

SILVER

Brings code to life



Virtualisation of ECUs



Virtual ECUs

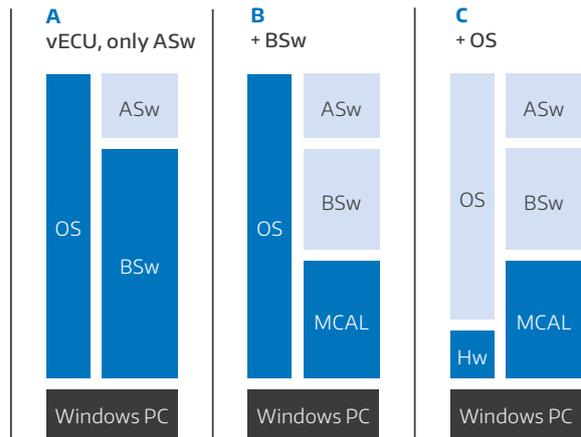
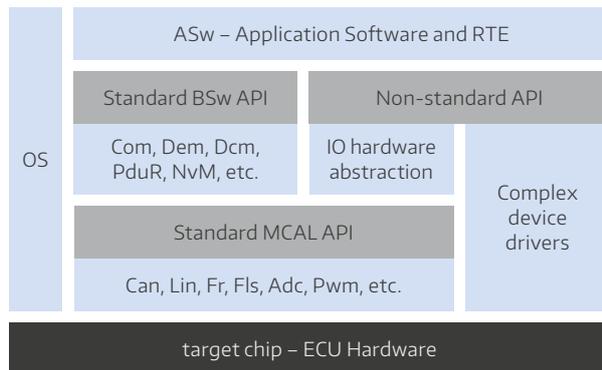
Silver is a tool for creating and running virtual ECUs. It moves development tasks from road and test rig to a Windows PC.

How much of the ECU software runs inside a vECU?

Depending on the use case and the availability of source code, different parts of the ECU software can be ported to a PC. The figures below show 3 typical virtualisations of an AUTOSAR ECU: (A) only the Application Software (ASw) is virtualised, (B) also parts of the

Basic Software (BSw) or (C) also the ECU's operating system (OS). Option (C) requires Silver's chip simulation feature. The ECU software that is not ported to the vECU (dark blue) is emulated by Silver.

ECU here: Autosar



Legend: ■ Original software ■ Emulated software ■ Interface ■ Hardware

Building vECUs with Silver

Silver supports two ways to build vECUs:

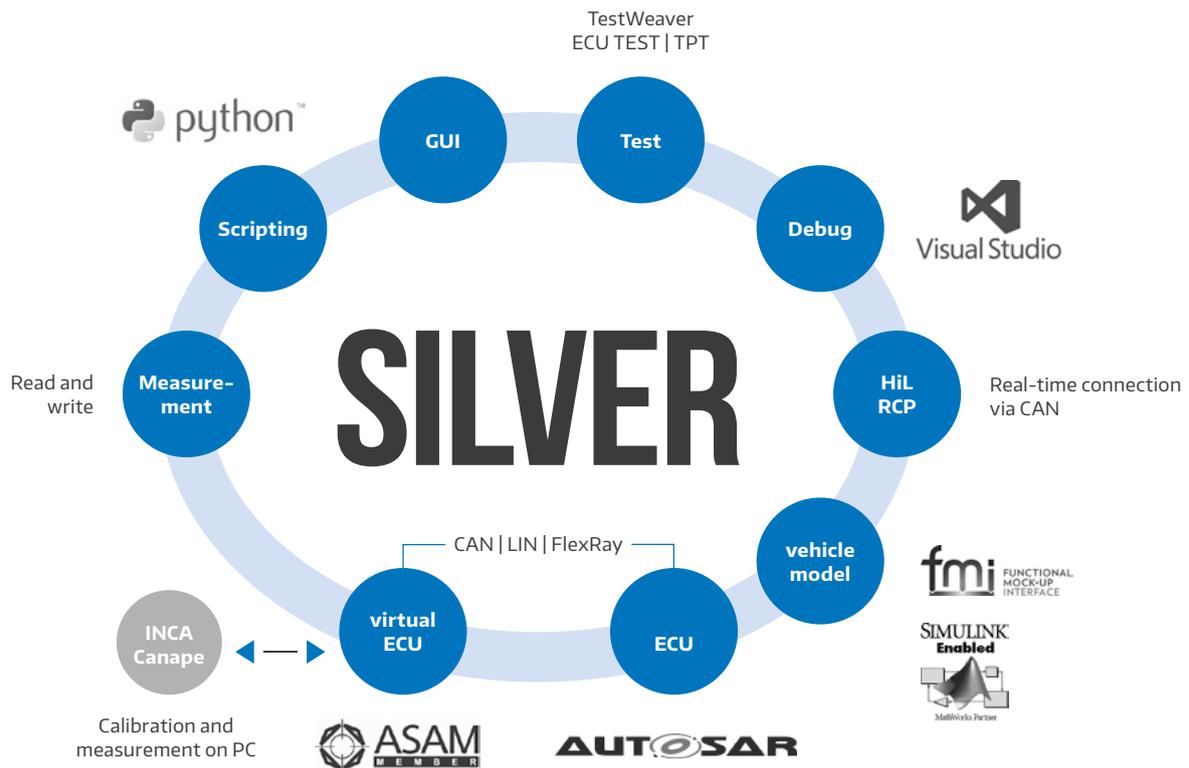
1. based on ECU source code – by compiling the C code for Windows PC;
2. based on ECU binary code (Hex file) – with Silver's chip simulation feature, supported for MCUs of the Tricore (Infineon) and PowerPC (NXP/Freescale and STM) families.

The build procedure is similar in both cases:

1. Write a configuration file that describes the desired vECU, for instance, tasks to run, inputs and outputs.
2. Let Silver build the vECU from the configuration file. The resulting vECU can be simulated with Silver, Simulink or with any FMU simulator.



Silver as execution platform for vECUs



One tool – many use cases

Besides a mature build process, Silver also provides a powerful execution and experimentation platform for virtual ECUs. Silver executes one or more networked vECUs on a single PC, in closed-loop with simulation models for engine, transmission and vehicle. Silver also offers a real-time mode for connecting to real hardware via CAN. Many other use cases are also supported: test automation, source level debugging, code coverage measurement, parameter studies, pre-calibration.

Since the first release in 2008, Silver has found hundreds of users worldwide. Leading OEMs and suppliers use Silver for developing, testing and tuning control software.

What is the effort to build a vECU?

We distinguish between the initial effort to set up an automated build process and the incremental effort for the repeated generation of vECUs during the product development. The initial setup effort can require days to weeks. The update of the vECU for a new software version can thereafter most often be done automatically within minutes or hours, for instance as part of "nightly builds".

Give it a try and virtualise your ECU with Silver, for instance in a kick-start project with QTronic.

QTronic Germany

Offices in Berlin, Stuttgart, Munich
QTronic GmbH
Alt-Moabit 92
D-10559 Berlin
Phone: +49 30 3512 1066
info@QTronic.de

Japan

Ubiquitous AI Corporation
Iijima Bldg.
2-25-2 Nishi Gotanda Shinagawa-ku,
Tokyo, 141-0031
Phone: +81 3 3493 7981
ueda@ubiquitous-ai.com

India

Gannet Engineering Pvt. Ltd.
28 Cowork Café, 2nd Floor
Kaikondrahalli, Off Sarjapur Rd
Bangalore 560035, Karnataka, India
Phone: +918197817272
sales@gannetsolutions.com

QTronic China

北京东城区南竹杆胡同6号楼9层
Beijing, DongCheng district
Nanzhugan hutong
Building 6, Floor 9
Phone: +86 13 520 520 719
lionel.belmon@qtronic.com

Republic of Korea

Inno-X
707, Jeljon Tower 1, 16, Neuti-ro,
Bundang-gu, Seongnam-si,
Gyeonggi-do, 13558 Korea
Phone: +82 31 711 3226
innox@inno-x.co.kr

Italy

Dofware s.r.l.
Corso Lombardia N° 75,
10099 San Mauro Torinese (TO), Italy
Phone: +39 011 223 7658
qtronic@dofware.com

Silver supports many automotive standards and can therefore easily be coupled with other tools, such as INCA, CANape, MATLAB/Simulink, CarMaker, GT-Power, axisuite, Dymola, SimulationX, AMESim and Simpack.

Our services: training and pilot projects, virtualisation of ECUs, virtual validation and test.

