vVIRTUALtarget
Developing and Testing Virtualized AUTOSAR Software

What is vVIRTUALtarget?

vVIRTUALtarget is a software for virtualizing individual software components and fully configured ECUs for all typical AUTOSAR projects. It supports function and software developers, software integrators and test engineers throughout the entire ECU development process. With vVIRTUALtarget, you develop and test functional software unchanged in combination with a behavioral model or with virtualized, complete AUTOSAR basic software. vVIRTUALtarget gives you a far-reaching insight into your software and enables you to perform detailed analyses by allowing you to influence the entire simulation environment in a range of different ways. Thanks to the extensive automation capabilities, you also benefit from the ability to perform continuous integration combined with fast, parallel testing capabilities.

Application Areas

- Testing of individual software components or their interaction with the help of abstracted communication already in early phases of development
- Virtual integration of the application code and the basic software into an overall system
- Accompanying testing during design and implementation of the functional software
- Testing and verification of software integration on a virtual basis
- Verification of tests using virtual ECUs for further use on real ECUs

Highlights of Version 6

- Supports all current standards from AUTOSAR Adaptive and AUTOSAR Classic up to and including R21-11
- Virtual ECUs can now be integrated into a test environment in three ways:
  - Classically directly in CANoe and in CANoe4SW Server Edition
  - As an independent process that is executed in parallel with CANoe
  - Via OpenSUT API in an individual runtime environment
- Even more clearly structured interfaces between test and System Under Test (SUT) through the supported CANoe Distributed Objects. Test scripts are thus even easier to understand and more intuitive to build.
- Generate Systems Under Test (SUT) for execution in Linux environments
- The new vVIRTUALtarget Server Edition is suitable for use in CI pipelines.

Overview of Advantages

- vVIRTUALtarget runs on all typical Windows PCs, whereas the generated SUTs are also executable in Linux environments
- Runs software in real time or independently
- Setup and test:
  - of individual software components with abstracted basic software
  - of the entire ECU software even without target hardware – from the application software to the AUTOSAR basic software to the hardware drivers

Typical user roles and software tools in a workflow with vVIRTUALtarget:

Even from a very early stage the “pro” and “basic” variants are used by software developers and integrators for virtual testing of functional software based on AUTOSAR. In the subsequent work steps, the virtual ECUs are integrated and used in test environments.
Stimulation and monitoring of ECU-internal variables
Modifying and simulation of configurations for real hardware
Always consistent configurations of real and virtual hardware
Easy coupling to other simulation and test tools

**Connectivity and Compatibility**

- **AUTOSAR 4**
- **AUTOSAR Adaptive**
- Supported networks: CAN, LIN, FlexRay and Ethernet
- Supported hardware interfaces: Digital I/O, ADC and PWM
- Coupling of vVIRTUALtarget to CANoe

**Use of Product Variants in Software Development**

You can start verifying your results with vVIRTUALtarget as early as the software component (SWC) design and development phases.

The vVIRTUALtarget pro variant allows you to automate the connection of one or more SWCs to a runtime environment via your AUTOSAR interfaces. In this case, vVIRTUALtarget pro emulates the typical behavior of the AUTOSAR basic software so that you do not need to worry about configuring basic services – as in the case of ECU configuration – or about the implementation of these services – as in the case of a unit test. On the one hand, the tool delivers an automatically generated proposal for the typical Management Layer services, while on the other, also allowing you to determine these yourself. Thanks to this flexible approach, you can concentrate fully on the task of test implementation itself, which means, simulating the inputs to your software and observing the reactions at the outputs.

The next step is to test the entire ECU configuration as visualized in vVIRTUALtarget basic or vVIRTUALtarget pro. This is done using an original target ECU configuration — again created using the designated tools from the Vector DaVinci product family — in order to obtain the greatest possible level of fidelity to detail. There is no need for any reconfiguration or new configuration work. The result is a binary file that you can use in your computer runtime environment, for example CANoe. In the same way as with physical ECUs, your test interfaces are network messages and I/Os.

The created virtual ECUs can be used in the cluster as well as with physical ECUs in order to test the entire system.

**vVIRTUALtarget Server Edition**

The new vVIRTUALtarget Server Edition is made for use in CI environments. This includes not only the Docker-enabled application VttMake, but also attractive licensing models for agile development teams.

**AUTOSAR Classic and AUTOSAR Adaptive**

vVIRTUALtarget supports you in creating virtual Systems Under Test (SUTs) for both AUTOSAR Classic as well as for AUTOSAR Adaptive:

- AUTOSAR Classic is the standard that has been established for many years for use in primarily signal-based applications. vVIRTUALtarget supports you from the early stages of development and testing of software components through to the integration of complete ECUs, including the AUTOSAR basic software (ECUs).
- AUTOSAR Adaptive, on the other hand, focuses on the service-oriented architecture that will be increasingly used in future projects. vVIRTUALtarget pro allows you to conveniently develop your AUTOSAR Adaptive application on your familiar Windows operating system and test it with CANoe.

Both architectures complement each other and are used depending on the use case.

**More information:** [www.vector.com/vVIRTUALtarget](http://www.vector.com/vVIRTUALtarget)