

# MICROSAR Ethernet (with hands-on)

## Agenda VectorAcademy

<b>Duration:</b>	14 hours Online (7 sessions of 2 hours each)
<b>Target Group:</b>	ECU Developers
<b>Prerequisites:</b>	Participation in the Training Program "AUTOSAR 4 in Practice" or a good AUTOSAR knowledge.
<b>Goal:</b>	Obtain an overview on the usage of Ethernet in an AUTOSAR based ECU. Acquire practical skills to configure a MICROSAR.ETH stack

### 1 | Overview and Introduction 0.5 h

- > Motivation for Ethernet in vehicles
- > Difference to traditional vehicle networks
- > Protocols and History of Ethernet in AUTOSAR
- > Vector's MICROSAR solutionDetail 2

### 2 | Basics of Ethernet andTCP/IP 2.0 h

- > PHY: MDI/MII, most commonly used PHY layers and ECU Hardware setup
- > MAC/VLAN Data Link Layer addressing and Switches
- > Internet Protocol IPv4/IPv6 Network Layer addressing and routers
- > ARP, NDP, ICMP
- > Transport Protocols (UDP, TCP), Transport Layer addressing
- > Dynamic Host Configuration Protocol (DHCP)Detail 2

### 3 | Ethernet in the AUTOSAR Software Architecture 1.0 h

- > Socket based communication using TCP/IP vs. PDU and Signal based communication in traditional vehicle networks
- > Approach in AUTOSAR (SOAD + PDU Container)
- > AUTOSAR Software Architecture
- > Network Management
- > MICROSAR configuration elements and principles

### 4 | Overview of Automotive Protocols and use cases 0.5 h

- > Requirements emerging from modern E/E architecture and distributed system approach
- > Summary of protocols SOME/IP(-SD), DoIP, TSN, AVB, XCP

### 5 | Diagnostics Over IP (DoIP) 2.0 h

- > AUTOSAR Software Architecture with DoIP
- > The DoIP Protocol
- > DoIP use cases DoIP Node vs. DoIP Gateway
- > Illustration of configuration principle in SOAD, DoIP and PDUR

# MICROSAR Ethernet (with hands-on)

## Agenda VectorAcademy

### 6 | SOME/IP and Service Discovery (SD)

2.0 h

- > Service Oriented communication with SOME/IP, SD and SOAD
- > Control Flow (SD) and Data Flow (SOME/IP)
- > Illustration of configuration principle in SOAD, SD, LDCOM

### 7 | Universal Calibration Protocol (XCP)

0.5 h

- > Integration into the ETH stack
- > Illustration of configuration principle in SOAD, XCP

### 8 | Time-Sensitive Networking (TSN) and AVB use case

1.5 h

- > Demarcation of TSN vs AVB
- > Time Synchronization Cluster in AUTOSAR
  - > TSYN
  - > STBM
- > Time Synchronization on CAN, FR, ETH
- > Synchronization message sequences on CAN, FR, ETH
- > Time Stamping and Time Bases on CAN, FR, ETH
- > Service Module STBM
- > AVB

### 9 | Exercise: Diagnostics over IP (DoIP)

2.0 h

- > Setup of an embedded Software DoIP use case
  - > DCM

### 10 | Exercise: SOME/IP – Service Discovery (SD)

2.0 h

- > Setup of an embedded Software SOME/IP-SD use case
  - > Service Discovery
  - > Events
  - > Remote Procedure Calls using Methods