ETHERNET & SWITCHING

Ref : 003367A **Duration : 4 days**

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

PREREQUISITES

- Experience of a digital bus is mandatory

RELATED COURSES

- IEEE1588 (004701A)

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Course also available customized

Next sessions, see : *http://www.mvd-fpga.com/en/formationsCalend.html*

TOPICS

INTRODUCTION TO ETHERNET

- Protocol layers
- Topology, equipments : hub, switch and router
- Collisions, backoff algorithm
- Full duplex Ethernet
- Flow control mechanisms

MAC LAYER

- Frame format
- Addressing : nodecast, multicast, broadcast
- Buffer management by Freescale FCC
- Transmit and receive errors detected by the MAC layers
- Data coherency when buffers are shared by PowerPC and SDMAs

10 Mbps NETWORKS

- Differential mode transmission
- Interface to the PHY, AUI and GPSI
- Repeater
- System considerations

100 Mbps NETWORKS

- Media Independent Interface (MII)
- 100Base-X physical sublayers PCS and PMA
- 4b/5b coding
- Far-end fault
- Scrambling
- 100Base-TX, MLT-3 modulation
- Auto-negotiation

1000 Mbps NETWORKS

- Medium types
- Gigabit Media Independent Interface (GMII)
- MAC implementation examples

1000BASE-X

- PCS layer, codage 8b/10b
- PMA layer
- Auto-negotiation, utilization of specific control symbols

SWITCH OPERATION – 802.1D

- Switch architecture
- Filtering services
- Quality of service
- Rapid Spanning Tree Protocol (RSTP)
- Management protocol

SWITCH OPERATION – 802.1Q

- Multiple Spanning Tree Protocol (MSTP)
- Frame tagging
- Quality of Service

INTRODUCTION TO TCP/IP

- The TCP/IP protocol stack
- IP [Internet Protocol]
- ARP [Address Resolution Protocol]
- RARP [Reverse Address Resolution Protocol]
- ICMP [Internet Control Message Protocol]
- Transport layer overview
- UDP [User Datagram Protocol]
- TCP [Transport Control Protocol]
- DOS/UNIX TCP/IP commands

MANAGEMENT LAYER

- RMON registers
- MIB organization
- Simple Network Management Protocol

POWER OVER ETHERNET

- Objectives
- Operation
- Protocol

LINK AGGREGATION

IEEE1588 INTRODUCTION

DOCUMENTATION

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