

# Embedded Services

Product Information

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## 1 Technical Consulting, Product- and Engineering Services by Vector

For over 20 years, Vector has been creating software components as well as professional tools, and has been successfully supporting customers worldwide in developing ECU software and networking ECUs. Our experts bring success to your project with individually tailored technical consulting and product services.

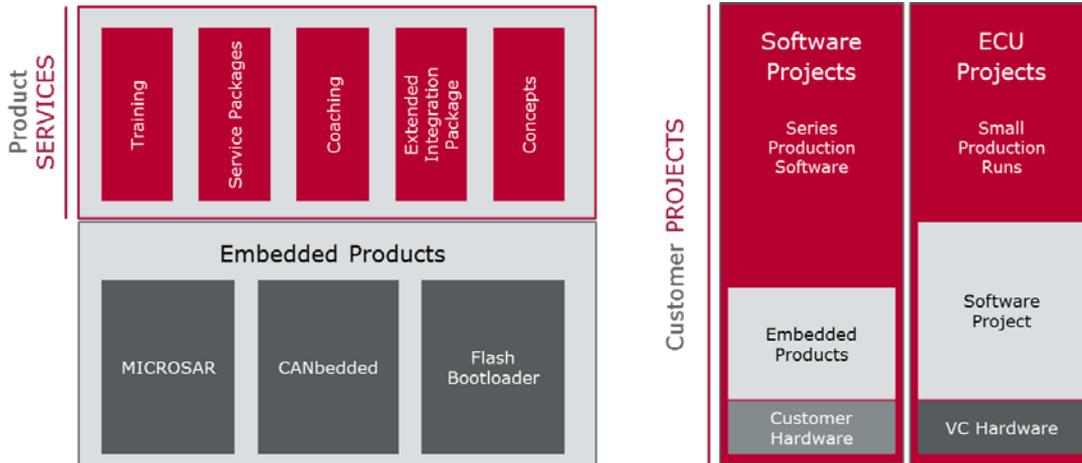


Figure 1: Product services and customer projects at Vector

With our product services, we support you in every phase of your ECU development. Starting with our extensive experience and your project goals, we jointly carry out a customized action package for you, from which you realize sustained benefits from our competence.

- > **Product-Services:** Our engineers support your development team through every phase of your project and offer you professional support with training, review, installation and coaching, either in our training premises or at your business site.
- > **Integration-Services:** start-up of the basic software on your ECU with the goal to achieve a successful first OEM bench integration. Prior to the delivery to the customer, our integration team carries out widespread tasks, exemplarily such as
  - > "Customer Hardware" for MICROSAR and CANbedded: Putting the ECU into an operationally ready state, configuration of the network transceiver and execution of tests on real customer hardware.
  - > "Start Application" for MICROSAR 4: Incorporation of real project-specific communication descriptions, execution of a fundamental wakeup and shutdown, configuration of the OS, execution of a diagnostic service (request/response), configuration of a NVRAM block, creation of a periodic watchdog trigger.
- > **Technical consulting:** Here, our expert team provides you with technical consulting or individual concept development. Our technical consulting, for example in the framework of joint workshops, helps you in tasks such as these:
  - > Introducing a new multi-core operating system
  - > Optimizing an existing software architecture
  - > Porting your application software to a multi-processor ECU
  - > Layout of safety-related "mixed ASIL" systems
  - > Migration of ECUs to AUTOSAR
  - > Introduction of Ethernet

## 2 Overview of Advantages

The services we offer include professional consultation which reduces the operational workload of your developers by having Vector assume responsibility for entire work packets:

- > **Competence:** Benefit from our solid background of many years of professional experience
- > **Precision:** Our engineers understand your project and perform "made-to-order" work

- > Tempo: Professional assistance without a long customer learning period
- > Knowledge transfer: Sustained build-up of know-how for your employees

### 3 Application Areas

Based on our embedded standard software (CANbedded or MICROSAR), we can provide the following support for the development of your ECU software:

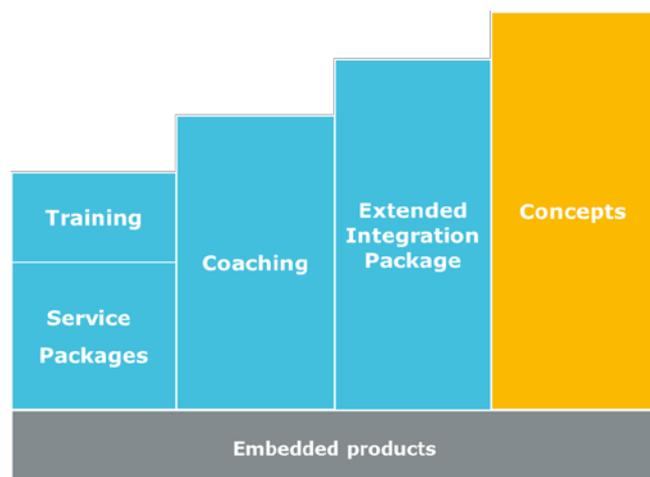


Figure 2: Services for the development of ECU software

#### 3.1 AUTOSAR Training

Vector AUTOSAR training courses provide you with an ideal entry into ECU development with AUTOSAR. Intensive exercises ensure its relevance to practice. For the list of available Vector in-house training courses on the Internet, please visit our website: [www.vector.com/AUTOSAR-Training](http://www.vector.com/AUTOSAR-Training), for example our trainings for AUTOSAR basics, usage of AUTOSAR 3 and 4 in practice, OEM related trainings and special topics such as Safety, NV memory and Multi-core .

#### 3.2 CANbedded Training

In the Vector CANbedded training you will get an introduction to the characteristics and interaction of the CANbedded software components. The training also includes the specific peculiarities for the different OEMs. For the list of available Vector in-house training courses on the Internet, please visit our website [http://vector.com/vi\\_class\\_canbedded\\_en.html](http://vector.com/vi_class_canbedded_en.html) .

#### 3.3 Flash Bootloader Training

The training on the Vector flash bootloader illustrates the important aspects of flash programming in the vehicle. Based on selected examples you learn the basics and functionalities of the flash bootloader. You get to know how to integrate the bootloader into an existing application in practice. For details on the training schedule, please visit [http://vector.com/vi\\_class\\_flash\\_bootloader\\_en.html](http://vector.com/vi_class_flash_bootloader_en.html).

#### 3.4 Installation and Support with the MICROSAR "Getting Started Package"

Here, we work together with you to start up the MICROSAR basic software (BSW) and the RTE on your ECU hardware using the related configuration tools and a sample application. This quickly gives you a runnable system, letting you afterwards focus on your application. This support is typically performed at your business site and is done at a fixed price. The main targets of this package are:

- > Communication works on all busses
- > Diagnostics responds on a basic service request
- > Non-volatile memory is accessible.

Afterwards, our hotline support is available to you by telephone or email, which ensures continuous support in case you have questions about how to use our products.

### 3.5 Installation and Support with the MICROSAR "V2G Getting Started Package"

Within the scope of this fix price service package, we will take the MICROSAR.V2G software into operation on your ECU hardware using the related configuration tools and a sample application. This quickly gives you a runnable system, letting you afterwards focus on your application. The project setup is completely performed at Vector site, while the handover workshop can either take place at your business site, at Vector site or by Webex.

The main targets of this package are:

- > The PHY chip is able to download firmware from host controller
- > A link can be established after SLAC has completed
- > V2G communication completes a full session

A detailed offer attachment will describe the prerequisites that have to be fulfilled prior to the start of this service package, in order to ensure successful completion in time.

Afterwards, our hotline support is available to you by telephone or email, which ensures continuous support in case you have further questions about how to use our products.

### 3.6 Review of your Configuration with the MICROSAR "Verification Package"

You have been using our AUTOSAR Embedded Software for a longer period of time, and you are approaching an important project milestone. Based on prepared checklists, we conduct an integration and configuration review related to the concrete usage of the MICROSAR stack. In this process, we evaluate the completeness, correctness and consistency of the selected settings and the required integration code. In particular, specific aspects of the OEM are considered, such as parameters, configuration settings, as well as provided software components.

### 3.7 Coaching

In Coaching, we accompany your ECU development during practice phase. We focus on addressing your individual needs and support you e.g. in:

- > Initializing the hardware, including CPU Clock and PLL
- > Integrating the software components in the project structure
- > Individual configuration of the operating system
- > Starting and stopping the bus communication depending on the network state
- > Providing the necessary I/O signal interfaces, including signal processing via the RTE
- > ECU and mode management in power up and shut down
- > Integration of diagnostics, error memory and memory management in your ECU software
- > Linking of the applications to watchdog management
- > Integration of further standard software from the OEM

The Premium Support, which is included in any coaching agreement, contains on-site support in addition to the telephone and email Hotline. Based on the specific objectives that were agreed on, we ensure individual support of your project.

### 3.8 AUTOSAR Consulting

In the framework of AUTOSAR consulting, together with you we can work out individual, technical solutions to various questions related to AUTOSAR:

- > Definition of an AUTOSAR-conformant software architecture
- > Optimal use of the AUTOSAR tool chain: DaVinci Developer, Configurator Pro and GENy
- > Migration of existing software to the AUTOSAR architecture
- > Conceptualization of gateway functions
- > Structuring of MATLAB/Simulink models to be linked as software components via the RTE
- > Interfacing external peripheral components

- > Hardware-dependent Sleep and Wakeup concepts under consideration of individual quiescent current requirements
- > Consideration of aspects related to Functional Safety according to ISO 26262

We are performing these consulting activities as customized workshops. This ensures that the worked-out solutions optimally fit into your ECU project.

### **3.9 Extended Integration Package (EIP)**

The Extended Integration Package is a pre-defined (standardized) project work for the integration of the OEM-specific standard software on your ECU. It offers an efficient start for your project and allows an early and successful execution of bench tests with the OEM. For details on the content of this service package, please refer to the separate Product Information "MICROSAR" at [www.vector.com/pi\\_microsar\\_en](http://www.vector.com/pi_microsar_en).



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