

# Ethernet & Switching

4 days - 28 hours

## OBJECTIVES

- The course explains the IEEE802.3 specification, and especially the evolution between Ethernet 10Mbps, 100Mbps, 1000Mbps and 10 Gbps
- An architectural view of an Ethernet network is provided, highlighting the differences between repeaters, switches and routers
- The MAC layer is studied through various Freescale implementation examples
- The course explains how the spanning tree algorithm works
- Quality of Service through the VLAN tag is explained
- The course details the operation of the PHY-to-MAC bus

## RELATED TRAININGS

## PREREQUISITES

- This training is adapted for electronics and computer engineer facing of the implementation of an Ethernet technology

## PARTNERS



## CHAPTERS

### INTRODUCTION TO ETHERNET

- Overview
- The OSI model
- Topology, equipments : hub, switch and router

### THE PHYSICAL LAYER

- 10 Mbps, 100Mbps, 1000Mbps and 10Gbps
- 10BaseT, 100BaseTX, 1000BaseT, etc...
- GPSI, MII, GMII, XGMII and TBI buses

- The station management
  - Cable type and category
  - Hub
  - Collision, CSMA/CD, jamming, Backoff
  - Auto-negotiation
  - 4b/5B and 8b/10b encoding
  - Elastic buffer, scrambling, MLT3, 4D-PAM5, Viterbi algorithm
  - Power Over Ethernet
- ### THE LINK LAYER
- The Ethernet frame
  - Ethernet Addressing

- Unicast, Multicast and Broadcast
- Freescale addressing example
- CAM memory
- The MAC sub-layer
- Burst and Jumbo frame
- Buffer management by Freescale FCC
- Transmit and receive errors detected by the MAC layers
- Data coherency when buffers are shared by PowerPC and SDMA
- The switch
- Spanning Tree Protocol (STP)
- Multiple Registration Protocol (MRP)
- Link aggregation
- Virtual Link (VLAN)
  - Frame tagging
  - Quality of Service
- Flow Control

#### THE NETWORK LAYER

- The Router / Gateway
- Internet Protocol

- IP addressing
- ICMP / IGMP
- ARP / RARP

#### THE TRANSPORT LAYER

- UDP
- TCP

#### APPLICATION LAYER INTRODUCTION

- Simple Network Management Protocol
  - RMON registers
  - MIB organization
- DNS
- DHCP
- FTP
- TELNET

#### DOS INSTRUCTIONS

- Ping, Tracert, Route, Ipconfig, Arp, Netstat

#### REAL-TIME ETHERNET SOLUTIONS

- Powerlink
- IEEE 1588
- AFDX

## NOTES

- Training course material will be given to attendees during training in print.

## CONTACT

Administratif : +33 (0)6 30 94 50 17  
Formateur : +33 (0)6 74 52 37 89  
info@mvd-training.com