STAR COOPERATION®

Your Partners in Excellence

SOME/IP & Ethernet

FlexTraining

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DAY 1

ETHERNET

A basic understanding of Ethernet is necessary to recognize and avoid pitfalls when dealing with Ethernet. The OSI layer model consists of seven layers, each with well-defined tasks and clear interfaces to the next layer. This model ensures that, ideally, individual layers may be exchanged.

Ethernet is used in vehicles for various functions such as diagnosis, measurement, calibration, flashing of ECU's and communication between electric vehicles and charging stations. Ethernet is now rapidly being used as a bus system in vehicle-communication to implement other functions, such as Advance Driver Assistance Systems (ADAS) for automated and autonomous driving and infotainment systems. Development engineers in the automotive industry are dealing much more with this breakthrough technology in their day-to-day work.

Vehicle manufacturers are posing with a broad range of daunting challenges e.g efficient data path, introduction to service-oriented communication, security aspects and global time.

What is there to know when dealing with automotive Ethernet bus systems? What practical issues may arise? And what possible solution strategies are available?

DAY 2

SOME/IP

SOME/IP is an automotive scalable service-oriented middleware solution over IP. It was designed aiming at meeting the automotive requirements for particular functionalities at different operating systems. SOME/IP compatibility with both AUTOSAR platforms since the beginning of the adaptive platform makes it unique among other communication platforms.
SOME/IP paves the way for features of the infotainment domain, Advance Driver Assistance Systems (ADAS), camera and etc. This allows SOME/IP to be predominantly replaced with many classic communication scenarios. SOME/IP supports a broad range of middleware features:

- Serialization
- Remote Procedure Call (RPC)
- Service discovery
- Publish/Subscribe
- SOME/IP TP – transport protocol for segmenting large messages

As a result, SOME/IP is not only constrained to a description of communication, rather it is very widespread as middleware for Ethernet communication in vehicles that has a considerable impact on the software components of an ECU.

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FlexTraining Ethernet Day 1

ETHERNET TRAINING SUPPORTS YOU BOTH WITH THEORETICAL & PRACTICAL PART

- **Overview to the layer by layer of the OSI Model**

- **Physical layer**
  - Various physical layer types (100BASE-TX/100BASE-T1/1000BASE-T1)
  - Coupling devices (Hubs/Switch/Media Gateway/TAP)
  - Automotive topologies (STAR/Extended STAR)
  - Transmission media (Cabling unshielded twisted pair UTP/ shielded twisted pair STP)
  - Measuring Ethernet bus traffic
  - Ethernet frame

- **Data link layer**
  - Ethernet frame format
  - MAC addressing
  - MAC addressing types
  - Virtual LAN addressing (VLAN)
  - Frame bit/byte stuffing
  - ARP (Address Resolution Protocol)

- **Network Layer**
  - IP addressing (IPv4/IPv6)
  - IP addressing types
  - IPv4 packet format
  - IPv6 packet format
  - ICMP – Internet Control Message Protocol
  - IGMP - Internet Group Management Protocol
  - Fragmentation
  - NDP – Neighbour Discovery Protocol

- **Transport layer**
  - Addressing and ports
  - Multiplexing and demultiplexing
  - User Datagram Protocol (UDP)
  - Transmission Control Protocol (TCP)
  - TCP handshake
  - TCP flow control

AGENDA

09:00 – 09:15 Introduction to OSI model
09:15 – 09:45 Physical layer
09:45 – 10:00 Practical part I
10:00 – 10:30 Break
10:30 – 11:15 Data link layer
11:15 – 11:30 Practical part II
11:30 – 13:00 Lunch break
13:00 – 14:00 Network layer
14:00 – 14:15 Practical part III
14:15 – 14:45 Break
14:45 – 15:30 Transport layer
15:30 – 15:45 Practical part IV
15:45 – 16:00 Results/Summary/open questions

FlexTraining SOME/IP Day 2

SOME/IP TRAINING SUPPORTS YOU BOTH WITH THEORETICAL & PRACTICAL PART

- **Service Oriented Architecture (SOA)**
- **Middleware features**
- **Service-oriented communication vs. signal-based communication**
- **SOME/IP integration**
- **Client/Server model**
- **SOME/IP service discovery message**
  - Message header
  - Message entries
  - Message options
- **SOME/IP service discovery timings**
- **SOME/IP events/fields/methods**
- **SOME/IP serialization/deserialization**
- **SOME/IP message container**
- **SOME/IP TP - Transport Protocol**
- **Securing SOME/IP via SecOC (Secure Onboard Communicaiton)**

AGENDA

09:00 - 09:15 Recap to Ethernet day 1
09:15 - 09:45 Introduction to SOME/IP
09:45 - 10:00 Practical part I
10:00 - 10:30 Break
10:30 - 11:15 SOME/IP service discovery
11:15 - 11:30 Practical part II
11:30 - 13:00 Lunch break
13:00 - 14:00 SOME/IP protocol
14:00 - 14:15 Practical part III
14:15 - 14:45 Break
14:45 - 15:00 Securing SOME/IP
15:00 - 15:15 Practical part IV
15:15 - 15:45 SOME/IP troubleshooting/analysis
15:45 - 16:00 Results/summary/open questions

ORDER INFORMATION

Product	Description	Order number
FlexTraining SOME/IP & ETH (@ STAR)	2 day on SOME/IP and Ethernet **at STAR ELECTRONICS location**	3-00200O01
FlexTraining SOME/IP & ETH (@ Customer)	2 day training on SOME/IP and Ethernet **at customers location**	3-00200Q01
FlexTraining SOME/IP & ETH (Online)	2 day training on SOME/IP and Ethernet **online**	3-00200S01

FACTS/CONDITIONS

	At STAR	AT CUSTOMER location	ONLINE
Min. participants	3	6	1
Max. participants	20	20	20
Appointment	by arrangement	by arrangement	by arrangement
Incl. Lunch and drinks	•	-	-
Language	english	english	english
Language documents	english	english	english
Documentation	digital	digital	digital
Certificate	•	•	•
Location	Star Goeppingen	in Germany only	online
Praxis parts	•	•	•

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