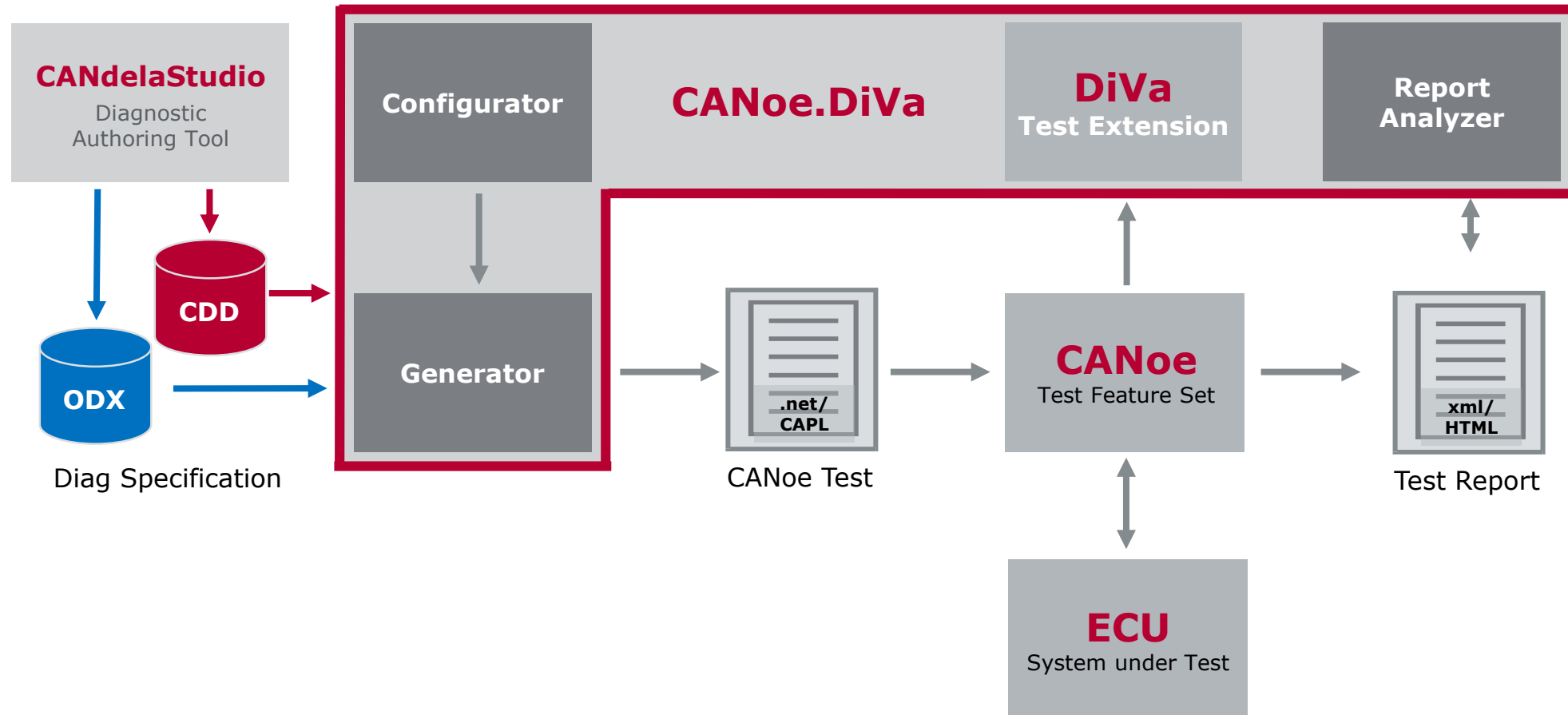
CANoe.Car2x (Scenario Simulation)

CANoe.CANopen

► **CANoe.DiVa (Diagnostic Integration and Validation Assistant)**

Application and hardware requirements

The Diagnostics Tool chain



Much more information at 2:15 this afternoon with PDG BDM, Vivek Jolly

Agenda

CANoe, vTESTstudio, Network Interfaces and the VT System

CANoe.Ethernet (TC8)

CANoe.J1939 (J1939-82)

CANoe.LIN (LIN Slave)

CANoe.SCC (Smart Charging Communications)

CANoe.Car2x (Scenario Simulation)

CANoe.CANopen

CANoe.DiVa (Diagnostic Integration and Validation Assistant)

► **Application and hardware requirements**

	Ethernet (TC8)	J1939	LIN	SCC	Car2x	CANopen	DiVa (Diagnostics)
CANoe	✓	✓	✓	✓	✓	✓	✓
.Ethernet	✓			✓			
.J1939		✓		✓ GB/T			
.LIN			✓				
.SCC				✓			
.Car2x					✓		
.CANopen						✓	
.DiVa							✓
vTESTstudio	✓	✓	✓	✓	✓	✓	✓
VT System			Optional or VH1150	✓			
VT7870 (+2)				✓			
R & S Test Equipment					✓		
Network Interface(s)	✓	✓	✓	✓	✓	✓	✓
SCC Test Package(s)				✓			
CiA Test Tool						✓	

✓ = required

✓ = recommended for additional test development

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