

Ethernet and IP Fundamentals – Communication Layers

Agenda VectorAcademy

Duration:	7 hours (3 to 4 sessions of 2hrs each) online.
Target Group:	Ethernet and IP users in vehicles
Prerequisites:	Basic understanding of serial data transmission
Goal:	Knowledge about Ethernet, IP, TCP and UDP in vehicles.

1 | Introduction

0.5 h

- > Motivation for Ethernet and IP in vehicles
- > Protocols and their application areas

2 | Physical Layers

1.5 h

- > Physical network architectures and topologies
- > Automotive Ethernet: IEEE 100Base-T1 and IEEE 1000Base-T1
- > Traditional office Ethernet: IEEE 100Base-TX and IEEE 1000Base-T

3 | Ethernet basics

1.5 h

- > Introduction to the Ethernet protocol
- > Local Area Network (LAN) and Virtual Local Area Network (VLAN)
- > Basic MAC Frame and Tagged MAC Frame
- > Addressing via MAC addresses and VLAN tag
- > Switch as networking device

4 | IP basics

2,0 h

- > Introduction to IPv4 and IPv6
- > IP addresses and subnet masks
- > IP packet and IP fragmentation
- > DHCP, ICMP, ARP, NDP and AutoIP

5 | TCP and UDP basics

1.5 h

- > Introduction to TCP and UDP
- > Connection-oriented and connectionless communication
- > Addressing via ports
- > TCP segment and UDP packet
- > TCP and UDP sockets