

Carrier Ethernet Networks

Course No. 1106B

Duration: 2 Days

Course Overview:

The course starts with analysis of the reasons why Metro Ethernet is attractive for Telcos / Service Providers. Then the impeding factors are also reviewed. Basic Ethernet, including shared media and switched/bridged networks are briefly covered. Later we focus on Bridging. Various techniques for Virtual LAN implementation are also reviewed. The MEF work and the IETF work on Pseudo-Wire is described and analyzed. Deep study of Metro Ethernet approach and standards as well as various IEEE standards are studied. With these topics we present solutions to the remaining impeding issues that were described earlier, which brings us to the summary that includes the migration path towards multiservice packet networks and new applications such as Mobile backhaul.

Who should attend?

The seminar is built for Technical, Marketing and Business Development individuals from Telecom Service Providers as well as Manufacturers of Ethernet or Metro Ethernet equipment.

Prerequisites:

Basic knowledge of data communications is expected from the participants.

Lecturer: Leon Bruckman

Leon is a senior lecturer at Logtel. Simultaneously Leon is a VP in IPLight. He has over 30 years of experience as an R&D manager and System Engineer in the telecommunications field. Prior to joining IPLight Leon was the CTO of Corrigent Systems, worked for Tadiran Telecommunications where his last position was of Director R&D for the Access division, and for HyNEX where he managed the R&D and the System Engineering groups. Leon is an expert in defining and developing Data and Voice transport systems and has vast experience in Hardware and Software development processes. Leon holds a BSc cum laude from the Technion Institute in Haifa and an MBA cum laude from the Bar-Ilan University in Ramat-Gan. He also holds over 30 patents in the telecom area and participated in various standard bodies.

Course Content:

1. General Introduction

- The evolution of transport: towards a packet universe
- The advent of IP and Ethernet

2. Ethernet basics

- Ethernet protocol, IEEE 802.3
- Addressing
- Bridging/Switching, learning bridges
- IP over Ethernet architecture
- Virtual LANs (VLANs)
- Rapid Spanning Tree Protocol
- Multiple Spanning Tree Protocol
- What is missing to become a WAN protocol?
 - Scalability issues
 - Traffic engineering mechanisms
 - Topologies
 - Protection and restoration
 - Quality of Service (QoS)
 - Legacy services transport
 - Operation and Management (O&M)

3. Metro Ethernet Forum Architecture and Services

- Framework
 - Layer network model
 - Reference points: UNI, NNI
 - MEN components
- Service definition
 - EPL, EVPL
 - EP-LAN, EVP-LAN
 - EP-Tree, EVP-Tree
- Service attributes
- Protection
- Circuit emulation
- Services examples

4. Improving Ethernet standards

- Provider Bridges (802.1.ad)
- Provider Backbone Bridges (802.1.ah)
- PBB frame parsing
- Link Aggregation
- Linear protection
- Ethernet Rings

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5. Ethernet transport

- PBB-TE
 - Forwarding plane
 - Multiservice over PBB-TE
 - Management plane
- Synchronous Ethernet
- IEEE 1588

6. Traffic Management and QoS

- QoS models
 - The need for traffic management
 - Per flow QoS
 - Aggregate CoS
- Flow aware networking
- Congestion Management
- Traffic Engineering

7. OAM

- IEEE 802.1 ag
- IEEE 802.3 ah

8. MPLS-TP

- MPLS-TP versus MPLS
- Control plane
- MPLS-TP versus PBB-TE

9. The IETF architectures

- PWE3
 - Reference model
 - Ethernet over PW
 - HDLC over PW
 - SAToP, CESoPSN, TDMoIP, CEP
- MPLS based level 2 VPNs:
 - VPWS
 - VPLS and VSI
- Multiservices over PWs
 - Convergence over MPLS
 - Practical example

10. Migration process

- Converging networks
- Ethernet over OTN
- Interworking
- Ethernet based advanced application
 - Triple play
 - IPTV
 - Mobile backhaul

11. Conclusion