The Customer
A successful European heavy-duty vehicle producer that is playing a leading role in the introduction of AUTOSAR. Its mature E/E processes enable efficient development of AUTOSAR-based ECUs.

The Challenge
To develop a reference system with multiple networked ECUs based on a specified development process. The system must support CAN, J1939 and LIN based on the Vector AUTOSAR basic software MICROSAAR.

The reference system should support key parts of the OEM AUTOSAR functional content and the following tasks:
- Validate correct implementation of the specifications and of the OEM’s predefined development process
- Verify system behavior
- Execute performance measurements
- Validate new software revisions
- Reproduce error states

The Solution
The system environment consists of four exemplary ECUs, the CANoe test software and the VT System test hardware with various slide-in modules.

Four typical ECU classes were defined, and each was represented by an ECU. This produced a meaningful and well-structured mapping of the later overall system.

To represent the system functions, several demo applications were implemented. They are controlled by CANoe via a newly developed CAN-based remote protocol. CANoe uses this protocol to stimulate a function or a special system state and to check the response. All diagnostic requests run as in the real vehicle over a diagnostic tester of the OEM, which is controlled remotely by CANoe.

Examples of implemented AUTOSAR functions:
- Wakeup & sleep handling
- Different transmission modes, update bits, routings
- Diagnostic services, security level and DTC handling
- J1939 dynamic DLC and BAM
- Diagnostic session control and software download
- Parameter handling (“Power lost safe”)

The Advantages
Compact reference system for ECU and system development with AUTOSAR
- “Sandbox” to develop functional extensions of the AUTOSAR basic software or the application
- Simple benchmarking of different system states
- Clearly organized user interface for manually stimulating system states
- Easy to extend the reference system with real ECUs
- Minimal effort for executing regression tests after functional changes or updates to the AUTOSAR basic software
- Good expandability based on modular structured hardware and software
- Validated and optimized development process

Case Study
Development of a reference system for AUTOSAR ECUs and system studies